Santa Clara Valley Water District

CONFORMED COPY

File No.: 18-0966

Agenda Date: 12/12/2018
Item No.: 2.3.

BOARD AGENDA MEMORANDUM

SUBJECT:
Authorization to Execute the State Water Project Contract Extension Amendment and Resolution Making Responsible Agency Findings.

RECOMMENDATION:

A. Consider the Final Environmental Impact Report for the Water Supply Contract Extension Project prepared by the California Department of Water Resources as the Lead Agency;
B. Adopt a Resolution MAKING RESPONSIBLE AGENCY FINDINGS PURSUANT TO THE CALIFORNIA ENVIRONMENTAL QUALITY ACT TO USE THE DEPARTMENT OF WATER RESOURCES' FINAL ENVIRONMENTAL IMPACT REPORT FOR THE WATER SUPPLY CONTRACT EXTENSION PROJECT TO AUTHORIZE EXECUTION OF THE CONTRACT AMENDMENT BETWEEN DEPARTMENT OF WATER RESOURCES AND THE SANTA CLARA VALLEY WATER DISTRICT; and
C. Authorize the Chief Executive Officer to execute Amendment No. 24 to Water Supply Contract Between the State of California Department of Water Resources and Santa Clara Valley Water District for Continued Service and the Terms and Conditions Thereof (Extension Amendment).

SUMMARY:

The Department of Water Resources (DWR) and the Public Water Agencies receiving water service from the State Water Project (SWP) have finalized Amendment No. 24 to Water Supply Contract Between the State of California Department of Water Resources and Santa Clara Valley Water District for Continued Service and the Terms and Conditions Thereof (Extension Amendment) provided in Attachment 3. The Extension Amendment will extend the SWP contracts from 2035 to 2085 and provide for cost-effective financial management.

On August 26, 2014, the Board of Directors approved and authorized the Chief Executive Officer (CEO) to sign the Agreement in Principle Concerning Extension of the State Water Project Water Supply Contracts (AIP) (Attachment 4). The AIP described the terms of agreement between the Public Water Agencies and the Department of Water Resources (DWR) and was used to develop contract language for the Extension Amendment. The Extension Amendment, once executed, will extend the term of the District's SWP contract through 2085, maintain affordability of the SWP supply, and improve the fiscal health of the SWP.

ADOPTED
DEC 12 2018

The Extension Amendment does not address cost allocation or other issues related to the California WaterFix (WaterFix) and is needed regardless of whether WaterFix moves forward or not.

As the California Environmental Quality Act (CEQA) lead agency, DWR certified a Final Environmental Impact Report (FEIR) for the Water Supply Contract Extension Project (Project) on November 13, 2018 (Attachment 1). The FEIR concludes that the Project would not result in any physical environmental impacts because it would amend and add financial provisions to the contracts and would not create new water management measures, alter existing authority to build or modify existing facilities, or change water allocation provisions of the contracts. District staff has determined that DWR's FEIR is adequate for the District's use to approve the amendment between DWR and the District. In addition, because the FEIR did not disclose any significant impacts, the District would not be required to make any written findings regarding any impacts.

Background

On November 20, 1961, the Water Supply Contract Between the State of California Department of Water Resources and Santa Clara Valley Water District (Water Supply Contract) was executed to provide up to 100,000 acre-feet annually from the SWP. Deliveries began through the South Bay Aqueduct in 1965. Since that time, the Water Supply Contract has been amended 23 times; however, the original 75-year term, which ends in 2035, has never been extended.

To begin the contract extension process, formal public negotiations between DWR and the 29 water contractors were initiated in May 2013, culminating in June 2014 with the AIP. The AIP provided the framework from which contract language was developed, which is now reflected in the Extension Amendment. The District Board approved the AIP on August 26, 2014.

The Extension Amendment is being pursued in advance of 2035 primarily to alleviate a compaction in SWP costs resulting from the repayment provisions in the contract that currently require that all capital debt be repaid by 2035. Absent the Extension Amendment, SWP contractors are obligated to pay down the debt in the time window ending in 2035. Extending the term would maintain the affordability of SWP supplies both for existing project obligations and for needed future capital investment. It would also allow DWR to issue new debt for terms extending past 2035. The Extension Amendment extends the existing contract term by 50 years to December 31, 2085.

The Extension Amendment includes modifications and terms aimed at improving the fiscal health of the SWP and increasing SWP contractor participation in its financial management. Key elements include:

1. The simplification of DWR's billing methodology and the implementation of a modernized Pay-as-You-Go system for capital costs and certain operations and maintenance costs that were formerly amortized.
2. The creation of a Finance Committee that will provide a forum for SWP contractors to participate in the development of financial policy for the SWP and all of the State Water Resources Development System. (The Draft Final Charter Agreement related to this is included as Attachment 5.)
3. The implementation of a financial structure that creates a revenue stream to allow for continual

reinvestment in the SWP and to fund non-reimbursable costs, and to improve reporting requirements to insure prudent financial management of the SWP.

California Water Code Section 147.5 requires that an informational public hearing be held 60 days prior the SWP contracts being extended. On September 11, 2018, the Joint Legislative Budget Committee held this hearing, satisfying the requirements of the water code.

Relation of the Extension Amendment to a Subsequent Amendment for the WaterFix

The Extension Amendment does not address cost allocation or other issues related to the WaterFix and is necessary regardless of whether WaterFix proceeds or not. The Extension Amendment is necessary to affordably finance significant repair projects that maintain the operational reliability of the State's largest water conveyance system. Some of these costly projects include the Oroville Dam spillway repair, the repair of subsidence damage to the California Aqueduct, and many other repairs throughout the system, including the South Bay Aqueduct, which is the primary conveyance for delivering SWP water to Santa Clara County.

DWR and the Public Water Agencies are developing the WaterFix amendments separately from the Extension Amendment. The WaterFix amendments will require a separate CEQA process before they would be ready for adoption by DWR and the Public Water Agencies that contract with DWR for SWP water supplies.

FINANCIAL IMPACT:

Execution of Amendment No. 24 will obligate the District to its share of SWP costs through 2085. These costs will be recovered through DWR's annual Statement of Charges in the same manner in which current costs are recovered. During the past five years, the District's SWP costs have averaged approximately $25 million per year.

If the Extension Amendment is not executed, the impacts of the compression in capital charges will not be alleviated, and the District will see a significant increase in its Statement of Charges. The Extension Amendment will allow DWR to issue traditional 30-year bonds, rather than the current process of recovering additional capital costs over a much shorter timeframe.

CEQA:

As described above, DWR certified its FEIR for the Project on November 13, 2018. The District, as a CEQA responsible agency, must consider the environmental impacts of the Project as analyzed in the FEIR prior to reaching its own conclusions on whether and how to approve the Project. District staff has determined that DWR's FEIR is adequate for District's use to approve the amendment between DWR and the District. Because the FEIR did not disclose any significant impacts from the Project, the District would not be required to make any written findings regarding any impacts. Attachment 2 is a resolution for the Board's adoption to make the finding that DWR's FEIR is adequate for the District's use to approve the Project.

ATTACHMENTS:
Attachment 1: Final Environmental Impact Report
Attachment 2: Board CEQA Resolution
Attachment 3: Extension Amendment
Attachment 4: Agreement in Principle
Attachment 5: Draft Final Charter Agreement
Attachment 6: PowerPoint

UNCLASSIFIED MANAGER:
Garth Hall, 408-630-2750

Certification of Final EIR
Water Supply Contract Extension Project

After reviewing and considering the Final Environmental Impact Report (FEIR) for the Water Supply Contract Extension Project under the California Environmental Quality Act (CEQA), I have determined that the FEIR has met the requirements of Section 15090, subd. (a), of the CEQA Guidelines. That section reads as follows:

Section 15090 of the CEQA Guidelines states: (a) "Prior to approving a project, the lead agency shall certify that:

(1) the final EIR has been completed in compliance with CEQA,
(2) the final EIR was presented to the decision-making body of the lead agency and that the decision-making body reviewed and considered the information contained in the final EIR prior to approving the project; and
(3) the final EIR reflects the lead agency's independent judgment and analysis."

I therefore certify that the FEIR has been completed in compliance with CEQA, that the FEIR was presented to me in my capacity as the Department of Water Resources' (DWR) decision-making body, and that the FEIR reflects DWR's independent judgment and analysis. Although I am certifying the FEIR today, I have not determined whether to approve the proposed project and will determine whether to approve the proposed project at a later date.

Dated 11-13-18

Karla A. Nemeth, Director

WATER SUPPLY CONTRACT EXTENSION PROJECT

FINAL ENVIRONMENTAL IMPACT REPORT

State of California
Natural Resources Agency
Department of Water Resources

November 2018

State of California
The Resources Agency
Department of Water Resources

WATER SUPPLY CONTRACT EXTENSION PROJECT
FINAL ENVIRONMENTAL IMPACT REPORT

NOVEMBER 2018

EDMUND G. BROWN Jr
Governor
State of California

JOHN LAIRD
Secretary for Resources
The Resources Agency

KARLA NEMETH
Director
Department of Water Resources

WATER SUPPLY CONTRACT EXTENSION PROJECT

Final Environmental Impact Report

Prepared for
State of California
Natural Resources Agency
Department of Water Resources

November 2018

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ACRONYMS AND ABBREVIATIONS

af	acre-feet
AIP	Agreement in Principle Concerning Extension of the State Water Project Water Supply Contracts
Banks Pumping Plant	Harvey O. Banks Delta Pumping Plant
BiOp	Biological Opinion
BDCP	Bay Delta Conservation Plan
CDFW	California Department of Fish and Wildlife
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
Contractors	State Water Contractors
Contracts	Water Supply Contracts
CVP	Reclamation’s Central Valley Project
DCR	The State Water Project’s Delivery Capability Report
DEIR	Draft Environmental Impact Report
Delta	Sacramento-San Joaquin Delta
DWR	California Department of Water Resources
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FEIR	Final Environmental Impact Report
FERC	Federal Energy Regulatory Commission
GHG	greenhouse gas
JPOD	Joint Point of Diversion
MAF	Million Acre-Feet
NBA AIP	North Bay Aqueduct Alternate Intake Project
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOA	Notice of Availability
NOC	Notice of Completion
NOD	Notice of Determination
NOP	Notice of Preparation
OCAP	Operations Criteria and Plan
proposed project	Water Supply Contract Extension Project
PWAs	Public Water Agencies
Reclamation	United States Bureau of Reclamation
RPA	Reasonable and Prudent Alternative
SCH	State Clearinghouse
SGMA	Sustainable Groundwater Management Act
State Water Board	State Water Resources Control Board

SWP	State Water Project
SWRDS	State Water Resources Development System
taf	thousand acre-feet
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service

1. Introduction

1 INTRODUCTION

1.1 INTRODUCTION

The Department of Water Resources (DWR) circulated the Water Supply Contract Extension Project (proposed project) Draft Environmental Impact Report (DEIR) for public and agency comment from August 17, 2016 to October 17, 2016. During the comment period, DWR held a public hearing in Sacramento. At the end of the circulation period for the DEIR, a total of 12 written comment letters and e-mails were received. There were no comments made at the public hearing.

This document is the Final EIR (FEIR) for the proposed project and it contains written responses to all comments received by DWR from agencies and the public on the DEIR. Because multiple comments were received that addressed a number of key issues, DWR prepared comprehensive responses addressing these issues (master responses). Each master response provides background regarding the specific issue, how the issue was addressed in the DEIR, and additional clarification and explanation as appropriate to address the comments. In addition, individual responses to comments received were prepared. The responses to comments clarify and amplify text in the DEIR and do not change the findings or conclusions of the DEIR. This FEIR also includes a list of commenters, and comment letters received.

This FEIR has been prepared in accordance with the California Environmental Quality Act (CEQA) and together with the DEIR (and appendices) constitutes the EIR for the proposed project.

1.2 SUMMARY OF PROPOSED PROJECT AND PROJECT OBJECTIVES

The proposed project includes amending certain provisions of the State Water Resources Development System (SWRDS) Water Supply Contracts (Contracts). SWRDS (defined in Water Code Section 12931), or more commonly referred to as the State Water Project (SWP), was established in the Burns-Porter Act, passed by the Legislature in 1959 and approved by the voters in 1960. DWR constructed and currently operates and maintains the SWP, a system of storage and conveyance facilities that provide water to 29 State Water Contractors (Contractors also known as Public Water Agencies or PWAs).

In May 2013, DWR and the Contractors entered into public negotiations to extend the term and make other financial improvements to the Contracts. The outcome of these negotiations resulted in the “Agreement in Principle Concerning Extension of the State Water Project Water Supply Contracts” (AIP). The proposed project, would amend certain financial provisions of the Contracts and extend the term of the Contracts to 2085 based on the AIP. The proposed project would not create new water management measures, alter the existing authority to build new or modify existing facilities, or change water allocation provisions of the Contracts.

DWR and the Contractors agreed to the following proposed project objectives:

1. Ensure DWR can finance SWP expenditures beyond 2035 for a sufficiently extended period to provide for a reliable stream of revenue from the Contractors and to facilitate ongoing financial planning for the SWP.
2. Maintain an appropriate level of reserves and funds to meet ongoing financial SWP needs and purposes.
3. Simplify the SWP billing process.
4. Increase coordination between DWR and the Contractors regarding SWP financial matters.

The changes to the SWP contracts by the proposed project are composed of the following five project elements that meet the proposed project objectives identified above.

1. **Extended Contract Term**. Revise Article 2 to extend the term of the 29 Contracts to December 31, 2085 (subject to the provisions of Article 4).[1]
2. **Increased Operating Reserves**. Provide for increased SWP financial operating reserves.
3. **New Billing Provisions**. Implement a comprehensive pay-as-you-go repayment methodology with a corresponding billing system that more closely matches the timing of future SWP revenues to future expenditures. The pay-as-you-go repayment methodology generally means to recover capital, operation, and maintenance costs within the year incurred and/or expended.
4. **Enhanced Funding Mechanisms and New Accounts**. Provide enhanced funding mechanisms and create additional accounts to address SWP financial needs and purposes.
5. **Enhanced Coordination Regarding SWP Finances**. Provide for a finance committee and provide other means to increase coordination between DWR and the Contractors regarding SWP financial matters.

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[1] Article 4 provides each Contractor an option for continued service after the date determined in accordance with Article 2. Article 2 is described in footnote 2 on page ES-2 and Article 4 is described in footnote 1 on page ES-1.

1.3 ORGANIZATION OF THE FEIR

The FEIR is organized as follows:

Chapter 1 – Introduction: This chapter summarizes the proposed project, describes the content and format of the FEIR, summarizes the public participation and review process and describes the CEQA certification and project approval process.

Chapter 2 – Responses to Comments: This chapter includes a list of the comment letters received followed by the comment letters and responses to the comments contained in each letter. The responses to comments are numbered consistent with the comment number for each letter. For example, the response to the first comment in Comment Letter 1 is Response to Comment 1-1. This chapter also includes the master responses prepared in response to comments received. Each master response is numbered and that number is referenced in a response that incorporates the master response.

Exhibit A – Proposed Contract Extension Amendment

Exhibit B – Comment letters received on the DEIR with attachments.

1.4 PUBLIC PARTICIPATION AND ENVIRONMENTAL REVIEW PROCESS

DWR notified all responsible and trustee agencies and interested groups, organizations, and individuals that the DEIR on the proposed project was available for review. The following list of actions took place during the preparation, distribution, and review of the DEIR:

- A Notice of Preparation (NOP) and Notice of Completion (NOC) were filed with the State Clearinghouse (State Clearinghouse Number (SCH #) 2014092036) on September 12, 2014 for public review ending on October 13, 2014.
- The NOP and information on the two scoping meetings were provided to: (1) State, local and federal agencies; (2) 28 local libraries; (3) 28 county clerk offices; (4) 29 newspapers; and (5) other interested parties. The NOP was also made available on DWR's website and can be found at: https://water.ca.gov/Programs/State-Water-Project/Management/Water-Supply-Contract-Extension.
- Two scoping meetings were held on September 23, 2014 in the Resources Building Auditorium, 1416 Ninth Street, Sacramento, CA 95814 from 2:00 to 4:00 pm and 5:00 to 7:00 pm.
- The NOC and copies of the DEIR were filed with the State Clearinghouse on August 17, 2016 with public review ending on October 17, 2016.

- Notices of Availability (NOA) and information on the public hearing was provided to: (1) State, local and federal agencies; (2) 28 local libraries; (3) 28 county clerk offices; (4) 29 newspapers; and (5) other interested parties. The NOA and the DEIR were also made available on DWR's website and can be found at: https://water.ca.gov/Programs/State-Water- Project/Management/Water-Supply-Contract-Extension.

- A public hearing to receive comments on the DEIR was held in Sacramento on September 12, 2016 from 4:00 p.m. to 8:00 p.m. in the Sacramento Central Library Tsakopoulos Galleria, 821 I Street, Sacramento, CA 95814.

- Copies of the DEIR, including appendices, were available for public review at DWR's State Water Project Analysis Office during normal business hours located at 1416 Ninth Street Room 1620, Sacramento, CA 95814. The document was also made available on DWR's website and be found at: https://water.ca.gov/Programs/State-Water- Project/Management/Water-Supply-Contract-Extension.

1.5 CEQA CERTIFICATION AND PROJECT APPROVAL

Before DWR makes a decision with regard to the proposed project, CEQA Guidelines Section 15090(a) requires that DWR first certify that the EIR has been completed in compliance with CEQA, that DWR has reviewed and considered the information in the EIR, and that the EIR reflects the independent judgment and analysis of DWR.

In the event DWR approves the proposed project, CEQA requires that it file a Notice of Determination (NOD) and adopt appropriate findings as set forth in CEQA Guidelines Section 15091. Under CEQA Guidelines Section 15092, a lead agency may only approve or carry out a project subject to an EIR if it determines that: (1) that project will not have a significant effect, or (2) that the agency has eliminated or substantially lessened all significant effects on the environment where feasible and any remaining significant effects on the environment that are found to be unavoidable are acceptable due to overriding considerations. This EIR may also be used by the Contractors, as responsible agencies under CEQA, in their discretionary approval processes within their jurisdictions to meet their CEQA requirements.

2. Responses to Comments

2 RESPONSES TO COMMENTS

2.1 INTRODUCTION

This chapter contains written responses to all comments received by DWR from agencies and the public on the DEIR. Table 2-1 lists all of the parties who submitted comments on the DEIR during the public comment period. The commenting parties are organized into the following categories: local and regional agencies, and individuals and other organizations. The comment letters are presented based on the date they were received within each of these categories.

TABLE 2-1.
LIST OF COMMENTERS

Letter #	Commenter
Local Agencies	
1	County of Santa Barbara, Public Works
2	Stanislaus County Environmental Review Committee
3	County of Santa Barbara, Executive Office
4	Plumas County Flood Control & Conservation District
5	Central Delta Water Agency
Organizations and Individuals	
6	California Water Impact Network/California Sportfishing Protection Alliance/AquAlliance
7	California Water Impact Network/California Sportfishing Protection Alliance/AquAlliance/Planning and Conservation League
8	Natural Resources Defense Council/Defenders of Wildlife/The Bay Institute
9	Center for Food Safety
10	Planning and Conservation League/Pacific Coast Federation of Fishermen's Associations/Environmental Water Caucus
11	AquAlliance/California Sportfishing Protection Alliance/California Water Network
12	Friends of the River

2.2 MASTER RESPONSES

Because multiple comments were received that addressed a number of key issues, DWR prepared comprehensive responses addressing these issues (master responses). Each master response provides background regarding the specific issue, how the issue was addressed in the DEIR, and additional clarification and explanation as appropriate to address the comments. Each master response is numbered and that number is referenced in a response that incorporates the master response. The following master responses were prepared for this FEIR:

1. No Project Alternative

2. Range of Alternatives
3. Relationship to California WaterFix
4. Regulatory Compliance
5. Recirculation of the DEIR
6. Reduced Table A Deliveries

Master Response 1: No Project Alternative

Comments were received regarding the identification of the No Project Alternative in the DEIR. Some comments suggest that DWR assume a no project alternative that would end the Contracts in 2035 or with a shorter term than DWR used for the No Project Alternative. Some comments suggest that the No Project Alternative should include reduced water service deliveries. Some comments suggest that the No Project Alternative should have included the possibility that some of the Contractors would choose not to renew their Contracts.

CEQA Guideline Section 15126 (1)(3) states that the purpose of the no project alternative is to allow decision makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project. Section 15126.6(e) provides that the no project alternative should be the project that would be reasonably expected to occur in the foreseeable future if the proposed project were not approved based on current plans. Furthermore, Section 15126.6(e)(3)(a) states that no project alternative is usually the continuation of the existing project. When selecting and analyzing the No Project Alternative for contact extension, DWR considered what was reasonably expected to occur if the Contracts were not extended as negotiated in the AIP. The DEIR describes the No Project Alternative on pages ES-6 and 7-6 to 7-9:

> "Under the No Project Alternative, DWR takes no action, and DWR and the Contractors would continue to operate and finance the SWP under the Contracts to December 31, 2035. Upon receipt of Article 4 letters from the Contractors (at least 6 months prior to the existing expiration date for each Contract) the term of the Contracts would be extended beyond their current expiration dates. Under this alternative, the Contracts would not expire beginning in 2035. Water service would continue beyond 2035 to all Contractors, consistent with the Contracts including the existing financial provisions. Annual revenue and water supply cost recovery would continue consistent with the current Contracts. Until the Contractors submit their Article 4 letters to extend their Contract expiration dates and the extended Contract expiration date is determined, DWR would not sell bonds with maturity dates past 2035 to finance SWP capital expenditures and therefore the current compression in the recovery of capital costs and the bond financing costs would be exacerbated."

DWR considers this to be the appropriate No Project Alternative for several reasons. As discussed on pages 7-9 to 7-11 of the DEIR, Article 4 of the Contract gives each Contractor the right to extend its Contract with certain key terms similar to the existing Contracts by giving notice to DWR of its intentions to extend its Contract at least six months before the expiration of the Contract. These key terms are the amounts of water delivered (including maximum Table A Amount), the cost of water delivery, the physical conditions of delivery, the water quality, and the ability to make use of transportation facilities. This option was included in the Contracts to give the Contractors guarantees about the continuity and dependability of SWP water service after 2035 and recognizes that the Contractors have been charged under the water supply contracts and paid significant amounts towards the cost of SWP water conservation and transportation facilities during the term of the Contracts, which is 75 years. Article 4 further provides that Contactors have the same option to extend their Contracts with the key terms after their current expiration date.

DWR described the No Project Alternative to continue the Contract beyond 2035 because it is reasonably foreseeable to expect that all of the Contractors will exercise their Article 4 rights before the end of the Contract, based in part on the interest that the Contractors have already expressed in extending their Contracts. All Contractors have already expressed an interest in some form in extending their water supply Contracts. Before starting the negotiations, DWR polled all of the Contractors to determine if they had an interest in extending their Contact beyond 2035 to address the bond compression described on pages 1-1 to 1-2 of the DEIR, and all of them responded affirmatively. Nine of the Contractors have already submitted their Article 4 letter to DWR requesting to extend their Contract, in some cases the letter was sent 25 years before the end of term. (Alameda County Water Agency, Kern County Water Agency, Antelope Valley-East Kern Water Agency, Coachella Valley Water District, Crestline-Lake Arrowhead Water Agency, Little rock Creek Irrigation District, Mojave Water Agency, San Gabriel Valley Municipal Water District, Alameda County Flood Control and Water Conservation District, Zone 7)All of the Contractors participated in the 23 public negotiation sessions to extend the Contract either directly or through a representative from the State Water Contractors, Inc. (https://water.ca.gov/Programs/State-Water-Project/Management/Water-Supply-Contract-Extension). These public negotiations ended with 25 of the Contractors signing the AIP, showing that these Contractors were in general agreement to extend the Contracts to 2085 consistent with AIP and subject to CEQA review (see Appendix A of DEIR). The four Contractors that have not signed the AIP have expressed a desire to review and consider signing the AIP at a later date and/or ultimately extend the Contract.

Further support for the selection of the No Project Alternative in the DEIR is that SWP waters supplies are important to meet existing water demands for all of the Contractors, so it is reasonably foreseeable that this water supply will continue after 2035, requiring the extension of the Contracts. Contactors rely on the SWP to meet their regional water demands. The DEIR discusses the importance of SWP water service to each Contractor on pages 5-142 to 5-146. In addition, on pages 5-149 to 5-151 the DEIR discusses the reliance and use of SWP supplies based on information contained in the Urban Water Management Plans prepared by SWP urban Contractors. The importance of the SWP was further demonstrated during the recent droughts from 2011-2015 and from 2007-2009. Without SWP supplies, water users within some of the Contractors' service areas would have likely faced additional shortages, affecting the local economies and quality of life.

In some service areas, it is further anticipated that alternatives to SWP supply could become less available and more expensive. This again suggests that it is reasonably foreseeable that the Contracts will continue beyond 2035 providing similar levels of water service. For example, the Sustainable Groundwater Management Act (SGMA) adopted in 2014, which is discussed on pages 5-83 to 5-84 of the DEIR, requires that groundwater basins designated as high and medium priority identify a local groundwater agency to prepare a groundwater sustainability plan by 2020 or 2022 that results in local groundwater management that limits undesirable effect, including overdraft. SGMA requires the preparation in the plans of a water balance to avoid overdraft and to bring the groundwater basin into balance. For Contractors in basins that have been designated as high and medium priorities, it is anticipated that the continued delivery of SWP water service could be needed to help achieve balance.

DWR also believes that costs associated with the SWP will continue to be affordable for the Contractors and will not serve as a deterrent for some Contactors to extend their Contract. The capital cost for the conservation facilities for the extended Contract were modeled and analyzed on pages 5-3 to 5-8 of the DEIR. The modeling shows that extending the contact now would eliminate the extreme financial repayment obligations that would otherwise occur between 2016 and 2035 due to the bond compression. The proposed project would level out future capital cost, allowing the Contractors to adopt more stable rate structures. As described on pages 3-1 to 3-2 of the DEIR, the Contractors have already paid billions of dollars to DWR under the Contracts to cover the capital costs related to SWP water supply since the SWP began operations. Given the significant amounts of payments from the Contractors used for the construction and repair of the conservation facilities and the facilities to transport water to the individual Contractors, it is reasonable to describe a no project alternative that assumes that the

Contractors would request continued water service beyond 2035 through Article 4, so that they would continue to receive the benefits from those capital facilities.

DWR elected not to specify an expiration date for the No Project Alternative. Article 4 gives Contractors the option to request an extension of the Contract without specifying the term, and the right to receive the same option at the expiration of each term. At the end of each term, DWR and Contractors would need to agree upon a new expiration date. DWR believes that it is reasonable to assume that whatever term was agreed upon after the Contractors invoke Article 4, that Contactors would exercise that option again after each term, and that SWP water service is likely to continue to at least 2085. In the EIR impact analysis, DWR believes it is helpful for the purposes of impact analysis to assume that under the No Project Alternative the Contract will continue to at least 2085 so that it could be more easily compared to the proposed project. This approach is consistent with Section 15126 (1)(3), which provides that one purpose of the no project alternative is to permit a comparison with the proposed project.

Other alternatives besides the No Project Alternative did address several alternatives suggested in the comments. Alternative 2 considered a shorter term with the Contracts ending in 2065, and compared that alternative to the proposed project. Alternative 7 considered an alternative where some Contractors elected not to extend the Contract after 2035 and to cease receiving SWP water service. This alternative analyzed what impacts such Contractors would face in their water service areas. DWR, considered on pages 7-2 to 7-4 of the DEIR, but rejected analyzing an alternative that resulted in reduced Table A deliveries because it did not meet project objectives. See Master Response 6 for more discussion on a scenario that looks at reduce Table A deliveries.

Master Response 2: Range of Alternatives

Some commenters suggested that DWR had improperly defined the scope of the project and that the EIR should evaluate the impacts of the SWP and the Contracts as a whole, including the impacts of the SWP on the Sacramento-San Joaquin Delta (Delta) and the inadequacy and future uncertainty of supplies. Other commenters suggested that the alternatives should include reduced water deliveries, reduced contract durations, different water supply contract amounts, increased Delta flows by reducing exports, and increased water conservation.

The lead agency has the authority and responsibility to initially frame the scope of its proposed purpose and objectives. As discussed in Response to Comment 5-11, the lead agency is free to limit its proposed objectives to the issues it wants to address and is not obligated to look at broader issues or concerns. The scope of analysis in the DEIR is based on the project description provided in Chapter 4, Project Description. As stated in the DEIR on page 4-2; “The proposed project would amend and add financial provisions to the Contracts based on the negotiated AIP between DWR and the Contractors (see Appendix A). The proposed project would not create new water management measures, alter the existing authority to build new or modify existing facilities, or change water allocation provisions of the Contracts.” To satisfy the requirements of CEQA, an EIR must include a reasonable range of alternatives to the project that would meet all or most of the project’s objectives. (See CEQA Guidelines Section 15126.6(a)). Accordingly, the project objectives are the starting points for DWR in developing the reasonable range of alternatives to be evaluated in detail in an EIR (CEQA Guidelines Sections 15124(b), and 15126.6(a)). The DEIR Chapter 4, Project Description, Section 4.3, Project Objectives describes in detail the project objectives.

CEQA Guidelines, Section 15126.6 (a) states: “There is no ironclad rule governing the nature or scope of the alternatives to be discussed other than the rule of reason.” The rule of reason “requires the EIR to set forth only those alternatives necessary to permit a reasoned choice” and to “examine in detail only the ones that the lead agency determines could feasibly attain most of the basic objectives of the project.” (CEQA Guidelines Section15126.6(f)) An EIR does not have to consider alternatives “whose effect cannot be reasonably ascertained and whose implementation is remote and speculative.” (CEQA GuidelinesSection15126.6(f)(3))

In Chapter 7, DWR analyzed seven different alternatives in addition to the proposed project. These alternatives are: 1. No Project; 2. Different Contract Term (2065) with Financial Provisions of the Proposed Project; 3. Different Contract Term (2110) with Financial Provisions of the Proposed Project; 4. Extend Contract Term to 2085 without Financial Provisions of the Proposed Project; 5. Extend Contract Term to 2085 and do not Implement Financial Provisions of the Proposed Project until 2035; 6. Extend Contract Term Through the Sale of Bonds; 7. Not All Contractors Sign.

These alternatives represent a reasonable range of alternatives, and the scope of the analysis of alternatives fully complies with CEQA. DWR carefully considered all potential alternatives that were proposed during the scoping process and while the EIR was being prepared (see Appendix B of the DEIR for the scoping comments and the letters received).

Draft EIR Chapter 7, Alternatives, explains the process used to develop the alternatives, and explain why certain potential alternatives were considered but ultimately eliminated by DWR. Out of the 10 alternatives considered in the DEIR, three alternatives to the proposed project were eliminated as they were not found to attain most of the basic project objectives or not to be feasible means to achieve basic project objectives; seven alternatives to the proposed project (including the No Project Alternative) were developed and analyzed in the DEIR for their ability to meet project objectives; and the proposed project received a full analysis in the DEIR. Each alternative to the project was evaluated to see if the alternative would feasibly attain most of the basic project objectives and avoid or substantially lessen significant project objectives. Table 7-2 on page 7-27 provides a summary of how each alternative compares to the proposed project.

As described in DEIR Chapter 5, Environmental Analysis, there are no impacts associated with the proposed project. Therefore, there are no alternatives that would reduce or eliminate significant project impacts as compared to the proposed project and development of specific alternatives to reduce or eliminate significant environmental impacts is not required by CEQA. However, as an informational document, the DEIR disclosed for public and agency consideration a reasonable range of alternatives to the proposed project in order to provide DWR with sufficient information to foster informed decision-making.

DWR considered the suggestions that the proposed project should cover the SWP or the Contract as a whole or that it should look at how the SWP affected or was affected by other conditions, including impacts on the Delta and the effects of climate change, and that alternatives should include reduced water deliveries, reduced contract durations, different water supply contract amounts, increased Delta flows by reducing exports, or increased water conservation but determined that these suggestions did not meet the proposed project objectives, but were actually different projects with different project objectives. Factors DWR considered include the following:

- The proposed project reflects a negotiated solution to a problem that provides benefits for the parties to the Contracts (SWP contractors and DWR). All the parties recognize that the financial problems identified in the objectives are real and need to be resolved. When a proposed project reflects a negotiated solution to a problem that provides benefits for different parties, the CEQA analysis can reject alternatives that do not achieve all of the objectives concurrently.
- CEQA does not require an agency to examine a project and objectives that are completely different from the one it has chosen to pursue. This is not an EIR on the operation and maintenance of the SWP. See also Response to Comment 5-11 for further discussion of the scope of the proposed project. The DEIR does not evaluate issues such as impacts attributed to the operation of the SWP, all of the problems facing the Delta, or activities relating to water conservation and water supply. These would continue to exist even if there were no proposed project. As a result, under CEQA, they are considered part of the baseline conditions and are not environmental impacts of the proposed project. Therefore, in the DEIR DWR is

not required to mitigate or consider alternatives for impacts attributed to the on-going operation and maintenance of the SWP.

- The proposed project cannot and does not change hydrologic conditions or regulatory requirements in effect at the time of export, including applicable permits and constraints to protect water quality and listed fish species (see Master Response 4 Regulatory Compliance). DWR has and continues to export SWP water to the Contractors in compliance with all State and federal environmental laws and regulation.
- Even though there are no impacts associated with the proposed project, the DEIR identifies seven alternatives to the proposed project. See DEIR Chapter 7, Alternatives for discussion of the reasonable range of alternatives developed for this DEIR.
- DWR is not avoiding the demands facing the State and the Delta with regard to these issues. As recognized in the DEIR, there are administrative and legislative efforts that address these concerns as part of other comprehensive statewide processes. This EIR does not need to address all issues facing the SWP or the Delta. DWR leaves resolution of these broader issues to other established planning, legislative and regulatory processes.
- See Master Response 6 Reduced Table A Deliveries with regard to the proposal that the parties consider an alternative that reduces Table A amounts, In the interests of providing more information to decision makers and the public on the effects of this scenario, DWR has prepared an analysis of the effects of reducing SWP water supplies. This analysis is not presented as an alternative or as a modification of any alternatives discussed in the DEIR, but as clarification of why DWR rejected the approach as an alternative.

Master Response 3: Relationship to California WaterFix

Several comments received on the DEIR suggest that the analysis in the DEIR is incomplete because it does not include projects that may be funded through the Contracts, including California WaterFix.

Legal Background

CEQA Guidelines Section 15165 provides that “[w]here one project is one of several similar projects of a public agency, but is not deemed a part of a larger undertaking or larger project, the agency may prepare one EIR for all projects, or one for each project, but shall in either case comment upon the cumulative effect. The California Supreme Court held that “an EIR must include an analysis of the environmental effects of future expansion or other action if: (1) it is a reasonably foreseeable consequence of the initial project; and (2) the future expansion or action will be significant in that it will likely change the scope or nature of the initial project or its environmental effects. Absent these two circumstances, the future expansion need not be considered in the EIR for the proposed project.” *Laurel Heights Improvement Assn. v. Regents of University of California* (1988) 47 Cal. 3d 376, 396.CEQA does not require DWR to analyze the proposed project in combination with California WaterFix as part of a single project in a single EIR because: (1) the proposed project and California WaterFix are not a reasonably foreseeable consequence of one another; and (2) the proposed project has significant independent utility, including independent benefits and independent purposes and objectives.

The scope of analysis in the DEIR is based on the project description provided in Chapter 4, Project Description. As stated on DEIR page 4-2: “The proposed project would amend and add financial provisions to the Contracts based on the negotiated AIP between DWR and the Contractors (see Appendix A). The proposed project would not create new water management measures, alter the existing authority to build new or modify existing facilities, or change water allocation provisions of the Contracts.” As further described, the changes to the Contracts by the proposed project are composed of the following five project elements that meet the proposed project objectives: (1) extend the Contract term; (2) increase operating reserves; (3) new billing provisions; (4) enhance funding mechanisms and new accounts; (5) enhance coordination regarding SWP finances. The proposed amendments to the Contracts do not include language that would approve or otherwise authorize the construction of new facilities that could be funded through the Contracts in the future, including California WaterFix.

DWR’s decision to focus its analysis on the proposed project is justified in light of the proposed project’s significant independent utility. As specifically stated on DEIR pages 6-3 and 7-5, while the proposed project and California WaterFix are related, the proposed project is a separate, independent project that would occur with or without implementation of California WaterFix. As discussed in Chapter 4 Project Description, one of the primary reasons the Contracts are being amended is to extend the Contracts’ expiration dates to 2085. It has become more challenging in recent years to affordably finance capital expenditures for the SWP since revenue bonds used to finance these expenditures are not sold with maturity dates that extend beyond the year 2035, the year the first Contract would expire. Not extending the Contracts would continue to exacerbate the revenue bond compression problem that DWR and the Contractors are currently facing. Extending the Contracts’ expiration dates to 2085 will enable DWR to finance SWP expenditures beyond 2035 and continue to receive a reliable stream of revenues from Contractors for the construction, operation, and maintenance of the SWP.

The proposed project would have significant independent utility, in terms of its benefits, purposes and objectives. As stated in Chapter 5 on pages 5-7 and 5-8, the proposed project would provide long-term benefits to the SWP by continuing to provide a stable revenue source, better matching revenues with anticipated costs, and providing for the maintenance of reserves and funds for all SWP purposes during the term of extended Contract. These benefits include the ability to continue to finance projects such as repairs to the California Aqueduct, replacement of aging pumps, generators, and other equipment and implementing low greenhouse gas (GHG) emission energy projects. Capital project that could be financed in whole or in part by the sale of longer term bonds (if available as the result of Contract extension) include: (1) reinforcing Perris Dam at Lake Perris against seismic failure and maintaining other SWP facilities to current seismic safety standards; (2) reconstructing the Ronald B Robie Thermalito pump-generating plant in the aftermath of a damaging fire to the facility; (3) implementing the Oroville hydroelectric license project; and (4) obtaining a renewed Federal Energy Regulatory Commission (FERC) license for the SWP's southern hydroelectric plants.

An EIR or other environmental documentation for each of these projects has been or will be prepared. For future projects, DWR will continue its practice of providing separate CEQA compliance at the time that each such project is proposed. For example, a separate EIR/Environmental Impact Statement (EIS) was prepared for the California WaterFix. In July 2017, DWR certified its Final EIR, adopted Findings of Fact, a Statement of Overriding Considerations, a Mitigation, Monitoring and Reporting Plan (MMRP), approved Alternative 4A - California WaterFix, and filed its Notice of Determination (NOD). The California WaterFix Draft Supplemental EIR/EIS (Draft Supplemental EIR/EIS) with updated environmental analysis covering footprint changes resulting from proposed design modifications that minimize impacts of the California WaterFix was released on July 17, 2018 for public review and comment. The CEQA public comment period on the Draft Supplemental EIR ended September 17, 2018. The Bureau of Reclamation released the EIR/EIS for public review under the National Environmental Policy Act (NEPA) on September 21, 2018. The California WaterFix is addressed in DEIR Chapter 6, Section 6.1.1.1 as a cumulative project and Chapter 7, Alternatives, Section 7.3.3.

DWR and the Contractors agreed to enter into the process for amending the Contracts to confirm and supplement certain provisions for several water management actions, including transfers and exchanges, and to address changes in financial provisions related costs of California WaterFix. This public process was initially noticed in November 2014 for cost allocation of the proposed Bay Delta Conservation Plan (BDCP). In February 2018, DWR and the Contractors resumed the public process to negotiate the proposed amendments. The purpose of the resumed negotiations was to address terms and conditions of water management actions related to water transfers and exchanges, and to develop terms and conditions for allocation of costs of California WaterFix for Contractors that directly benefit from WaterFix. The negotiations led to development of a non-binding “Agreement in Principle Concerning the State Water Project Water Supply Contract Amendments for Water Management and California WaterFix.” DWR is currently in the process of preparing a separate EIR for this project.

Master Response 4: Regulatory Compliance

Comments were received on the DEIR stating that the SWP does not comply with existing regulatory requirements, including impacts on salmon, Delta smelt and Delta water supplies, and should do so before Contract extension is approved. Some comments also suggested that future regulatory changes could affect the proposed project.

Existing SWP regulatory requirements are covered in the DEIR in Chapter 5, Environmental Analysis under each resource topic. See pages 5-126 through 5-127 of the DEIR for a description of the SWP water rights decisions and orders.

When exporting water from the Delta, DWR must comply with all current State and federal regulatory requirements in effect at the time of the export pumping, including numerous environmental standards, laws, and regulations relating to reservoir releases and Delta inflow and outflow, Delta water quality, fish protection, environmental needs, water rights, and the needs of other users. The needs of other users include in-Delta users and the water rights of the areas of origin of Delta inflow. These requirements include applicable State Water Resources Control Board (State Water Board) orders, United States Army Corps of Engineers (USACE) permits, Biological Opinions (BiOps) and other regulatory constraints including any relevant judicial orders in effect at the time of the operation. They have established water quality and flow requirements and limits on the rate of export of water that can be pumped by the state and federal pumping plants.

Therefore, compliance is included in the proposed project and all of the alternatives analyzed in the DEIR. Approval of the proposed project would not alter the SWP obligation and commitment to comply with all current and future applicable regulatory requirements, including biological opinions and water rights decisions.

Master Response 5: Recirculation of the DEIR

Several comments suggest that the DEIR is insufficient and requires a revised project description for a different project, more alternatives, and more analysis of environmental impacts leading to significant changes that would require recirculation. See Master Response 2 for more details on the range of alternatives selected and evaluated in the DEIR, and Response to Comment 5-11 for more details on definition of the project.

CEQA requires a lead agency to recirculate an EIR when significant new information is added to the EIR after public notice is given of the availability of the DEIR for public review but before certification. (CEQA Guidelines, Section 15088.5 (a))

Although new information is included within this FEIR, the new information is not considered significant new information requiring recirculation. For instance, no new information was included that would result in: (1) a new significant environmental impact resulting from the project or from a new mitigation measure proposed to be implemented. (See *Laurel Heights Improvement Association v. Regents of University of California* ("*Laurel Heights II*") (1993) 6 Cal.4th 1112, 1129); (2) a substantial increase in the severity of an environmental impact unless mitigation measures are adopted that reduce the impact to a level of insignificance; and/or (3) a feasible project alternative or mitigation measure considerably different from others previously analyzed were added that would clearly lessen the environmental impacts of the project.

All information included in this FEIR clarifies or amplifies information provided in the DEIR. (See *Laurel Heights II*, *supra*, 6 Cal.4th 1112, 1129-1130.) Therefore, recirculation is not required.

Master Response 6: Reduced Table A Deliveries

A number of comments state that the proposed project should include a reduction of the Table A amounts set forth in the Contracts. These comments also cite a desire to reduce SWP exports from the Delta as a means of potentially reducing environmental effects in the Delta, and single out Table A amounts as a mechanism to achieve that goal. In response, it is helpful to review the background and purpose of the Table A amounts as well as other provisions of the Contracts, and address the issues with placing limitations on SWP pumping from the Delta. These comments appear to reflect a misunderstanding of the calculation and delivery of SWP water under the Contracts.

The Contracts and Table A Amounts

The Contracts are agreements between DWR and the Contractors which primarily define how costs of the SWP are determined and allocated, and how water available to the SWP is allocated. Each Contract has a table, Table A, which lists maximum annual amounts of water estimated by each Contractor to reflect their increased water needs through the years due to urban or agricultural growth in their service area (see Chapter 2, State Water Project, and Appendix C, Sample Water Supply Contract). These Table A amounts are *not* used in DWR's annual determination of SWP water supply, but instead are used in the proportioning of available Table A water among the Contractors.

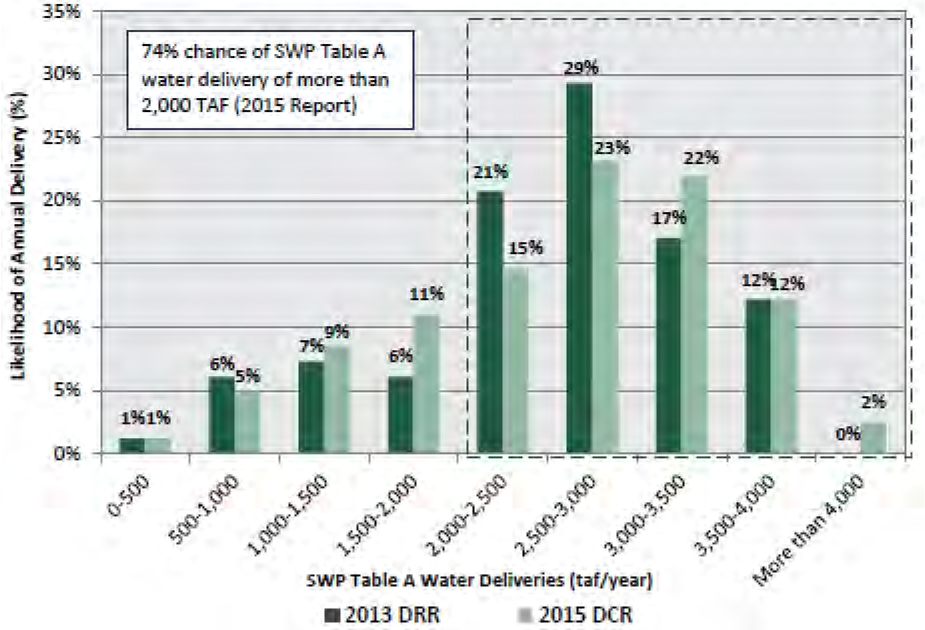
DWR annually determines the supply of SWP water that can be scheduled for delivery throughout the year based on hydrology, SWP reservoir storage, SWP facility constraints, and regulatory constraints. The initial determination of water supply is forecasted in December and the Table A water is prorated among the Contractors in relation to their maximum Table A amounts. As winter and spring progress, updated rainfall and snowpack typically increase the available SWP water supply, which includes Table A water and other types of water. Whenever the supply of Table A water is less than the total of all Contractors' Table A requests, the available supply of Table A water is allocated among all Contractors in proportion to each Contractor's annual Table A amount.

It is important to note that the SWP as originally envisioned has not been completed, and that the reliability of SWP water supply fluctuates for many reasons, including physical and regulatory causes. Additional storage upstream of the Delta in conjunction with facilities to transport water across the Delta has not been constructed. Additionally, listing of Delta smelt and winter-run Chinook salmon as endangered and threatened under the federal Endangered Species Act (ESA), as well as more stringent water quality standards in the Delta, contributed to a reduced probability of delivering 100 percent of the maximum Table A amounts from when the Contracts were executed in the 1960s. To help Contractors better evaluate their SWP water supply, DWR every two years provides the reliability of SWP water supplies under a range of hydrologic conditions and publishes the results in a report entitled "The State Water Project – Delivery Capability Report" (DCR).

In the 2015 DCR, the capability of the SWP to deliver Table A water is presented, utilizing a range of past hydrology from 1922 through 2003. This range incorporates dry years, multi-year droughts, average years, and wet years, thereby allowing Contractors to understand the probability of receiving maximum Table A amounts under various hydrologic conditions. This analysis is important since the maximum Table A amounts cannot be delivered every year due to the above reasons and other constraints. As shown in DCR Figure 6-2 (presented below), there is a 74 percent chance of a total Table A water delivery of more than 2,000 thousand acre-feet (taf).* However, the chance of a total Table A water delivery of more than 4,000 taf is only 2 percent. It is not the Contract Table A amounts that set this delivery probability, but the hydrological, physical, and regulatory constraints pertaining to the SWP.

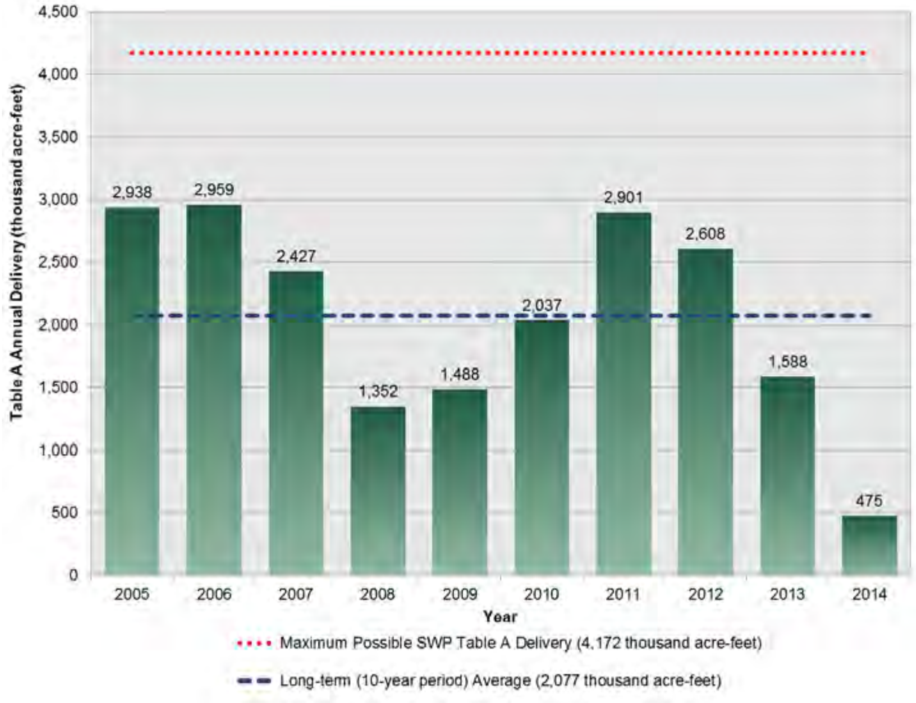
DCR Figure 5-1 (presented below) shows that the average historical deliveries of Table A water for 2005-2014 are 2,077 taf/year. During this 10-year period, the hydrology was trending more on the below normal and dryer side, plus the addition of two new Delta requirements for fish in 2007/2008 reduced both the SWP and Central

DCR Figure 6-2



***** The probability of delivering less than 2 million acre-feet (MAF) is the sum of 1 percent (%)+5%+9%+11%=26%; therefore, the probability of delivering more than 2 MAF is 100%-26%=74%.

DCR Figure 5-1



Valley Project's (CVP) ability to capture water at their Delta export facilities. Again this history affirms that Table A amounts do not dictate the hydrology or Delta export restrictions, but that hydrology and other regulatory requirements dictate how much Table A water can be delivered to Contractors, and how much water can be exported by both the SWP and CVP (Reclamation) projects from the Delta.

The Contract and Other Water

The Contract includes provisions for Contractors to take delivery of SWP or non-SWP water and to better manage all of their SWP water supplies. There is "Article 21" water, "Carryover" water, "Turnback Pool" water, "Article 55" water (transfer water), "Article 54" water (flexible storage in two Southern California SWP reservoirs), and other provisions for the delivery and management of water for the Contractors.

Article 21 water is an interruptible water supply made available only when certain conditions exist, namely that the SWP share of San Luis Reservoir is full or nearly so, other SWP reservoirs are full, the Delta is in excess conditions (releases from upstream reservoirs and unregulated flow exceed the water supply needed to meet Sacramento Valley in-basin uses and exports from the Delta), Table A deliveries are being met, and the Harvey O. Banks Delta (Banks) Pumping Plant has additional available capacity consistent with regulatory constraints. DWR then offers Article 21 water to those Contractors that can, on relatively short notice, put it to beneficial use. As with all SWP water, Article 21 water is supplied under existing SWP water rights permits, and is pumped from the Delta under the same regulatory, environmental, and operational constraints that apply to all SWP Delta exports. When Article 21 water is available, DWR may only offer it for a short time, and the offer may be discontinued when the necessary conditions no longer exist. Typically, Contractors have used Article 21 water to meet needs such as additional short-term irrigation demands, and storage in local surface reservoirs and groundwater basins, all of which provide Contractors with opportunities for better water management.

SWP conveyance of non-SWP water is another important aspect of total Delta exports. Article 55 of the Contracts provides the conveyance of non-SWP water for the Contractors. The Contractors and other water agencies often enter agreements with water agencies upstream of the Delta for temporary water supplies when SWP and other local supplies are forecasted to be less than the target supply needed to meet their demand for the year. These temporary transfer supplies represent additional water to the downstream system that would not be otherwise available. Water transfers considered for approval by DWR or Reclamation are usually based on crop idling or shifting, groundwater substitution, and reservoir reoperation. Transfer water made available by the willing sellers can be exported at Banks between July 1 and September 30, consistent with the requirements of BiOps issued by United States Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) in December 2008 and June 2009, respectively, along with certain other operational restrictions for the SWP. DWR is willing to approve the conveyance of the transfer water for the buyers provided certain conditions are met including available Banks capacity, and that DWR can determine that the transfer will not result in impacts to SWP operations.

Delta Exports

An important fact about total Delta water exports is that Reclamation and DWR have historically shared capacity at their Delta export pumping facilities when it is advantageous to do so. Sharing of the pumping facilities can help both projects deliver water to their contractors when demand is high or some facilities are out of service in emergencies or during maintenance. The sharing of facilities is referred to as the Joint Point of Diversion (JPOD). In 1978, DWR agreed to, and the State Water Board permitted, the CVP to use the SWP’s Banks Pumping Plant capacity to divert and export up to 195,000 acre-feet (af) annually from the Delta to replace pumping capacity lost at the CVP’s Jones Pumping Plant. Pumping capacity was lost as a result of restrictions contained in the State Water Board’s Decision 1485. In 1986, Reclamation and DWR formally agreed that “either party may make use of its facilities available to the other party for pumping and conveyance of water by written agreement.”

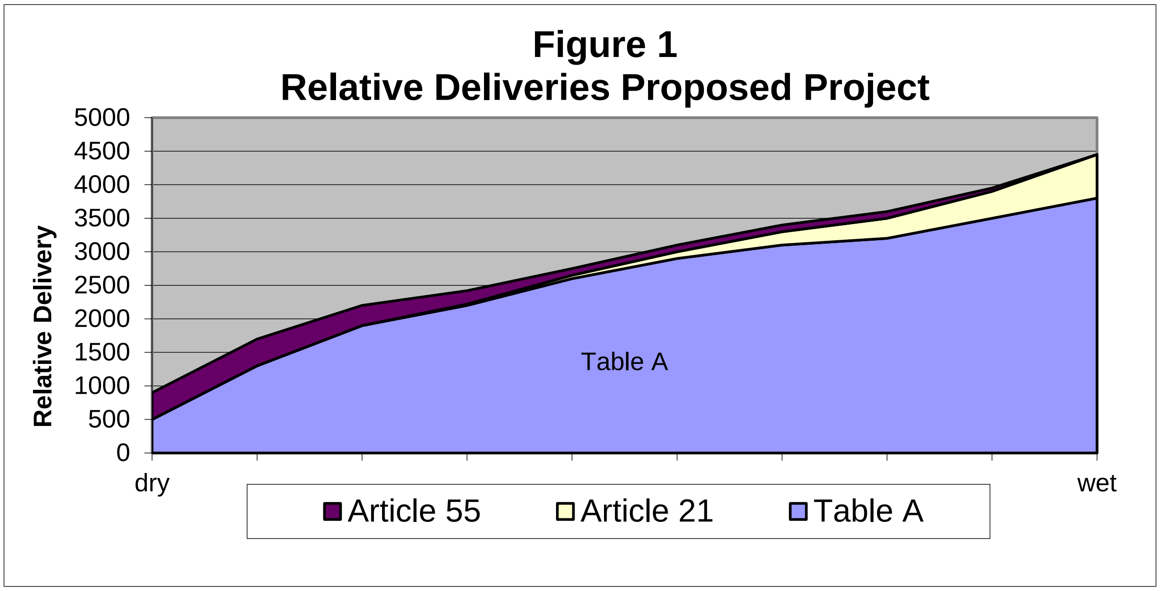
Several commenters incorrectly believe that if Table A amounts were reduced, that total exports from the Delta would be reduced as well. If Table A amounts were reduced to some limit below the capability of DWR to schedule delivery of those supplies, the Contractors would try to make up their reduction by requesting other water. Article 21 water and transfer water from north of the Delta would increase, all of which are exported from the Delta.

As mentioned earlier, other components of Delta exports include JPOD use by Reclamation, whereby CVP water is exported at Banks under current regulations when certain conditions have been satisfied. In addition, if the SWP reduces its export pumping and added pumping is permitted under the regulatory constraints, Reclamation and/or other Delta exporters may increase their pumping once DWR had fulfilled the deliveries to its Contractors first. Additionally, there are other “in-basin” users who pump water for use on Delta islands for irrigation, municipal, recreation, and environmental purposes.

Reduced Delivery Scenarios

DWR presents two scenarios to address comments on Delta exports and Table A deliveries, to further the discussion of Delta exports: (1) A reduction in Table A amounts to a lower value of 3.2 MAF per year; and (2) a total delivery scenario on combined Table A and Article 21 deliveries of 3.2 MAF per year. Conceptual figures provide a visual explanation of the classification of the water available to the SWP that can be exported from the Delta under regulatory constraints. Both scenarios assume that non-SWP water exports would continue because of the requirements of California Water Code Sections 1810-1814, which in part provide that a public agency not deny access to available capacity, subject to certain conditions. Additionally, both scenarios would require DWR to negotiate and execute a Contract amendment for these reductions.

It is necessary to first present the delivery capability of the SWP in various hydrologic years for Table A, Article 21, and Article 55 water (which were obtained from the 2015 DCR). Figure 1 below shows the relative distribution of SWP deliveries among these three types of water, with a potential for a maximum delivery in a wet year of close to 4,500 taf. Figure 1 also represents the delivery probabilities without the constraints of the two scenarios described below. However, this value does not indicate the probability of occurrence. The probability of occurrence of a 4,000 taf delivery as noted previously is 2 percent (CDR Figure 6-2).



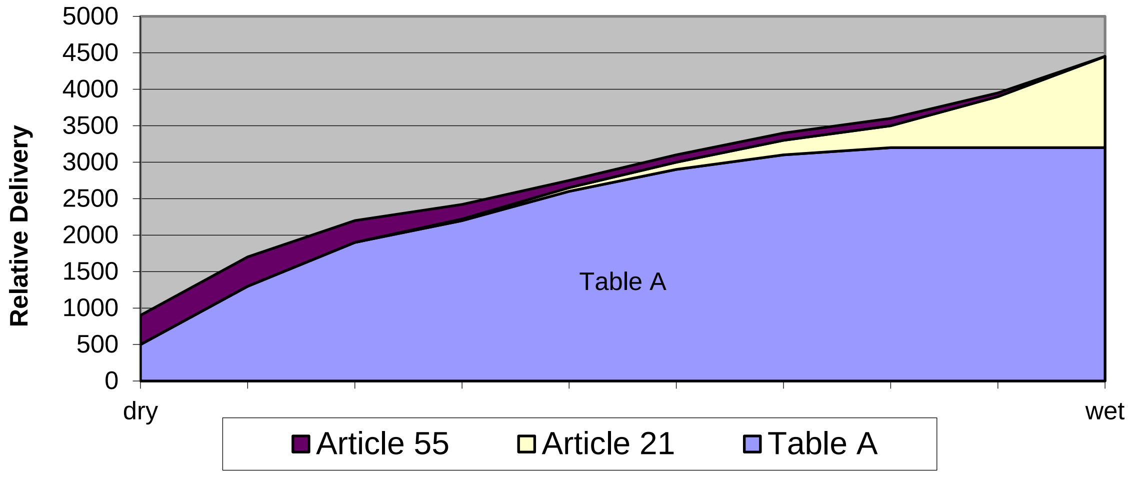
Scenario 1: Reduction of Table A Deliveries to 3.2 MAF per Year

Scenario 1 is a reduction in Table A amounts to 3.2 MAF per year. Figure 2 illustrates that other types of water would be requested by Contractors to make up the reduction. If Table A amounts were reduced in the Contract, it would not change the amount of water available to the SWP in any particular year, but would primarily affect the type of water delivered by DWR – with the reduction being made up by Article 21 water and Article 55 water (transfer water).

Analysis

Assuming no limitations to Article 21 deliveries, reduction of Table A amounts would mean that the relative deliveries of Table A amounts and Article 21 water would be different, but would not necessarily result in a reduction in the total amount of SWP water exported from the Delta. Article 21 supplies would increase, and the SWP would use available capacity to move water to storage south of the Delta for future allocation such that reservoirs South of the Delta would be fuller more often. Such changes in Article 21 deliveries would alter the distribution of water among the Contractors to the benefit of some and detriment of others. This differential impact occurs because Article 21 water is only available under certain conditions that generally occur only in the winter and early spring. Those Contractors that do not have sufficient storage capabilities or other immediate beneficial use of the water cannot accept delivery. Those that have such capabilities then get an added share when the water is allocated.

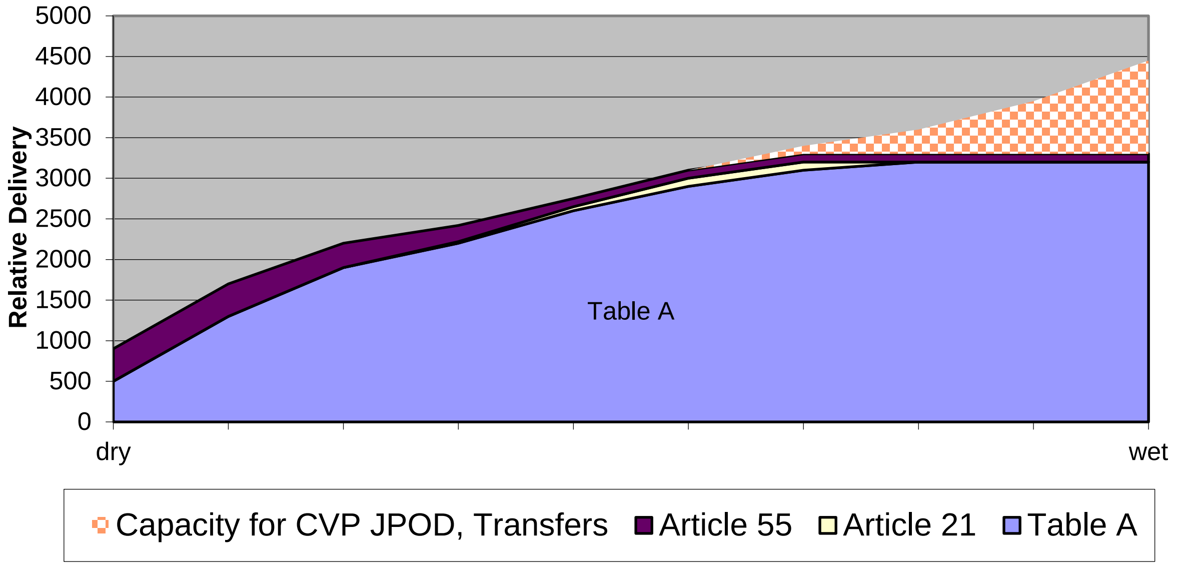
Figure 2
Relative Deliveries with Reduced Table A



Scenario 2: Combined Reduction of Table A and Article 21 Deliveries of 3.2 MAF per Year

Scenario 2 is a reduction in both Table A and Article 21 deliveries to 3.2 MAF per year. Figure 3 illustrates that total SWP exports from the Delta may not change due to the export of other water through Banks. Implementation of such a contractual scenario would not necessarily mean that more water would remain in the Delta to become outflow because other exporters might increase their exports, and the CVP might increase its use of Banks for JPOD exports and CVP transfers, as discussed previously.

Figure 3
Relative Deliveries with Reduced Table A and Article 21

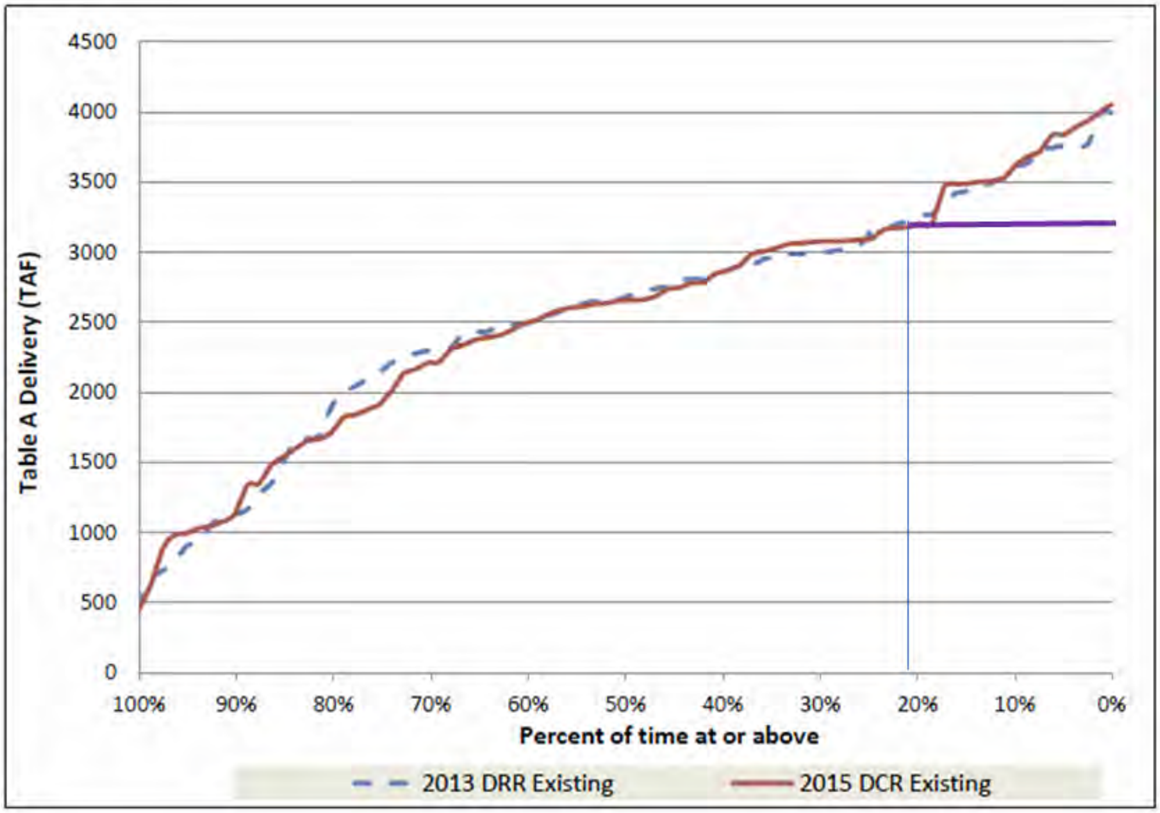


Analysis

Using DCR Appendix B, Figure B.4 (delivery probability figure; 2015 conditions), a vertical blue line was drawn to mark a reduced Table A delivery at 3.2 MAF. Figure 4 illustrates only the estimated Table A deliveries, and contains an added horizontal line drawn at 3.2 MAF, and vertical line illustrating the delivery probability of the point where the cap would take effect on Table A supplies. Figure 4 shows that 79 percent of the time Table A deliveries would be less than 3.2 MAF, and Contractors would be unaffected by this scenario. However, 21percent of the time Contractors would be affected by imposing this permanent reduction of Table A deliveries, with a reduction of 800 taf in the wettest of years (~4,000-3,200 taf). Additionally, this scenario assumes that they could not make up the difference with Article 21 deliveries exported from the Delta.

Limiting Table A deliveries to 3.2 MAF would decrease average annual SWP Table A deliveries by about 84 TAF. Table A deliveries would average somewhat less than the about 2,077 taf shown in DCR Figure 5-1 on page 2-15 of this FEIR, probably reduced to about 1,993 TAF per year.

Figure 4: Probability of Exceedance for Table A Deliveries



Annual deliveries of Article 21 water would be reduced by a smaller annual average amount than Table A in the years when Table A is less than 3.2 MAF. The impact would be as much as 650 taf in the wettest years (based on tabular data in Appendix B of the 2015 DCR).

The reduction of Table A and Article 21 deliveries would create Banks capacity for Article 55 water for Contractors, JPOD exports, and transfer water for CVP contractors. The amount of the capacity available for CVP JPOD use and added CVP transfers is not readily estimated, as it depends on SWP operational requirements, Reclamation's water needs and export capacity, federal budgetary considerations, availability of willing sellers of transfer water, willingness of south-of-Delta CVP purchasers to agree to purchases, and other factors.

Because exports would be artificially constrained at levels less than the SWP capability to deliver water in those wetter years, additional water could be retained in Oroville Reservoir. The added water could then help supplement deliveries during subsequent dry years. During some years, Banks Pumping Plant would operate at lower average export volumes. In the driest years, export pumping would be unchanged or, if Oroville held more water due to reduced deliveries in the prior year, increased slightly to move additional stored water from Oroville through the Delta and to Contractors.

The SWP share of San Luis Reservoir could also contain more water in the wetter years, helping increase deliveries during subsequent dry years when the full 3.2 million af could not be delivered. The normal fluctuation of the reservoir would be less due to a higher reservoir level and less deliveries in about 21 percent of the years. Low point water quality issues in San Luis Reservoir could be slightly less of a concern (when the reservoir storage falls below about 300 taf, algal growth in the water surface layers affects water quality at the level where water is extracted from the reservoir, especially impacting Santa Clara Valley Water District CVP deliveries).

The most serious effects of the scenario analyzed would result from an average 84 taf per year reduction in Table A deliveries to the 29 Contractors, affecting supplies to 23 million California residents and important agricultural uses. The reduction in water supply could trigger potentially significant adverse impacts affecting up to 23 million people, and affecting over 600,000 acres of irrigated agricultural lands. The actual percentage reduction in supply experienced by these people would vary locally according to the water supply mix used by each water agency.

Some agencies could be pressured to seek alternative supplies with consequential redirected environmental impacts to offset the reduced deliveries. The nature of those impacts is beyond the scope of this analysis, but they might involve: (1) more aggressive programs by Contractors in developing wet year transfer programs to fill the available capacity at Banks in the capped years (with added Delta export pumping, possible crop idling and associated impacts, and groundwater pumping with attendant impacts); (2) construction and use of desalting facilities (with added energy use, GHG emissions, and coastal resource impacts); (3) groundwater pumping (with impacts on other wells, more over drafted groundwater basins, and possible ground subsidence); (4) new reservoirs (with multiple potential impacts); (5) new stream diversions (with fish, recreation, and other impacts); and (6) other water supply development actions with associated impacts. Enforced conservation, rationing, shortages, forced landscape abandonment, abandonment of annual and permanent crops, and consequential economic impacts could also result. Some customers might forgo water use for landscaping with consequential effects on vegetation and wildlife. As noted in the prior section, Lake Oroville and San Luis Reservoir could contain more water at times, with beneficial impacts to recreation and visual resources.

CVP supplies in the area served by the federal CVP could benefit by pumping more water from the Delta through both Jones when SWP pumping is reduced and through capacity at Banks that, absent the limited delivery scenario, would be used for SWP purposes. The CVP would likely use JPOD at Banks more frequently to supplement exports at Jones and increase supplies to CVP contractors. The magnitude of this impact is influenced by the Coordinated Operations Agreement and other factors, and therefore has not been estimated at this time.

With the Banks Pumping Plant diverting less water at times, salvage of fish species would likely be less than under the proposed project or any of the No Project Alternative. The timing and extent of changes in salvage would depend on the timing and rate of Banks pumping, which would be influenced by SWP operational schedules under the scenario, use of Banks Pumping Plant for transfers, JPOD use for CVP supplies, increased exports at Jones, and other factors. No estimate of net change in salvage is available absent detailed operational studies, but a reduction in salvage appears likely from preliminary analysis.

2.3 RESPONSES TO COMMENTS

This section presents the comment letters received (see Table 2-1) and responses to the comments contained in each letter. The responses to comments are numbered consistent with the comment number for each letter and the order of the comment. For example, the response to the first comment in Comment Letter 1 is Response to Comment 1-1.

From: Alvarez, Ted@DWR
To: Cohen, Steve@DWR; Sandronsky, Vera@DWR; Ely, Terri@DWR; Sandino, David@DWR
Subject: FW: State Water Contract Extension EIR
Date: Thursday, October 06, 2016 7:46:14 AM
Attachments: Notice of Preparation - Water Supply Contract Extension Project Environm....pdf

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FYI, first comment letter on the Draft EIR

Ted Alvarez, P.E.
SWP Support Branch
State Water Project Analysis Office
(916) 653-6271
ted.alvarez@water.ca.gov

-----Original Message-----
From: Stewart, Bret [mailto:Bstewart@cosbpw.net]
Sent: Wednesday, October 05, 2016 12:00 PM
To: Alvarez, Ted@DWR
Cc: Crease, Fray@CountyofSantaBarbara; Hartley, Johannah; tfayram@cosbpw.net; Lackie, David; Paul, Mark
Subject: RE: State Water Contract Extension EIR

Greetings Mr. Alvarez,

I have attached a copy of a comment package dated October 7, 2014 which was sent to you on behalf of the County of Santa Barbara regarding the NOP for the Water Supply Extension Project EIR. Page three of the comment package is from Public Works and requested that the EIR address our liability concern that if a contractor default should occur, the County would be held responsible for covering the default without the taxation ability that exists under the current contract, because of its pre-Prop 13 legal status. In reviewing the current Draft EIR, we see that our comment has not been addressed. 1-1

We feel strongly that this is a valid liability concern for the County of Santa Barbara and potentially other similar agencies, and should be discussed and addressed in the EIR.

Please feel free to reply or phone me at (805) 568-3041 if you have any questions.

Sincerely,

Bret A. Stewart, PE
Civil Engineer Specialist
County of Santa Barbara

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Response to Comment 1-1

Although this comment does not address the environmental analysis in the DEIR, DWR is providing the following information in response. Each water supply Contract provides that if in any year a water Contractor fails or is unable to raise sufficient funds by other means, the Contractor shall levy a tax or assessment upon all property not exempt from taxation within the Contractor's jurisdiction sufficient to provide for all payments under the Contract due or to become due within that year (Article 34). The obligation expressed in this contractual provision stems directly from the statutory requirement contained in the CVP Act (Water Code Section 11652). Given the statutory requirement and the significance of this obligation to the financial integrity of the State Water Project, DWR does not intend to make changes to this provision and expects that the Proposition 13 exemption for prior voter approved indebtedness will continue to apply during the extended term of the Contracts.

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Stanislaus County
Striving to be the Best

CHIEF EXECUTIVE OFFICE

Stan Risen
Chief Executive Officer

Patricia Hill Thomas
Chief Operations Officer/
Assistant Executive Officer

Keith D. Boggs
Assistant Executive Officer

Jody Hayes
Assistant Executive Officer

1010 10th Street, Suite 6800, Modesto, CA 95354
Post Office Box 3404, Modesto, CA 95353-3404

Phone: 209.525.6333 Fax 209.544.6226

STANISLAUS COUNTY ENVIRONMENTAL REVIEW COMMITTEE

October 3, 2016

Ted Alvarez, Project Manager
Department of Water Resources
State Water Project Analysis Office
PO Box 942836
Sacramento, CA 94236-0001

SUBJECT: ENVIRONMENTAL REFERRAL – DEPARTMENT OF WATER RESOURCES – WATER SUPPLY CONTRACT EXTENSION PROJECT – DRAFT ENVIRONMENTAL IMPACT REPORT

Mr. Alvarez:

Thank you for the opportunity to review the above-referenced project.

The Stanislaus County Environmental Review Committee (ERC) has reviewed the subject project and has no comments at this time. 2-1

The ERC appreciates the opportunity to comment on this project.

Sincerely,

Patrick Cavanah

Patrick Cavanah
Management Consultant
Environmental Review Committee

PC:ss

cc: ERC Members

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Response to Comment 2-1

The comment letter conveys that the commenter has no comments on the DEIR and no response is required.

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Letter 3

County Of Santa Barbara

Mona Miyasato
County Executive Officer

105 East Anapamu Street, Room 406
Santa Barbara, California 93101
805-568-3400 • Fax 805-568-3414
www.countyofsb.org

Executive Office

October 17, 2016

Mr. Ted Alvarez
State Water Project Analysis Office
Department of Water Resources
1416 Ninth Street, Room 1620
Sacramento, CA 95814

E-mail: ted.alvarez@water.ca.gov

Re: Draft Environmental Impact Report – Water Supply Contract Extension Project Environmental Impact Report

Dear Mr. Alvarez:

Thank you for the opportunity to comment on the draft Environmental Impact Report for the Department of Water Resources' Water Supply Contract Extension Project. At this time, the County is submitting the attached letter from the County Public Works Department.

The County has no further comments on this project at this time and looks forward to hearing more about the project's progress. If you should have any further questions, please do not hesitate to contact my office directly, or Glenn Russell, Director, Planning and Development Department, at (805) 568-2085.

Sincerely,

Mona Miyasato
County Executive Officer

cc: Glenn Russell, Ph.D., Director, Santa Barbara County Planning and Development Department
Tom Fayram, Deputy Director, Flood Control, Public Works Department

Attachments: October 12th Letter, County of Santa Barbara Public Works Department

Terri Maus-Nisich *Assistant County Executive Officer* tmaus@countyofsb.org	Matthew P. Pontes *Assistant County Executive Officer* mpontes@countyofsb.org	Dennis Bozanich Deputy County Executive Officer dbozanich@countyofsb.org	Tom Alvarez *Budget Director* toalvarez@countyofsb.org

Letter 3

COUNTY OF SANTA BARBARA
PUBLIC WORKS DEPARTMENT
123 E. Anapamu Street
Santa Barbara, California 93101
805\568-3000 • FAX 805\568-3019

SCOTT D. MCGOLPIN
Director

October 12, 2016

Mr. Teodoro Alvarez, Supervising Engineer
California Department of Water Resources
1416 9th Street
Sacramento, CA 95814

RE: Comments on Draft Contract Extension EIR – State Water Project (SWP)

Dear Mr. Alvarez:

The Santa Barbara County Flood Control and Water Conservation District (District) appreciates the opportunity to comment on the draft EIR for the Proposed Contract Extension. We offer the following comments:

1. As we commented at the outset on the Notice of Preparation, the fiscal impacts of how the contract extension impacts the ability of the District and other Contractors to meet its obligations under our existing SWP Contract through tax assessments in the case of a failure of payment to the State by one of our water purveyors have not been addresses in the draft EIR. Ultimately a tax assessment is the only practical way the District can assure payments. It seems a cornerstone issue in this contract extension to either assure the taxing ability is intact or provide relief from the requirement. Please address this issue in the Final EIR. 3-1
2. Alternative 7 indicates that if a Contractor fails to sign a contract amendment that their water service would only continue until the expiration of their contract. Such a statement is in conflict with the provisions of the existing executed Water Supply Contracts, including the Water Supply Contract executed with the District. In particular Article 4 of the Water Supply Contract gives the Contractor the option to extend the contract. While it is understood certain financial changes may not be implemented if the Contractors do not approve an extension before the timeframes included in Article 4, this alternative incorrectly presumes that contractors must commit to an extension of the Water Supply Contract more than 6 months in advance of the contract's expiration. 3-2
3. Finally, the EIR provides no timeline for executing a Contract Amendment. The District recognizes that conditions are different for the various SWP Contractors and as such a contract extension would need to address specific conditions and concern applicable to that Contractor, including the Prop 13 issues. 3-3

Thank you again for the opportunity to provide these comments and we look forward to the State's responses to these critical issues.

Sincerely,

Bret A. Stewart, P.E.
Santa Barbara County Department of Public Works

cc: Tom Fayram, Deputy Director, Flood Control

AA /EEO Employer

Thomas D. Fayram, Deputy Director Chris Sneddon, Deputy Director Mark A. Schleich, Deputy Director
Mark Paul, Chief Financial Officer Aleksandar Jevremovic, County Surveyor
www.countyofsb.org/pwd

Response to Comment 3-1

See Response to Comment 1-1.

Response to Comment 3-2

Alternative 7 addresses the situation where: (1) most Contractors sign the proposed amendment and in so doing extend their Contract beyond their expiration dates; and (2) a few Contractors opt not to extend their Contracts and allow their Contracts to expire without any extension. However, DWR concurs with the comment that a Contractor may choose not to sign the proposed amendment and still exercise its right in accordance with Article 4 of the Contract, to extend the expiration date of its Contract. Article 4, described on pages 7-9 and 7-10 of the DEIR, gives each Contractor a right to extend its Contract on generally the same fundamental terms as in the current Contract (including among other things, the same quantities of water to be delivered, the same quality of water to be delivered, and the same cost of service), by providing a notice to DWR at least six months in advance of the Contractor's contract expiration date. Extension of the Contract through the exercise of rights under Article 4 is addressed in the No Project Alternative. If DWR approves the proposed project, it is anticipated that most of the Contractors, after making their own independent determinations, may also elect to sign the proposed Contract amendment (25 of the Contractors have signed the AIP). If this situation occurs, it would be possible for non-signing Contractors to extend their Contracts through the exercise of Article 4, which would be the No Project Alternative as to those Contractors. Even if this situation occurred, DWR is of the opinion that this would still not result in any significant environmental impacts as discussed in the No Project Alternative for those Contractors extending through Article 4 and in the analysis of impacts arising from the proposed project for those Contractors choosing to sign an extension amendment. The DEIR provides the impact analysis for the latter in Chapter 4, Environmental Analysis. Potential impacts for the scenario where some Contractors do not sign and extend their Contracts through Article 4 was analyzed in the No Project Alternative in Chapter 6, Alternatives of the DEIR.

Response to Comment 3-3

The timeline for executing the proposed Contract amendment depends on several factors, including compliance with all CEQA requirements and completion of a draft amendment based on the AIP, and as a result no timeline has been established. With regard to the reference to Proposition 13, please refer to Response to Comment 1-1.

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Letter 4

PLUMAS COUNTY FLOOD CONTROL & CONSERVATION DISTRICT
1834 East Main Street, Quincy, CA 95971 *Telephone: (530) 283-6268*

Submitted on October 17, 2016 via e-mail to: watercontractextension@water.ca.gov

Mr. Ted Alvarez
State Water Project Analysis office
Department of Water Resources
P.O. Box 942836
Sacramento, Ca. 94236-0001

RE: Draft Environmental Impact Report for the Water Supply Extension Project

Dear Mr. Alvarez:

Plumas County Flood Control and Water Conservation District (Plumas) appreciates the opportunity to provide public comments on the Contract Extension Project – Draft Environmental Impact Report (DEIR). Having participated actively throughout the Contract Negotiation and Agreement in Principle (AIP) process, Plumas officials appreciate the amount of effort that it has taken the parties to reach this milestone.

Plumas concluded the AIP development process with the expectation that the final AIP, now the proposed project in the DEIR, would include resolution of the Objective 4 issue that was brought forth by Plumas and Butte Counties. That anticipated resolution has not occurred because the DEIR does not address the outstanding Objective 4 issue. Please see attached letters from Plumas and the Department of Water Resources (DWR) concerning Objective 4. 4-1

Objective 4 would have provided State Water Project (SWP) Contractors the option to "opt out" from the BDCP project. The DWR position in the DEIR is that the California Water Fix (the name for the revised BDCP or "Tunnels" projects) is not part of this DEIR. The Plumas concerns with having an "opt out" option for financing new projects are not resolved by the DEIR because the DEIR's proposed project includes providing financing mechanisms for undefined new projects that appear to total over 2 billion dollars in new debt service compression by 2085 (from Figure D2).

The DEIR fails to describe the magnitude of new debt that results in over 2 billion dollars in new debt compression by 2085, despite pay as go financing. For comparison, the current compression "cliff" that is driving the need for a contract extension appears to be approximately 400 million dollars (Figure D1). The need for financing future debt and the magnitude of that future debt is fundamentally another purpose and the need for the project, in addition to paying off the existing SWP project and securing the financing for the operation and maintenance of the existing SWP project through 2085 or 2110. 4-2

Failing to distinguish between financing existing debt and new debt in the project description leads to in inadequate range of DEIR alternatives.

The DEIR fails to identify two potentially environmentally superior alternatives because the financing of the existing SWP project, where environmental impacts are defined and mitigated, is intertwined with the financing of new SWP projects having unknown environmental impacts. Strengthening the financial integrity of the existing SWP system is, arguably, an environmentally superior alternative to alternatives where the environmental effects are unknown. Therefore, final EIR needs to analyze an environmentally superior Alternative for a SWP contract extension to 2085 that does not include new SWP debt financing and unknown environmental impacts for new SWP projects. This is partially accomplished in the DEIR Alternative 4.

However, the DEIR Alternative 4 does not include the new financing aspects of the AIP and the DEIR's proposed project that Plumas believes will provide needed financial security for the existing SWP system. It needs to be noted that Article 4 in the Original Contract fails to provide DWR with the new financing tools such as the increased GOA and the SSA that Plumas supports. Increasing reserves for SWP emergencies by increasing the GOA from 32 million to 150 million dollars, and securing bridge funding for recreation and environmental SWP project features (the SSA) are new financing provisions that will enhance the environmental and recreational performance and security of the existing SWP. Plumas contends that for the purposes of environmental analysis, new financing mechanisms for extending financial security for the existing SWP system can be "severed" from the new financing mechanisms for new SWP projects even though they were developed as integrated parts of a larger financing package during Contract Extension Negotiation process.

When new financing mechanisms are applied to the existing SWP system two potentially environmentally superior alternatives emerge.

A new Alternative 4 applies the new GOA and SSA provisions of DEIR Objective 2 to the existing SWP system. The new Alternative 4 includes authorization for revenue bond issuance for current projects with known and fully mitigated environmental effects, and simplified billing (for existing SWP projects) in DEIR Objective 3. Thus, the new Alternative 4 more fully achieves Objectives 1-3 by extending the existing Contracts to 2085 without incurring new debt compression associated with post 2016 SWP projects (Figure D2). The new Alternative 4 fully supports and secures the existing SWP system without binding Contractors to "blank check" liabilities for undefined projects with undefined environmental consequences.

4-2
cont.

The DEIR Alternative 5 commits all "affected" Contractors to financing new projects if 80% of "affected" Table A Contractors agree, but proposes a delay in implementing the proposed project until 2035. Thus, Alternative 5 becomes another potentially environmentally superior alternative to the proposed project if the almost 20 year delay in financing for new projects allows new projects to mature to the point that their environmental effects and mitigations become available to the public in advance of financing commitments for those projects. For transparency, the Alternative 5 should include "the list" of new SWP projects from 1987-2016 that are potentially fungible with DWR issues revenue bonds and their current status.

4-3

In addition to failing to identify environmentally superior alternatives, the DEIR is defective because it fails to describe a transparent and consistent process for determining the affected Contractors and affected environments for new projects, and for assigning financing liabilities for new projects among Contractors in the event of defaults. 4-3 cont.

In summary, the final EIR should include: 4-4

- A new Alternative 4 that includes the GOA, SSA and, simplified billing provisions described in the DEIR as parts of Objectives 2 and 3.
- A more defined Alternative 5 that commits the DWR during the "delay period" between 2016 and 2035, to provide sufficient detail for the public to be able assess the environmental and economic outcomes. By 2035, DWR would:

  (1) describe the new projects requiring financing,

  (2) disclose the anticipated environmental effects and

  (3) identify the benefits and costs for the "affected" (as defined) Contractors and environments.

- The process that the DWR will utilize for determining the affected contractors and environments for financing new projects. 4-5
- The process that the DWR will utilize for redistributing debt for new projects where one or more of the "affected Contractors" default on their financing obligations.

The Plumas Amendment: 4-6

Plumas offers other recommendations for the final EIR to remedy the outstanding obligations on the part of DWR to Plumas regarding the Objective 4 in Contract Extension Negotiation process through the development of the Plumas Amendment under the Monterey Settlement Agreement.

Plumas is one of two SWP Contractors that did not sign the Monterey Amendments. Instead the Plumas Amendment is provided in the Monterey Settlement Agreement, as a mechanism whereby the DWR and Plumas can negotiate contract amendments for the SWP facilities located in Plumas SWP service area.

Given Plumas's unique location as the sole, headwater Contractor that is entirely upstream of the SWP's Oroville –Thermalito Complex, Plumas anticipates no benefits from any new projects that will become eligible to be financed by the proposed project. Plumas will receive no new water supplies, nor has Plumas ever used water supplies from the Oroville Reservoir and from the Thermalito forebay and afterbay, or from the rest of the SWP system downstream of the

Oroville-Thermalito facilities. Plumas will receive no new power supplies, nor has Plumas ever used power from Oroville -Thermalito Complex or from SWP facilities downstream of the Oroville-Thermalito Complex. Plumas has received no water supply or power benefits from SWP projects constructed after 1987. And Plumas neither proposes nor anticipates any water supply or power benefits from any new SWP projects that will be financed from 2016 to 2085 or 2110.

In recognition of the different water management needs for the SWP Contractors located upstream of the Delta, DWR has developed and Initial Study and has executed contract amendments for the other "North of Delta"(NOD) or "Area of Origin" Contractors (Yuba, Butte, Napa, and Solano) http://www.water.ca.gov/swpao/wsc.cfm displays the SWP Original Contracts with amendments. Appendix A of the Initial Study quantifies and specifies modifications to each of the contractors' SWP allocations, and thereby, defines the companion contract amendment for each of the four NOD Settlement Agreement Contractors.

The Plumas Amendment has yet to be negotiated. Plumas anticipates that the Plumas Amendment will not change Table A Allocations for any SWP Contractor. And because instream flows would be maintained below the SWP Antelope, Frenchman, and Davis reservoirs, downstream effects to SWP Contractors would remain unchanged. The three SWP reservoirs would continue to be operated for their original project purposes for recreational, environmental and water supply benefits.

4-6 cont.

The pre-Monterey Amendment SWP Contract provisions include Section 18b. In the spirit of Section 18b, Plumas declares that the SWP projects for the Plumas SWP service area of the Oroville-Thermalito Complex are finished and complete for the entire duration of the new contract period. The SWP developments authorized in Original SWP Contract for the Plumas SWP service area that are not already built will never be built. Therefore, the final EIR should make the determination that Plumas is not an "affected Contractor" for any new SWP projects or new project-related environmental mitigations after 1987. Nor is Plumas liable for any portion of the new compression debt "cliff" (despite "pay as go" financing) that the rest of the SWP Contractors will incur as a result of debt financing for the proposed project after 1987 or that will be built during the new Contract Extension period.

In summary, Plumas recommends that the final EIR provide the "new Alternative 4" option for all SWP contractors. Or the final EIR should provide a definition of "affected contractors" for new projects that specifically excludes Plumas. These are reasonable and feasible ways to allow Plumas to continue as a SWP Contractor during the Contract Extension period of 2016-2085 (or 2110) without being forced to finance new SWP projects under the SRA and other new debt financing provisions in the DEIR's proposed project.

The final DEIR should disclose that the proposed project will provide the future payments to the Monterey Plaintiffs that were stipulated in the Monterey Settlement Agreement, and that the

DWR and Plumas will negotiate the Plumas Amendment in good faith, including the extension of the Bridge Agreement in order to address the aforementioned concerns and recommendations raised by Plumas in this comment letter. 4-6 cont.

Thank you for the opportunity to comment.

Very truly yours,

Robert A. Perreault, Jr.
Co-Manager, for the Plumas County Flood Control and Water Conservation District, and
Director of Public Works
County of Plumas

1834 East Main Street
Quincy, California 95971
bobperreault@countyofplumas.com
(530) 283-6268

Attachments (2): Correspondence letters between DWR and Plumas regarding Objective 4 in the Contract negotiation process

cc: Governing Board, Plumas County Flood Control and Water Conservation District

Randy Wilson, Co-Manager, for the Plumas County Flood Control and Water Conservation District, and Planning Director, County of Plumas

Craig Settlemire, County Counsel for the County of Plumas

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Response to Comment 4-1

As indicated in the AIP (Section XIV), Contractor participation in California WaterFix will be addressed through a separate public negotiation and environmental review process to develop appropriate SWP water supply Contract amendments. Accordingly, it was the opinion of the DWR and several water Contractors that this issue would be more appropriately addressed in a separate Contract amendment negotiation process and not as part of the proposed Contract extension negotiations. See Master Response 3 for more information on the relationship of the proposed project and California WaterFix and the separate Contract amendment process.

Response to Comment 4-2

As noted by the commenter, Alternative 4 addresses extension of the Contracts without any new or modified financial provisions. Under this Alternative 4, without any new or modified financial provisions, DWR would still be able to continue to finance capital projects using the existing provisions of the Contracts. However, this commenter is suggesting that a modified Alternative 4 or new alternative be considered that would only allow DWR to undertake a capital project if DWR is aware of the project (or has completed the environmental review of the project) prior to the execution of a contract extension amendment or prior to 2035. In the past, SWP capital projects have included such projects as aqueduct and facilities repairs and additions, new pumping plants, new power plants, aqueduct extensions, pipeline extensions, and dam rehabilitations. The need for some of these same types of projects is certain to occur in the future, but will not in all cases be identified by the time of the execution of the proposed project or by 2035. Accordingly, to limit the capital projects to be undertaken in the future to only those identifiable (or environmentally reviewed) prior to the execution of the proposed project or 2035, does not appear feasible given the critical need to maintain the operational integrity of an already ageing SWP. And it is important to reiterate that any project or activity proposed for repair, construction, or acquisition beyond 2035, just like any project or activity undertaken before 2035, would require a review and determination in compliance with the CEQA whether or not to proceed. In addition, it is DWR's practice to inform and consult, as appropriate with the Contractors before undertaking new projects.

In addition, Appendix D of the DEIR states: "Only existing SWP facilities and associated expenses are included in this model [See Figure D2 in Appendix D, SWP Financial Model] evaluation and no expenditures for additional SWP facilities are included as part of this analysis." This information was included in the model to illustrate what could happen under the proposed project if no future action is taken to extend the Contract beyond 2085.

Response to Comment 4-3

Alternative 5 would extend the Contracts to the same extent as the proposed project, but would not otherwise implement the new and modified financial provisions and enhancements until 2035. As stated on page 7-28 in Chapter 7, Alternatives, Alternative 5 is not the environmentally superior alternative because it would meet most of the objectives but to a lesser degree than the proposed project. On the other hand, the proposed project would implement the new and modified financial provisions and enhancements upon the proposed project taking effect. As addressed in the DEIR (See Chapters 1 and 4), the sooner the proposed new and modified financial provisions and enhancements are implemented the sooner those changes will provide for a more fiscally sound SWP and for charges to the Contracts that better match revenues with costs, among other benefits. As to the modifications to Article 1(hh) taking effect as soon as the proposed project takes effect, it is significant to keep in mind that any new project considered for financing through the issuance of water system revenue bonds pursuant to Article 1(hh) would always require consultation with the affected Contractors and compliance with CEQA before revenue bond financing would be determined to be appropriate. See also the Response to Comment 6-2 concerning article 1hh and 4-5 concerning “affected Contractors.”

Response to Comment 4-4

See Response to Comment 4-2.

Response to Comment 4-5

Although this comment does not address the environmental analysis in the DEIR, DWR is providing the following information in response. The AIP includes a proposed addition to Article 1(hh) to allow water system revenue bonds to be sold to finance a project if 80 percent or more of the affected Contractors (with 80 percent or more of the Table A water among those Contractors) approve the use of revenue bonds to finance the project. Those Contractors that would be affected by a project and, therefore, responsible for sharing the costs of the project, would be identified at the time of project development using the water supply Contract principles and practices that have applied up to now. Here again, before any financing would take place, the project would have first been reviewed and a determination made in compliance with CEQA whether or not to proceed with the project. Also, in the event of a default by an affected Contractor in making its payments related to water system revenue bonds, Article 50 of the Contract provides for an additional charge to the non-defaulting Contractors to cover the deficiency (but up to no more than an additional 25 percent of each Contractor’s individual water system revenue bond repayment obligation).

Response to Comment 4-6

The commenter, Plumas County Flood Control & Conservation District, states that there is an amendment to its Contract that has been contemplated as a result of the Monterey Settlement which has not yet been completed. The commenter has also suggested that certain concepts (regarding, among other things, its cost responsibilities) should be included in such an amendment to its Contract. These suggestions specific to the commenter’s Contract are more appropriately considered in separate contract amendment negotiations between DWR and the commenter, and for this reason are not within the scope of this EIR. Please see also Response to Comment 4-2 regarding commenter’s proposed revisions to Alternative 4. The attachments to the comment is included in Exhibit B to this FEIR.

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CENTRAL DELTA WATER AGENCY
235 East Weber Avenue • P.O. Box 1461 • Stockton, CA 95201
Phone (209) 465-5883 • Fax (209) 465-3956

DIRECTORS
George Biagi, Jr.
Rudy Mussi
Edward Zuckerman

COUNSEL
Dante John Nomellini
Dante John Nomellini, Jr.

October 17, 2016

Via email watercontractextension@water.ca.gov
and First Class U.S. Mail

Ted Alvarez
State Water Project Analysis Office
Department of Water Resources
P.O. Box 942836
Sacramento, California 94236-0001

Re: Water Supply Extension Project.
Draft Environmental Impact Report.

Dear Mr. Alvarez:

Please accept these comments on behalf of the Central Delta Water Agency and the South Delta Water Agency concerning the Draft Environmental Impact Report ("DEIR") for the Water Supply Extension Project ("Project"), including the comments set forth in the attached Public Draft SWP Contract Renewal EIR: Additional Central and South Delta Water Agency Comments.

1. Extend the Comment Period and Delay Action.

Informed and meaningful evaluation, analysis, comment and public participation as well as the development and analysis of realistic alternatives is not possible until a complete DEIR is provided. An informed administrative decision cannot be made in the absence of a complete DEIR and knowing the outcome of several issues. Without an actual, final form contract to review, the environmental review process cannot proceed. 5-1

It is unknown whether the Twin Tunnels project will go forward. Viability of the existing project appears in doubt given the uncertainty in the State Water Resources Control Board 5-2

("SWRCB") water quality and flow proceedings, particularly given the negative impacts on the Delta of existing project operations and the requirement of the Delta Reform Act that there be reduced reliance on the Delta. In the Delta Stewardship Council Cases, Judicial Council Coordination Proceeding No. 4758, Superior Court Judge Michael P. Kinney found that the Delta Plan failed to include quantifiable or otherwise measurable targets associated with achieving reduced Delta reliance required by the Delta Reform Act. The uncertain future of the various Delta related proceedings in and of itself militates against proceeding with environmental review at this time, much less a 50 year extension of the water contract. 5-2 cont.

The DEIR also fails to take proper account of the impacts on Salmon, Delta Smelt, ground water pumping, the Sustainable Groundwater Management Act ("SGMA"), global warming trends, and the trend in SWP service areas toward the planting of permanent crops and the associated long term demands thus made upon already insufficient water supplies. 5-3 Further, the DEIR fails to consider impacts of the project on the Delta, the inadequacy and future uncertainty of supplies, the SWRCB proceedings, and the relationship of contract renewal with the San Joaquin River Restoration Plan. 5-4

It would be premature to impatiently move forward at this time on such a long term extension of the project for another 50 years without addressing these and other public and environmental needs. These problems, as well as the possible lack of participation due to the DEIR's fatal approach of characterizing the project as limited to financial issues rather than the project as a whole, require delay and preparation of a proper DEIR at the proper time. 5-5

2. The Incomplete And Poorly Defined Project Renders The Pending Draft Environmental Impact Report Premature.

At this time there is merely an Agreement in Principle ("AIP") "that could provide the foundation for an agreement . . ." according to the DEIR. This is a gaping whole of uncertainty as to what the actual contract terms will be. In the absence of a final version to evaluate, adequate review and comment cannot be made. Further, any variations between the AIP and a final, execution version are likely to generate further controversy and cause the need for a further environmental review process. 5-6

3. The DEIR Fails To Analyze And Address The Issues Raised In The Scoping Comments Of October 13, 2014.

CDWA provided detailing scoping comments, including the enclosed Attachment to Central Delta Water Agency's Comments on the Notice of Preparation of an EIR for the "Water Supply Contract Extension Project" dated October 13, 2014. We herewith resubmit those comments and the DEIR is defective in its failure to analyze and address each of the concerns 5-7 raised therein. 5-7 cont.

4. The No Project Alternative Is Not Properly Formulated, And Speculatory.

The No Project alternative is characterized as taking no action and allowing the continuation of operations, until 2035, but speculating the contractors would renew under the existing contract. However, without the ability to continue long term financing at subsidized rates, and the need to pay-off overdue capital expenditures exacerbated by increased regulatory and supply constrictions, some contractors may chose not to renew. Moreover, any failure to renew could free up supplies for other purposes. Such events, as well as other potential scenarios, should have been evaluated. DWR prejudiced the DEIR by limiting its description of the No Project alternative to a view most favorable to the contractors, and abrogated its responsibilities. 5-8

5. Statewide Impacts Were Not Evaluated.

By limiting the study area, the DEIR fails to analyze the potential environmental impacts of the 50 year extension in areas outside the areas analyzed, including impacts on listed and non-listed species outside the area of study. Most noticeably, the potential impacts in the area where the water supply is taken from, the Sacramento-San Joaquin Delta, as well as other areas of the entire state not analyzed. 5-9

It is misleading to state in the Notice of Availability that the project location itself merely consists of operations and facilities areas, and service areas, particularly where projects outside those areas may be financed and such areas may be impacted. Even more misleading is the statement that the project will not "Alter the existing authority to build new or modify existing facilities . . ." since part and parcel with authority is the ability to finance, and the thrust of the project was to pave the way for the BDCP and the Twin Tunnels.

6. Expansion of Water System Facilities to be Financed by Water System Revenue Bonds.

This proposal to revise Article I, to expand the authorized facilities, would dramatically increase the projects capable of being financed, such that it prospectively could sanction the financing of projects such as the Twin Tunnels, include financing by state revenue bonds. Attempting such an end-run around consideration and analysis on a project by project basis evidences piece-mealing of the environmental review process. This deprives the public of and avoids the proper analysis and vetting of each project on its own. The need for analysis of funding for any project beyond that already authorized, on a case by case basis, points up the overreaching of the existing the DEIR and the AIP. If this is to be permitted, the DEIR should 5-10 have described, evaluated and reviewed each project that could be financed using this new, open-ended expansion of project funding that seeks to avoid such public review.

The proposal lays the groundwork, and is an integral part of undescribed, unknown and unevaluated facilities. 5-10 cont.

7. Environmental Review Was Improperly Limited To Financial Aspects.

While certain segments of the extended contract that may be the subject of revision pursuant to the AIP may be financial in nature, the true project is not limited to financial aspects, but instead is an outright renewal of the entire contract for 50 years. Accordingly, review should have been made of the environmental effects of the project as a whole, and the contract as a whole. By failing to analyze the effects of the renewal of the contract as a whole, the environmental impacts were not properly analyzed and mitigated is absent. 5-11

8. Supply Reductions for Area of Origin.

Any contract extension would be subject to reductions in deliveries in order to meet the water needs within Areas of Origin pursuant to law, including without limitation the requirements of California Water Code section 11460, et seq. Greater emphasis and analysis should have been provided in the DEIR of these aspects. 5-12

9. River Regulation Including Salinity Control.

Any contract extension should expressly be subject to the greater need to provide river regulation, including salinity control, from time to time, that may result in reductions of contractual deliveries. This should be made abundantly clear to assure that there is no undue reliance on the over-stated quantities specified in the contracts. Such issues should be analyzed within the current context. 5-13

10. Mitigation, Public Trust, and the Endangered Species Act.

All contract deliveries under any extension should expressly be evaluated and conditioned on meeting mitigation, public trust, and Endangered Species Act ("ESA") responsibilities, and State Water Resources Control Board ("SWRCB") requirements and standards. These obligations are indisputable and should be expressly delineated in their current context in the contract and analyzed in the DEIR. (See also 11. below). Instead, the AIP proposes a sweetheart extension of the contracts in which DWR appears to have abandoned its public trust duties and responsibilities. 5-14

11. The DEIR Should Have Analyzed The Need to Limit Supply to Capacity of Existing Facilities and Supplies.

It is egregious in the extreme to continue with the over-subscription by both state and federal contractors in relationship to the undeniable insufficiency of existing supplies. The original planned supply was to develop North Coast waters, but that never did happen. See Bulletin No. 76 Delta Water Facilities CDWR December, (1960), provided by mail only, excerpt page 11 provided by email. The water to be made available should be expressly limited to those designed historical amounts which could be legally and reliably provided without unbuilt North Coast facilities or operations, and consistent with existing trends of shortage. If new facilities or operations are built to provide water in excess of supplies currently capable of delivery, such should be clearly stated and the subject of separate long term contracts. It should also await the required environmental review and the actual permitting and completion of the facilities and operations necessary to fulfill such a contract for supplies not presently capable of being delivered. The time for the overstated Table A contract amounts and the supply of unclaimed water and vague Article 21 "interruptible water" should be ended instead of continuing to manipulate supplies in a manner conducive to creating hard demands for unavailable water. See The State Water Project Final Delivery Capability Report 2015 (DWR July, 2015), provided by mail only. Intermittent and unreliable supplies encourage and soon develop into hardened demands to supply urban grown and permanent crops such as orchards. 5-15

The quantities of water should be reduced to a level not in excess of the greatest quantity supplied under the existing long-term supply contract. The quantities should also be reduced pro-rata by the quantities of water required to be supplied for other purposes.

12. Project Mischaracterized As "Amendment to financial provisions".

The DEIR mischaracterizes the project as mere amendments to financial provisions, and in so doing limits and fails to analyze and address the task that should have been at hand: analysis of environmental impacts of the contract amendments themselves, including the term and the contract as a whole. While amending the contract for ease of administration, expanding the scope to allow financing of other capital expenses, and extending the term for 50 years may all have financial effects, it is the environmental impacts of the whole of the project which need to be studied, rather than the limited environmental impacts of the financial issues studied and analyzed. By describing the project as merely amending the financial provisions, DWR improperly limited the scope of the analysis in the DEIR. 5-16

13. Premature Project

The DEIR admits it will not only amend existing articles, but would add new articles. This is further evidence of an incomplete project not yet ready for environmental review. 5-17

14. Erroneous Assumption That Water Supply Amounts Would Not Change And Would Continue To Be Delivered.

Without any basis in fact the EIR assumes that water supply amounts would not change and would continue to be delivered. It is beyond reason that such assumption could be made during a period of extended drought, whether characterized as a weather drought or a regulatory drought. Assuming no change in past supplies which had anticipated undeveloped North Coast supplies, maintaining past deliveries which were harmful to the Delta and its species, and maintaining never provided contract quantities, is unreasonable and unsupportable. 5-18

15. Impacts and Mitigation Measures Not Property Analyzed.

5-19

With the scope of the project description described as limited to financial provisions, every single segment of the DEIR concerning impacts and mitigation measures is myopic, tainted, and deficient. Indeed, the scant impacts and mitigation measures analysis is nearly identical in almost all segments of the Environmental Analysis, paying token lip-service to the EIR process. In this regard, it is concluded in nearly every Impacts and Measures provision, as follows:.

> "The proposed project would amend and add financial provisions to the Contracts based on the negotiated AIP between DWR and the Contractors. The proposed project would not change or create new water management measures, alter the existing authority to build new or modify existing facilities, or change water allocation provisions of the current Contracts.
>
> . . . .
>
> Because the proposed amendments to financial provisions would not change Contractors' water operations and no structures would be constructed as part of the proposed project, no substantial adverse effect . . . . Furthermore, the proposed project would not have a substantial adverse effect. Therefore, no impacts would occur . . ."

These conclusions are unreasonable and reflect the flawed nature of the DEIR. A 50 year extension of a contract for the most scarce public resource in the state by definition will have profound environmental impacts that need to be analyzed and considered. 5-19 cont.

For all of these reasons we respectfully submit the DEIR should be rejected and a new DEIR should be prepared when the illusory AIP has matured to a true, proposed contract, and proper consideration is given to the substantial environmental concerns present. 5-20

Yours very truly,

DANIEL A. McDANIEL
Counsel

cc: Board of Directors
South Delta Water Agency

Public Draft SWP Contract Renewal EIR:
Additional Central and South Delta Water Agency Comments

The SWP contract renewal proposed project does not mitigate any on-going impacts of the SWP (e.g. fish genetic introgression from continued blockage of fish upstream passage by the continued existence of the Oroville Dam, degradation of genetic integrity from continued unnatural reproductive selection resulting from elevated water temperatures from the continued existence of and operation of Oroville Dam, on-going habitat quality and quantity degradation from continued sediment and large woody debris capture at Orville Dam, continued salt accumulation degradation of soils and agricultural productivity in the SWP service area from on-going SWP export of salts in the delivered irrigation water, continued groundwater overdraft and subsidence in the SWP service areas from variations in SWP water delivery quantities, etc. - see Oroville Relicensing EIR Cumulative Impacts for a more comprehensive list of on-going SWP impacts.) Similarly, the BOR Remand EIS identifies similar on-going impacts of the operations of the CVP. The revised draft EIR for the SWP Contract Renewals must include identification, evaluation, quantification, mitigation and disclosure of these environmental impacts from the on-going operations of the SWP that would continue as a result of the water supply delivery contract renewal. 5-21

The EIR is not suitable to support agency decision making. The EIR finding of no significant impacts is incorrect as there are many significant impacts of continuing water supply deliveries as compared to not continuing operations (which must be the No Project definition - see related comments). DWR's EIR/S of the California Water Fix identified many significant impacts of continued operation of the SWP - see related comments. Reclamation's Remand EIS also found may significant impacts of continued operations of the CVP - see related comments. The on-going impacts of the operations of the CVP and SWP would largely be the same. CEQA requires “lead agencies” to include in their Environmental Impact Reports (“EIRs”) information deemed necessary for Projects to be taken or considered by “responsible agencies.” (CEQA Guidelines, § 15082, subd. (b)) Information provided in this EIR is not sufficient to support decision making for responsible agencies issuance of permits, including, but not limited to: Central Valley Regional Water Quality Control Board certification as compliant with the Water Quality Control Plan for the Delta, Delta Stewardship Council Delta Plan Consistency Certification, local Reclamation Districts, etc. Because the finding of no significant impacts in contradiction to the findings of other contemporary documents that analyze the same impacts and the incorrect definition of the No Project as the basis of comparison, the EIR is not suitable as a decision support document for the lead agencies. 5-22

Failure of Alternatives to Meet Project Objectives:

In DWR's November 2013 BDCP EIR/S, page 2-5, line 7 "As indicated by the “up to full contract amounts” phrase, alternatives need not be capable of delivering full contract amounts on average in order to meet the project purposes. Alternatives that depict design capacities or operational parameters that would result in deliveries of less than full contract amounts are consistent with this purpose." So DWR is saying that when they deliver less than the contract amounts that these lower delivery quantities still meet the SWP project purpose. The SWP Contract Renewal must consider alternative which include reduced water deliveries as DWR has already said that reduced deliveries still meet the project purpose. 5-23

All of the alternatives assume the same delivery amounts as the original water supply contracts. The quantities identified in the original contracts were predicated on the completion of the build out of the SWP as it was planned at the time of the contract origination. Many facets of the originally planned SWP were never completed so the potential to deliver the quantities identified in the original contract were never fulfilled. "The original 1957 California Water Plan included provisions for dams on the Klamath, Eel, Mad and Smith Rivers of California's North Coast. Fed by prolific rainfall in the western Coast Ranges and Klamath Mountains, these rivers discharge more than 26 million acre feet (32 km^3) to the Pacific each year, more than that of the entire Sacramento River system. A series of dams in these watersheds would have shunted water through interbasin transfers into the Klamath River system. The centerpiece of the project would be a 15-million-acre-foot (19 km^3) reservoir on the Klamath River – the largest man-made lake in California – from where the water would flow through the 60-mile (97 km) Trinity Tunnel into the Sacramento River, and thence to the canals and pump systems of the SWP. This would have provided between 5 and 10 million acre-feet (4.0–8.1 km^3) of water each year for the SWP." (https://en.wikipedia.org/wiki/California_State_Water_Project) This large component of the SWP was never built, so a large portion of the originally anticipated water supply was never realized. Since the current actually built portions of the SWP almost never fulfills the full contract amount and the SWP is not built to reliably deliver the current contract quantities, it is only reasonable that the contract renewal alternatives consider reduced delivery quantities below those of the original contract amounts. In fact, it is unreasonable, with the definitions of CEQA alternatives development, to include aspects of a project definition that cannot be consistently be met with the current and reasonably foreseeable SWP infrastructure. 5-24

DWR has not complied with the vast majority of the current OCAP BO RPAs - see related comments. As required by Davis-Dolwig, the State Water Contractors are responsible for paying for all operations costs of the SWP. The lack of DWR compliance with the OCAP BO RPAs represents an unfulfilled cost commitment by the SWP Water Contractors. There is a very significant unstated objective for this project and that is for the SWP to become completely compliant with the current legal obligations of the project. The SWP has always claimed that compliance with the OCAP BOs would come through the implementation of the BDCP, but the new BDCP (Water Fix) alternatives do not include Projects that satisfy this project objective. The responsible agencies must not approve a project or issue permits based on an alternative that fails to result in compliance with the OCAP BO RPAs. 5-25

Beneficial uses of Delta water include: municipal, industrial, and agricultural water uses, fish and wildlife uses, environmental protection, flood management, navigation, water quality, power, and recreation. There is not a single one of these non-SWP beneficial uses of water that are not degraded by the on-going impacts the project from continued operation of the SWP. If the No Project had been correctly defined as not renewing the contract, the impact analysis would have correctly determined that all alternatives that include renewal of the contracts would have significant impacts to designated beneficial uses of water as compared to the No Project (with no contract renewal). 5-26

Ongoing impact - The water rights of the SWP and CVP are conditioned by the State Water Board to protect the beneficial uses of water within the Delta under each respective project's water rights. As Junior water rights holders, the SWP operations are not allowed to impair the water rights of senior water rights holders. Under the existing conditions the SWP routinely violate water quality standards which impair the suitability of irrigation water quality of senior water rights holders. Under the proposed project and all of the alternatives, the SWP Contract Renewal would continue the frequency, severity, duration and number of affected parties with their continued operations would perpetuate the rate of water quality violations - see related comments. 5-27

The "project objective" that is missing from this discussion is that the SWP needs to stop operationally violating water quality standards. The SWP contract renewal must add this criteria to its project objectives and the responsible agencies considering issuing permits on this project must not issue permits for a project that violates the law by exceeding water quality parameters. The analysis of all of the project alternatives and the No Project/No Project demonstrate that the project does, will under the no Project and under all alternatives continue to violate water quality standards, which literally cannot be permitted. The lead agencies must not approve a project that they know will result in the continued violation of state water quality protection laws. 5-27 cont.

Inconsistencies with Current Plans, Policies and Regulations:

The SWP Contract Renewal project is inconsistent with and is in direct conflict with existing policy and water code of the state of California. Water Code § 85021: “The policy of the State of California is to reduce reliance on the Delta in meeting California's future water supply needs through a statewide strategy of investing in improved regional supplies, conservation, and water use efficiency." The SWP Contract Renewal by not considering any alternatives in which there is a reduced reliance upon the delta as a water supply source is in conflict with the California Water Code. The project is in fact attempting to make the recipients of the water from the SWP even more reliant upon delta exported water by taking time, human resources, motivation and available funding for projects that would reduce reliance on delta water and would be consistent with this water code requirement. The contract renewal further increases dependency upon delta water supplies as it provides the water contractors with a greater certainty of water supply over a longer period of time which reduces their motivation to seek out and develop more regionally self reliant supplies as is required by law. The project must propose an alternative which is consistent with this water code requirement to reduce reliance on Delta water supplies. 5-28

The SWP Contract Renewal is not consistent with flow criteria for the delta contained in "Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem Prepared Pursuant to the Sacramento-San Joaquin Delta Reform Act of 2009", SWRCB, August 3, 2010. "Water Code section 85086 (See Appendix B), contained in the Delta Reform Act, was enacted as part of the comprehensive package of water legislation adopted in November 2009. Water Code section 85086 requires the State Water Resources Control Board (State Water Board) to use the best available scientific information gathered as part of a public process conducted as an informational proceeding to develop new flow criteria for the Delta ecosystem to protect public trust resources. The purpose of the flow criteria is to inform planning decisions for the Delta Plan and the BDCP." (http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/deltaflow/docs/final_rpt080310.pdf, page 2, paragraph 1) The SWRCB developed the flow criteria as required by the Delta Reform Act, but the SWP Contract Renewal proposed alternatives operations are not consistent with this SWRCB flow criteria. The Delta Reform Act required the SWRCB to produce "flow criteria for the delta" it did not require the update of the Bay-Delta Plan. The SWP Contract Renewal operations must conform to the flow criteria to be compliant with the Delta Reform Act. The SWRCB considered these flow criteria to be necessary for the protection of fish in the delta and any less flow regime proposed by the SWP Contract Renewal operations would be, by definition, not fully protective of fish species in the delta. 5-29

Here is a comparison of the SWRCB recommended flow criteria to be protective of fish species in the delta to the average flow conditions from the CVP/SWP that the SWP Contract Renewal proposes to perpetuate. "In order to preserve the attributes of a natural variable system to which native fish species are adapted, many of the criteria developed by the State Water Board are crafted as percentages of natural or unimpaired flows. These criteria include:

- 75% of unimpaired Delta outflow from January through June;

- 75% of unimpaired Sacramento River inflow from November through June"

" In comparison, historic flows over the last 18 to 22 years have been:

- approximately 30% in drier years to almost 100% of unimpaired flows in wetter years for Delta outflows;

- about 50% on average from April through June for Sacramento River inflows"

(http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/deltaflow/docs/final_rpt080310.pdf, page 5) The SWP Contract Renewal proposed perpetuation of the historical flows above Freeport in the Sacramento River result in flows being 50% lower in April through June than the flow criteria specified by the SWRCB that are defined as being protective of delta fish species. The delta outflows under the proposed project and alternatives are 50% below the flow criteria deemed by the SWRCB to be necessary for protection of delta fish species. These proposed project and alternatives flows obviously would not protective of delta fish species and should be deemed unacceptable by the fisheries agencies charged with protection of these public trust resources. 5-29 cont.

The SWP Contract Renewal project and alternatives do not comply with the flow criteria or biological objectives contained in the CDFW document, "Quantifiable Biological Objectives and Flow Criteria for Aquatic and Terrestrial Species of Concern Dependent on the Delta Prepared pursuant to the Sacramento-San Joaquin Delta Reform Act of 2009". "In November 2009 the Legislature passed several bills focused on better protecting Delta resources. Senate Bill No. 1 (SB 1) (Stats. 2009 (7th Ex. Sess.) ch 5, § 39) contains the Sacramento-San Joaquin Delta Reform Act of 2009 (Delta Reform Act) which establishes and requires the Delta Stewardship Council (DSC) to develop, adopt, and commence implementation of a comprehensive management plan for the Delta (Delta Plan) on or before January 1, 2012. To inform the planning processes of the Delta Plan, the Delta Reform Act requires that the State Water Resources Control Board (SWRCB) develop new flow criteria for the Delta ecosystem and that DFG identify quantifiable biological objectives and flow criteria for the species of concern in the Delta. " (https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=25987, pdf page 5, paragraph 3) 5-30

Comment continued: "**Aquatic Species Biological Goals**

- Halt species population declines and increase populations of ecologically important native species, as well as species of commercial and recreational importance, by providing sufficient water flow and water quality at appropriate times to promote species life stages that use the Delta.
- Establish water flows through the Delta that will likely benefit particular species, community or ecosystem functions in a manner that is: (1) comprehensive, (2) not overly complex, and (3) encourages production. Functional flow criteria shall be established for at least:

Yolo Bypass
Sacramento River and its basin
San Joaquin River and its basin

Eastside streams and their basins
Interior Delta including Old and Middle rivers Delta outflow"
(https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=25987, pdf page 6)
The current SWP Contract Renewal alternatives would perpetuate the SWP violation of these flow criteria and biological objectives. The project must develop alternatives that are consistent with these legal requirements and the lead agencies must not approve any project that is not consistent with these legal requirements. 5-30 cont.

The OCAP BO determined that without the RPAs that the SWP continued operations would result in jepeoardy of listed species. The environmental analysis in the draft EIR of the continued operations of the SWP at the current contract amounts is in direct conflict with and is inconsistent with the OCAP BO impact findings. Six and seven years respectively after the FWS and NMFS BO's made their jepeoardy determinations, DWR and Reclamation have yet to implement the vast majority of these mandatory Projects to avoid jepeoardy. The mandatory Projects from the OCAP BOs are still part of the environmental baseline as they were required prior to the initiation of the SWP Contract Renewal project and baseline date definitions for the project. The CA Water Fix has dropped the BO RPAs from the project scope as well as the other Projects which were designed to contribute to the conservation of the proposed covered listed species, the CA Water Fix is proposing to implement a project that will continue to jepeoardize these species and result in continued violation of ESA and the requirements of the OCAP BOs. The CA Water Fix is also not a finalized EIR/S and is to date still not funded so it does not qualify for this EIR as a reasonably foreseeable project to include in the No Project baseline assumptions. There are also no other projects in progress which address the implementation of the OCAP BO RPAs which meet the criteria of reasonably foreseeable. Therefore the SWP is not legally compliant with the legal obligations of the OCAP BO RPAs and has no plans or projects in motion that qualify as reasonably foreseeable for being compliant. The SWP must not be allowed to renew water supply contracts for a project that is currently out of legal compliance and has no plans to become compliant. To remedy this, the SWP Contract Renewal must add actions to its project alternatives that would result in the SWP becoming legally current and compliant. 5-31

The SWP Contract Renewal has omitted from the scope of the Proposed Project and alternatives Projects that would bring the SWP into compliance with the OCAP BO RPAs. The OCAP BO RPAs are part of the baseline and No Project condition, but are not part of the Proposed Project. By not including compliance with the OCAP BO RPAs in the project scope, the project has deflected the impacts of the implementation of their current legal requirements to comply with the OCAP BOs to another, as yet to be initiated project, California EcoRestore. When the California EcoRestore project is finally started (a date yet to be officially determined) the impacts of that project will include the SWP contract renewal project (if approved) would be part of California EcoRestore's baseline and No Project condition. What California Eco Restore will find in its impact analysis, prior to approval or implementation, is that continued operations of the SWP under the renewed contract amounts precipitates unacceptable and unviable environmental impacts and continues to jeopardize endangered and threatened special status species and result in adverse modifications to designated critical habitat. If the SWP Contract Renewal project is approved with the current delivery amounts prior to implementation of the OCAP BO RPAs, the OCAP BO RPAs will never be approved as the impacts that will occur will be adverse to the requirements of not jeopardizing the T&E species. Therefore, the SWP must comply with the pre-existing OCAP BO RPAs to avoid jeopardy of T&E species before approval of the SWP Contract Renewal can ever be considered. Otherwise, the NMFS and USFWS agencies that issued the OCAP BO RPAs will be precluding implementation of the BO conditions and therefore jeopardizing the species they are supposed to protect.

The SWP does not have incidental take permits for the operations of the south delta diversions. The contract renewal must be staid until such time as DWR has the appropriate permits in place as to allow lawful and compliant operations of the SWP. The primary requirement for issuance of the incidental take permit is that the Project must minimize and fully mitigate the impacts of the proposed take. The SWP Contract Renewal project has not addressed or mitigated the ongoing impacts of the SWP operations in adverse modification of designated critical habitat for ESA listed species or jeopardy of listed species as determined by the OCAP BOs. These SWP significant impacts are not mitigated or even mitigated to less than significant levels by the SWP Contract Renewal. Since there are significant impacts to ESA listed species that the SWP Contract Renewal does not mitigate, the fisheries agencies may not issue any incidental take permits for the SWP Contract Renewal project based on this environmental document. 5-31 cont.

The SWP Contract Renewal is not consistent with the Delta Plan and must not be certified as compliant with the Delta Plan. The Draft EIR failed to include the review and analysis of compliance with the delta plan. This is a material omission that must be rectified in a revised and recirculated public draft EIR. The public must be allowed to review and comment on this important disclosure on the compliance of the project (or in this case, the lack thereof) the project with this legal requirement of all projects implemented within the boundaries of the statutory delta as this project is. 5-32

The SWP still does not have Incidental Take Permits (ITPs) required for operations of the south delta intake pumps. The contract renewals project must not be approved until the ITP permits have been approved by the fisheries agencies and acquired by DWR. Alternatively, the Contract Renewal alternatives could include actions which would justify the issuance of ITPs for the SWP. An example project alternative which would merit issuance of ITPs is the construction of criteria compliant fish screens onto the SWP south delta intakes -see related comments. 5-33

Inadequacies of Alternatives:

Previously submitted alternatives and alternatives components that meet the Project Objectives must be included for full evaluation in the EIR. Examples of previously proposed alternatives and alternative components (and in various combinations) which better meet the Project Objectives include, but are not limited to: some amount of reduced water deliveries to address the requirement for reduced reliance upon delta water supplies, reduced contract duration to address uncertainties with climate change, and compliance with all existing laws and obligations prior to contract renewals (Incidental Take Permits and OCAP BOs, etc.) 5-34

The alternatives included in the EIR included versions which did not include fundamental elements from the AIP. The inclusion of alternatives that omit the financial component of the AIP provides a precedent for the project to consider other alternatives which also omit or alter some fundamental components of the AIP and would still, based on this precedent, be considered reasonable in achieving the objectives of the project. The alternative component that was never considered in the EIR is the incorporation of alternatives that include reduced water supply contract amounts. Given the precedent of the no financial component alternatives, the EIR must include alternatives which also consider different (lower) water supply contract amounts. It would be considered reasonable by any measure to consider a contract delivery amount of one gallon less than the current contract delivery amounts and still meet all tests of reasonably meeting the project objective. It may be argued that a 50% reduction in the delivery amount would not meet the project objective. The project must provide a rationale as to what level of reduction in contract delivery amount is reasonable and still does meet the objectives of the project. This is an important variable to make up defensible alternatives and DWR must disclose the rationale supporting the definition of the reasonable contract delivery amount which still meets the project objectives. Since this will result in material new information and new alternatives, the EIR will require recirculation for additional public comment. 5-35

The project did not provide an Alternatives Scoping Report for the EIR. The Alternatives Scoping Report is an integral component of the process and deliverable product of preparing an EIR (Title 14 California Code of Regulations section 15000 et seq.)(40 Code of Federal Register 1501.7). The SWP Contract Renewal has failed to disclose this essential and material information on how the alternatives passed each of the screening criteria used for developing project alternatives. The project must show their rationale and justification as to how these alternatives meet the project objectives which are the basis of the alternatives development screening criteria. The draft EIR must be recirculated with this require and material information. 5-35 cont.

The public draft EIR did not identify, evaluate, minimize or mitigate all of the on-going impacts from the continued operation of the SWP resulting from the contract renewals. These on-going impacts of continued SWP operations that are not covered by the EIR impact analysis include, but are not limited to: salt accumulation in the soils and groundwater in the SWP service areas, groundwater overdraw in SWP service areas, water quality violations in the delta, degradation of designated essential fisheries habitat for T&E species, genetic introgression of fish at the Oroville dam, reservoir operations affects on reservoir and upstream fisheries and wildlife, hatchery impacts, California aqueduct leaks, greenhouse gasses, and other comments included herein - see related comments. 5-36

Title 14, section 15082, subdivision (b)(1)(B) of the California Code of Regulations, requires that responsible and trustee agencies should indicate their respective level of responsibility for the project to the Lead Agency (Cal. Code Regs., title 14, div.6, ch. 3 (CEQA Guidelines), section 15082, subdivision (b)(1) (B)). The draft EIR is deficient as it did not disclose this required and material information. The Draft EIR must be recirculated for additional public comment once this information has been added. 5-37

Title 14, section 15082, subdivision (c)(1) and section 15206, subdivision (b)(4)(E), state that projects of statewide significance should provide notice to cities/counties within which the project would be located. The project notices did not include areas and communities which are in downstream drainages of the SWP service area but are not in SWP service area, e.g. Lathrop, Manteca, French Camp, Dos Rios, Riperdan, Vernalis, etc. These communities are affected by the SWP contract renewals by ongoing flow and water quality impacts to their municipal surface and groundwater water supplies from the SWP water delivery drainage flows. This EIR process deficiency must be corrected with a noticing of these communities and a round of public scoping which would afford them the opportunity to provide input to the project alternatives development and the scope of the issues that the EIR would address. 5-38

Under CEQA, any alternatives that are put forward for consideration in the EIR for potential adoption must be feasible. CEQA defines "feasible" as "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors." (CEQA Guidelines, § 15364) The SWP Contract Renewal alternatives are not "feasible" in that they result in significant and unavoidable environmental effects which adversely alters designated critical habitat for listed species - see related comments. The SWP Contract Renewal alternatives are not compliant with the Delta Reform Act, so they are not legally feasible either - see related comments. Since these alternatives are not environmentally or legally feasible, they must be dropped from further consideration in the EIR. Reduced contract deliveries would avoid and minimize at least some of the on-going impacts of SWP operations that would result from the contract renewals and therefore may potentially be determined as environmentally and legally feasible. 5-39

As previously commented, renewal of the SWP contracts results in the continuation of operations which degrade designated critical fisheries habitat. As the project jeopardizes federally listed fish species, the FWS and NMFS must evaluate the project impacts in a Biological Opinion. Section 7 of ESA requires that a federal agency may not take any Project that would "jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification" of designated critical habitat. (16 U.S.C. § 1536(a)(2)) The SWP Contract Renewal operations adversely modifies designated critical habitat of several fisheries species by continuing to degrade the dissolved oxygen, salinity, selenium concentration, methyl mercury concentration and other habitat suitability criteria - see related comments. The alternatives do not include implementation of the OCAP BO RPAs which were required by FWS and NMFS to avoid a jepeoardy call on listed species (see related comments), SWP contract renewal alternatives would result in the continued jepeoardy of listed species and therefore the lead agencies must not approve this project. 5-40

DWR non-compliance with current OCAP BO RPAs: The OCAP BO RPAs are a part of the No Project definition for the project comparative analysis (see related comments) as they are current obligations of the SWP. The SWP Contract Renewal project has failed to accurately represent the vast majority of the OCAP BO RPAs in terms of their environmental affects and their impacts on water operations, storage; fish habitat quality, quantity and distribution; on water rights, water supplies, water quality and many other environmental resources. The project falsely claims that no details were available to represent these OCAP BO RPAs, but in fact most of the Projects do have available information and the project has failed to meet the CEQA test to utilize the best available information. Other comments included herein identify most of the OCAP BO RPA deliverables that are current obligations of DWR to fulfill. The comments identify the deadlines for the Projects and in some cases describe the nature of the information that should be available to the project to incorporate into their EIR. If none of this information is available to the project, then it means that DWR has not fulfilled their legal requirement to comply with the OCAP BO RPAs and the SWP is in violation of the ESA.

Clifton Court Forebay Criteria Compliant Fish Screen Alternative

The most significant on-going impact of the SWP contract renewals would be the continued take of listed fish species (without a take permit - see related comments) at the south delta pumps. The intakes do not have criteria compliant fish screens. An alternative which incorporated criteria compliant fish screens on the export pumps would reduce ESA species take associated with south delta pump operations and could be utilized as justification for issuance of Incidental Take Permits which would allow the future operations of the SWP to be ESA compliant. The SWP Contract Renewal must fully consider an alternative that includes compliant fish screens on the export pumps. 5-41

Comment continued: The ongoing impacts of operating the south delta intakes without criteria compliant fish screens must be fully mitigated for the SWP Contract Renewal. This impact can be avoided and minimized by including a project alternative or alternative component that includes criteria compliant fish screens for the south delta pumps. These south delta criteria compliant fish screens must be included as a mitigation measure for the on-going CVP/SWP impacts and for other alternatives as they are a feasible method to avoid and minimize significant impacts to listed fish species that otherwise go unmitigated by the current proposed contract renewal-related operations.

Comment continued: The core of the Coordinated Long-Term Operations (CLTO) of the CVP/SWP is a simple reoperation of the CVP/SWP south delta intakes to reduce the magnitude of reverse flows in Old and Middle River which the last few years of reoperation have proven to significantly reduced fish salvage rates that resulted in a significant reduction of the principle impact of the SWP/CVP on the fish species that the project was putting into jepeoardy. Since the CLTO CVP/SWP reoperation has been so successful, it makes sense to combine project alternatives components with that reoperation to form other viable project alternatives to further reduce the rate of take from the CVP/SWP south delta intake operations. First and foremost in these considerations would be a reduced contract delivery quantity in the SWP contract renewals. This alternative should include reverse flow restricted operations with other physical modifications to the existing CVP/SWP south delta facilities such as, but not necessarily limited to: fish screens with criteria compliant approach and sweeping velocities; a reduced distance fish path through Clifton Court Forebay to reduce duration of exposure of fish to predators in the Forebay; fish behavioral modification devices to manage fish distribution away from the intakes (bubble curtains, acoustic and light deterrents); and improved fish salvage capture, storage and release facilities and operations.

Comment continued: Designs for an isolated Clifton Court Forebay have been discussed many times by DWR and through the CALFED project, so these concepts should have been evaluated as avoidance and minimization measures for the SWP Contract Renewal alternatives.

Comment continued: Isolation of Clifton Court Forebay as a fish free facility would reduce the magnitude of impacts on fisheries from SWP south delta operations. Following is a description of an fish free isolated Clifton Court Forebay facility with the option for an integrated CVP intake that have been previously discussed and proposed in the DWR California Water Fix Revised EIR/S comments.

5-41 cont.

Comment continued: Here are the basic elements to this Clifton Court criteria compliant fish screen alternative component: widen the Clifton Court operable gates, install trash racks outside the operable gates, install a course large fish exclusion screen between the trash racks and operable gates, construct a conveyance channel in Clifton Court Forebay from the operable gates to the western side of Clifton Court Forebay, install criteria compliant fish screens in the conveyance channel, reengineer the current fish salvage facilities, and (optionally) plumb the CVP intake into the fish free north side of Clifton Court via a short tunnel. Following is a more detailed description of each of these elements.

Comment continued: Widen the Clifton Court Forebay operable gates to the north from their existing location. The width of the new operable gates needs to be sufficient to create a channel cross section of about 15,000 square feet. Dredge and reinforce channels as most economical and reliable from an engineering standpoint. As an example, dredge the approach and channel at the operable gates to a tidal working channel depth of 30' for a total operable gate width of 500'. The new gates should be set back into Clifton Court sufficiently to allow installation of trash racks and course large fish exclusion screens in front of them without reducing the existing channel cross section outside of Clifton Court. The Clifton Court Forebay Gates and tidal operations/storage can continue to function as they do under the existing conditions and No Project/Project so there are no operational impacts from this alternative component on tidal operations of Clifton Court Forebay.

Comment continued: Install trash racks outside Clifton Court Forebay outside of the widened Clifton Court operable gate. The trash racks will intercept debris coming in with the diversion water and serve as a behavioral deterrent to the fish to stay in the main channel as much as possible.

Comment continued: Behind the trash racks and just in front of the operable gates would be a course fish screen designed to keep out only larger "predator" size fish that have much higher swimming performance capability from entering Clifton Court Forebay. With the new 15,000 square foot cross section of the operable gates and surface area of the course fish screens, at full capacity CVP/SWP diversions the approach velocity at the course fish screens would be one foot per second. Predator sized fish would easily out swim this approach velocity, but smelt and juvenile salmonid would be pulled through and past the course large fish exclusion screen. There would be some predation at the trash racks and course fish screens but this can be managed and reduced with predator removal Projects and fish traps. The level of predation at the trash racks and course fish screens would be the same as the predation rates that occur at the current SWP trash racks and fish louvers under the No Project. This course fish screen outside of Clifton Court Forebay is designed to pass smelt and juvenile salmonids without risk of impingement, e.g. 15 - 25mm wide screen inlets. This screen would significantly reduce the exposure of juvenile salmonids and delta smelt to predation as larger predators would be excluded from within Clifton Court Forebay where a large amount of current predation is documented to occur.

Comment continued: A conveyance channel would be created in Clifton Court Forebay by segmenting the northern and southern parts of the Forebay with a new sheet pile partition that would draw water from the Clifton Court Forebay operable gates channel directly toward the existing SWP intakes on the southwestern side of the Forebay. The conveyance channel would start at the east side of the Forebay at the north and south ends of the widened operable gates channel. The partition would then quickly (but maintaining orderly water flow vectors) narrow from 500' wide to a width of approximately 250' wide and deepen from the initial 30' channel depth at the operable gates to a conveyance channel depth of 60 feet deep. The rest of the length of the conveyance channel would be dredged to a 60 feet deep with the channel partitions reinforced as necessary for stability. The channel depth is to accommodate the large surface area of fish screens and to increase the channel cross section to reduce water velocities. The channel would speed the transit of the fish across the Forebay (as compared to the No Project) and keep them from straying out into the Forebay so that they would have a significantly reduced duration of exposure to predation. Fish predation studies of the current Forebay operations have shown that a large portion of the juvenile salmonid and delta smelt population that enter the Forebay do not make it to the salvage facilities due to predation. By excluding predator size fish from entering Clifton Court, not allowing the smelt and juvenile salmonid fish to stray into the larger part of the Forebay and by shortening the duration and distance of their transit across the Forebay prior to capture and salvage; predation rates on juvenile salmonids and delta smelt would be significantly reduced with the Clifton Court criteria compliant fish screen alternative as compared to the existing condition, No Project/No Project or in comparison to any of the other alternative which retain dual operations without south delta intake screens that are criteria compliant.

5-41 cont.

Comment continued: Install criteria compliant fish screens in the conveyance channel in Clifton Court Forebay. Orient the screens in the conveyance channel in a "deep V" (10 to 15 degree angle) across the Clifton Court Conveyance Channel with the bottom of the V in the middle of the new conveyance channel approximately 1/4 mile from the west side of Clifton Court Forebay. The fish screens would be oriented vertically on the sides of the V. The top of the V is on the east side of Clifton Court Forebay and is attached to the sides of the conveyance channel partitions where the channel comes to approximately 250 feet wide. Each side of the V fish screen would be approximately 6850 feet long with a depth of 60 feet for a total working surface area in their vertical orientation of 822,000 square feet. If greater surface area is desired, alternatives designs where the screens are sloped in towards the middle of the conveyance channel at the bottom can be evaluated for cost, operational flexibility and fish protection performance. The deep V shape of the screen orientation in the conveyance channel creates a shallow angle of approach of water to the screens and creates a sufficient surface area to reduce approach velocities and to have the draw of the export pumps create sweeping velocity across the screens.

Comment continued: As an example, water approaching a screen at a 15 degree oblique angle has an approach velocity that is 3.5% of the sweeping velocity. With the conveyance channel at 250 foot wide and 60 feet deep, at maximum CVP/SWP diversion volumes of 15,000cfs the water column velocity in the conveyance channel would be one foot per second. With a water column velocity of 1 foot per second, a 15 degree angled V screen would result in a sweeping velocity of 0.965 feet per second and an approach velocity of 0.035 feet per second.

Comment continued: The total surface area of vertically oriented deep V fish screen configuration is 822,000 square feet with the above assumptions. (As previously mentioned, sloped screen designs could have even larger surface areas if desired.) At the maximum combined CVP/SWP volume of 15,000 cfs the approach velocity to screens with this large surface area is just over 0.018 feet per second. 0.2 foot per second screen approach velocity is the compliance criteria for delta smelt so the fish screens as described would be only be 10% of the maximum approach velocity for smelt at the maximum CVP/SWP intake volume operations. If this screen configuration is considered over-designed with the 10% of the allowed approach velocity criteria and is excessively protective, and a more relaxed (but still compliant) approach velocity is deemed by the fisheries agencies to be adequately protective, the channel depth could be reduced along with the fish screen height and a narrower channel with a shorter length fish screen could be applied and still easily meet the fish screen criteria requirements. As an example a fish screen only 30 feet deep and half as long would still result in approach velocities that were half as fast as are delta smelt criteria compliant.

5-41 cont.

Comment continued: The fish capture/salvage facility for the Clifton Court criteria compliant fish screen starts at the very bottom end of the fish screen deep V (western side). There is a separation of the "water intake" portion of the screens on the sides of the V for a "fish intake" opening (slot) at the very bottom end of the V that is 4" to 6" wide. A shade structure should be built from the bottom of the V out to at least 50 feet to the east up the V so the intake slot is in deep shade so that fish do not attempt to evade the fish intake. The fish salvage pumps draw water into the fish intake slot at an approach velocity of 3 feet per second. The higher approach velocity of the fish intake slot is so the fish are quickly drawn in and do not swim away. The top 25 feet and the bottom 5 feet of the conveyance channel at the end of the water intake screen would have this fish intake slot. The top and bottom fish intake slots are to reflect the fish distribution in the water column. The juvenile salmonids and smelt will generally be concentrated in this top 25 feet of water column and the juvenile sturgeon at or near the bottom of the water column. With a 30 foot long total intake slot height, 6 inch width and 3 foot per second approach velocity, the fish salvage pumps would need to intake a maximum of 45 cubic feet per second to bring the fish into the fish collection facility. The current collection facility will need to be redesigned and enlarged to support fish/water separation of fish into transport tanks with this larger than current fish capture water flow. The same principles of the current fish salvage facility still apply, but will have improved handling of fish directly into holding tanks with reduced holding times prior to transport and active predator removal with nets (for the few that get through the large fish exclusion course fish screens). Other fish salvage facilities, handling, storage, transportation and release protocols can be developed and integrated with this Clifton Court criteria compliant fish screen alternative component.

Comment continued: The current fish separation, handling, storage and release operations would need to be revamped as has been previously recommended in many previous meetings, projects and communications. Under the Clifton Court criteria fish screen alternative, predation from salvage operations would be further reduced as compared to the existing conditions, No Project/Project or any of the other project alternatives because captured juvenile salmonids and smelt would not be stored, shipped and released with predator sized fish.

Comment continued: Since the concept of an isolated Clifton Court Facility has been discussed, described and debated publicly and by the lead agencies many times (e.g. CALFED) and the SWP Contracts should not be renewed while the project still lacks the ITPs that would make the continued operations legally compliant, there is no excuse for the SWP Contract Renewal project to not have addressed this important project alternative in their alternatives development, screening and alternatives analysis process. None of the project features described in this Isolated Clifton Court Criteria Fish Screen alternative require new technology and all features described have built out project examples to rely upon for their engineering design, construction methods and for expectations regarding as-built real world performance characteristics. 5-41 cont.

Comment continued: Without inclusion and due consideration of this fish screen alternative component, the current EIR document is deficient and should be recirculated after it has been revised to include this alternative.

Comment continued: The Fisheries Facilities Technical Team (FFTT) must be convened to review, refine and more fully develop this concept into a fully formed and project-level project description that is suitable for full analysis in a revised EIR. This group is well qualified to adapt the preceding description as needed to optimize its function, performance and cost effectiveness. They can adapt the dimensions of the channels and cross sections to manipulate channel velocities under different tidal and operational scenarios. They can adapt screen size, depth, length, angles and configurations to optimize fish protection, costs, maintenance, etc. As the preceding description and analysis proves, building a criteria compliant fish screen in Clifton Court is technically feasible. This criteria compliant Clifton Court Fish Screen is a win-win alternative. Fish are protected, water supply delivery capacity is optimized, and delta water quality is protected.

CEQA compels an interactive process of assessment of environmental impacts and responsive project modification which must be genuine. It must be open to the public, premised upon a full and meaningful disclosure of the scope, purposes, and effect of a consistently described project, with flexibility to respond to unforeseen insights that emerge from the process. DWR should pursue permit terms shorter than 50 years due to the levels of uncertainty regarding the future effects of climate change on the Delta and the Sacramento River watershed. The SWP Contract Renewal Project must include a 30 year alternative. CEQA requires inclusion of alternatives that reasonably meet the project objectives and this suggestion for a shorter duration contract alternative more reasonably meets the project objectives taking into account the uncertainties of climate change in the currently proposed longer contract period. 5-42

DWR is non-compliant with current OCAP BO RPAs. The OCAP BO RPAs are a part of the No Project definition for the SWP Contract Renewal comparative analysis (see related comments) as they are current obligations of the SWP. DWR has failed to accurately represent the vast majority of the OCAP BO RPAs in terms of their environmental affects and their impacts on water operations, storage, fish habitat quality, quantity and distribution, on water rights, water supplies, water quality and many other environmental resources. The SWP Contract Renewal falsely claims that are insufficient detail available to represent these OCAP BO RPAs, but in fact most of the Projects do have available information and project has failed to meet the CEQA test to utilize the best available information. The following comments identify most of the OCAP BO RPA deliverables that are current obligations of DWR to fulfill. The comments identify the deadlines for the Projects and in some cases describe the nature of the information that should be available to the project to incorporate into their EIR baseline definitions and operations modeling. If none of this information is available to the project, then it means that DWR have not fulfilled their legal requirement to comply with the OCAP BO RPAs and they 5-43 are in violation of the ESA.

Comment continued: • Plans, status and annual reports submitted to NMFS on the Lower Putah Creek enhancements in compliance with the 2009 NMFS OCAP BO Project I.6.3. By December 31, 2015, DWR shall develop and implement. As described in Appendix 2-C, including stream realignment and floodplain restoration for fish passage improvement and multispecies habitat development on existing public lands. By September 1 of each year, DWR shall submit to NMFS a progress report towards the successful implementation of this Project. Since this BO RPAs required implementation of this Project by 12/31/15, these plans must have either been available for inclusion in the EIR baseline definition and operations modeling or DWR has failed to comply with the OCAP BO RPA implementation schedule and failed to meet the test of even a good faith effort to develop and implement these Projects.

Comment continued: • Annual reports submitted to NMFS on the Lisbon Weir improvements in compliance with the 2009 NMFS OCAP BO Project I.6.4. By December 31, 2015, DWR shall assure that improvements to the Lisbon Weir are made that are likely to achieve the fish and wildlife benefits described in Appendix 2-C. Improvements will include modification or replacement of Lisbon Weir, if necessary to achieve the desired benefits for fish. By September 1 of each year, DWR shall submit to NMFS a report on progress toward the successful implementation of this Project. Since this BO RPAs required implementation of this Project by 12/31/15, these plans must have either been available for inclusion in the EIR analysis or DWR have failed to comply with the OCAP BO RPA implementation schedule and failed to meet the test of even a good faith effort to develop and implement these Projects. • OCAP BO note regarding rationale for I.6.2 – I.6.4, "These improvements are necessary to off-set ongoing adverse effects of project operations, primary due to flood control operations." Since these have not been implemented, they do not offset the on-going impacts of flood control operations and therefore these species remain in jeopardy from the SWP operations which the contract renewal project proposes to perpetuate without mitigation. 5-43 cont.

Comment continued: • Plan submitted to NMFS in compliance with the 2009 NMFS OCAP BO Project I.7. By December 31, 2011, as part of the plan described in Project I.6.1, DWR shall submit a plan to NMFS to provide for high quality, reliable migratory passage for Sacramento Basin adult and juvenile anadromous fishes through the Yolo Bypass. Since this BO RPAs required implementation of this Project by 12/31/11, these plans must have either been available for inclusion in the EIR analysis or DWR has failed to comply with the OCAP BO RPA implementation schedule and failed to meet the test of even a good faith effort to develop and implement these Projects.

Comment continued: • Proposed engineering solutions submitted to NMFS in compliance with the 2009 NMFS OCAP BO Project IV.1.3. Due by March 30, 2012. DWR shall provide a final report on recommended approaches by March 30, 2015. If DWR had complied with the OCAP BO RPAs, this information would have been available for inclusion in the EIR baseline definition and impact analysis.

Comment continued: • Weekly reports from DWR to the interagency Data Assessment Team (DAT) regarding the results of monitoring and incidental take of winter-run, spring-run, CV steelhead, and Southern DPS of green sturgeon associated with operations of project facilities per the 2009 NMFS OCAP BO. This information would have informed DWR regarding relationships of operations and ESA species response to operations influenced behavioral responses. This information is for adaptive management of operations which DWR claims it does not have available to include in the EIR baselines, operational modeling and impact comparisons.

Comment continued: • DWR annual written report to NMFS following the salvage season of approximately October to May. This report shall provide the data gathered and summarize the results of winter-run, spring-run, CV steelhead, and Southern DPS of green sturgeon monitoring and incidental take associated with the operation of the Delta pumping plants (including the Rock Slough Pumping) per the 2009 NMFS OCAP BO. This information would have informed Reclamation regarding relationships of operations and ESA species response to operations influenced behavioral responses. This information is for adaptive management of operations which DWR claims it does not have available to include in the EIR.
Comment continued: • Reports to NMFS of facility salvage efficiency of 75 percent in compliance with the 2009 NMFS OCAP BO Project IV.4. DWR shall implement the following Projects to reduce losses associated with the salvage process, including: (1) conduct studies to evaluate current operations and salvage criteria to reduce take associated with salvage, (2) develop new procedures and modifications to improve the current operations, and (3) implement changes to the physical infrastructure of the facilities where information indicates such changes need to be made. Reclamation shall continue to fund and implement the CVPIA Fish Facility Program. In addition, DWR shall fund quality control and quality assurance programs, genetic analysis, louver cleaning loss studies, release site studies and predation studies. Funding shall also include new studies to estimate green sturgeon screening efficiency at both facilities and survival through the trucking and handling process. By January 31 of each year, DWR shall submit to NMFS an annual progress report summarizing progress of the studies, recommendations made and/or implemented, and whole facility salvage efficiency. This is probably the most important missed obligation by DWR as the plans to meet these salvage efficiencies would have become an important component of a project alternative that would have had lower environmental impacts than the proposed project - see related comments for a criteria compliant fish screen for the SWP intake at Clifton Court Forebay. In order to meet these goals, it is likely that full criteria fish screens would have been designed for implementation and should have been included in the EIR. DWR cannot both claim it is compliant with the OCAP BOs and that information is not available in sufficient detail to allow analysis in the EIR. DWR must provide NMFS with the designs and operations for the SWP to become compliant with this RPA and these Projects must be included in the EIR No Project baseline definitions and included in the detailed analysis of an alternative in a revised and recirculated EIR.
Comment continued: • Documentation of the Skinner Fish Protection Facility to achieving the minimum 75 percent salvage efficiency for CV salmon, steelhead, and Southern DPS of green sturgeon after fish enter the primary channels in front of the louvers in compliance with the 2009 NMFS OCAP BO Project IV.4.2.1). Due from DWR by December 31, 2012. If DWR had complied with the OCAP BO RPAs, this information would have been available for inclusion in the EIR baseline or as a project alternative component (see fish screen alternative related comments), in the impact analysis.
Comment continued: • Report to NMFS on compliance with the 2009 NMFS OCAP BO Project IV.4.2.2)a). DWR is to immediately commence studies to develop predator control methods for Clifton Court Forebay that will reduce salmon and steelhead pre-screen loss in Clifton Court Forebay to no more than 40 percent. Studies complete on or before March 31, 2011. 40% improved predator control shall be achieved by March 31, 2014. Failure to meet this timeline shall result in the cessation of incidental take exemption at SWP facilities unless NMFS agrees to an extended timeline. This OCAP BO RPA compliance information must also be in the EIR baseline definition. DWR's lack of compliance with this project legal requirements means the contract renewal will perpetuate these fisheries impacts which NMFS has determined in their OCAP BO result in jepeoardy of these listed species.

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Comment continued: • Documentation of the completion of fish collection facilities in compliance with the 2009 NMFS OCAP BO Project V, NF4.1. DWR American River Fish Facility – Collection facility shall be operational no later than March 2012. DWR should have several years of operational data on the impacts of implementing these Projects and this information must be included in the revised baseline and recirculated EIR. DWR should also have completed an EIR/S on this project prior to its permitting and construction so those materials should also be available to use in the SWP Contract Renewal EIR and as part of the No Project/No Project baseline definition.

Comment continued: • Plans submitted to NMFS specifically in compliance with the 2009 NMFS OCAP BO RPA I.7 reduction of migratory delays and loss for salmon, steelhead and sturgeon. These were due from DWR by 6/30/11 and this information must be included in the SWP Contract Renewal EIR. Given that the plans were required more than 5 years ago, the project-level description of these Projects must be available and must be included in a revised and recirculated EIR.

Comment continued: • Reports to NMFS on specific Projects implemented specifically in compliance with the 2009 NMFS OCAP BO RPA I.7 reduction of migratory delays and loss for salmon, steelhead and sturgeon. These were due to be implemented by DWR by 12/31/11 so there should be 5+ years of information on these implemented Projects available for inclusion in the EIR baseline definition and comparative analysis.

Comment continued: • Reports submitted to NMFS on the reduction of fish predation rates to less than 10% in the primary channel in response to 2009 NMFS OCAP BO RPA IV.4.1. DWR is required to implement this no later than 12/31/12 so this information should have been included in the SWP Contract Renewal EIR baseline definition and a 10% predation loss rates in the primary channel should have been assumed in the impacts assessment for the No Project. All of these DWR mandatory improvements to predation rates and fish salvage rates must be included in the No Project and, if DWR were compliant with the OCAP BO RPA implementation schedule, the existing conditions/affected environment description. The EIR must be revised with all of these past implementation deadlines as part of the No Project definition and integrated into the alternatives comparisons to these baselines. The public draft EIR must be recirculated for this material new information for public comment and disclosure.

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Comment continued: • Predation reduction method reports submitted to NMFS specifically in compliance with the 2009 NMFS OCAP BO RPA IV.4.3. DWR is required to complete this no later than 6/15/11 so this information should have been in the EIR baseline definition and description.

Comment continued: • Copy of reports submitted to NMFS documenting the improvements of fish salvage monitoring and release survival rates for the south delta pumps specifically in compliance with the 2009 NMFS OCAP BO RPA IV.4.3. DWR is required to complete this by 10/1/09 and annually thereafter. This information should have been in the EIR.

Comment continued: • Correspondence and joint work products with the CVP/SWP Fish Passage Steering Committee in response to the coordination requirements from the 2009 NMFS OCAP BO RPA NF 4.5. These materials should be available from DWR to inform the EIR analysis.

Comment continued: • Reports submitted to NMFS specifically regarding DWR's Skinner Fish Collection Facility reductions in fish predation rates in response to 2009 NMFS OCAP BO RPA IV.4.2. Compliance was required to be achieved no later than 3/31/14 and should have been included in the EIR baseline description and comparative analyses for the alternatives impact analyses.

Comment continued: • DWR reports, plans and correspondence to FWS specifically in response to FWS OCAP BO RPA "Component 4: Habitat Restoration, to implement a program to create or restore a minimum of 8,000 acres of intertidal and associated sub tidal habitat in the Delta and Suisun Marsh. The restoration efforts shall begin within 12 months of signature of this biological opinion and be completed by DWR (the applicant) within 10 years. The restoration sites and plans shall be reviewed and approved by the Service and be appropriate to improve habitat conditions for delta smelt. Management plans shall be developed for each restoration site with an endowment or other secure financial assurance and easement in place held by a third-party or DFG and approved by the Service. The endowment or other secure financial assurance shall be sufficient to fund the monitoring effort and operation and maintenance of the restoration site. An overall monitoring program shall be developed to focus on the effectiveness of the restoration Projects and provided to the Service for review within six months of signature of this biological opinion. The applicant shall finalize the establishment of the funding for the restoration plan within 120 days of final approval of the restoration program by the Service." Since there are only 2 years left for this Project to be completely implemented and contracting and construction will take at least that long, the plans and supporting detailed environmental documents and permitting must already be completed. This information should have been included in the EIR as part of the No Project and variants of this Project should have been included in some of the project alternatives. This omission makes the EIR materially incomplete and deficient. This deficiency must be remedied and a revised EIR recirculated for public comment.
Comment continued: • DWR reports or correspondence to FWS specifically in response to FWS OCAP BO RPA "Component 5: Monitoring and Reporting, Information on salvage at Banks and Jones is both an essential trigger for some of these Projects and an important performance measure of their effectiveness. In addition, information on OMR flows and concurrent measures of delta smelt distribution and salvage are essential to ensure that Projects are implemented effectively. Such information shall be included in an annual report for the Water Year (October 1 to September 30) to the Service, provided no later than October 15 of each year, starting in 2010." This information should have been included in the EIR as it would provide a basis to characterize the No Project as well as informed potential options in the development of alternatives and adaptive management measures.
Comment continued: • Notifications and reports to FWS for BO RPA Project 6. Documentation should include the location, plans, designs, evaluations, environmental documents, permit applications, and status updates and reports to FWS. "A program to create or restore a minimum of 8,000 acres of intertidal and associated sub tidal habitat in the Delta and Suisun Marsh shall be implemented. The restoration efforts shall begin within 12 months of signature of this biological opinion and be completed within a 10 year period." Since there are only 4 years left for this Project to be completely implemented and contracting and construction will take at least that long, the project-level description and land modification and water operations plans and supporting detailed environmental documents and permitting must already be completed. This information should be available if the SWP were compliant with the ESA as required in the OCAP BO RPAs. This information should have been included in the EIR. This omission makes the EIR materially incomplete and deficient. This deficiency must be remedied and a revised EIR recirculated for public comment.
Comment continued: • DWR reports to FWS regarding any information about take or suspected take of federally-listed species not authorized in the 2008 FWS OCAP BO. Notification must include the date, time, and location of the incident or of the finding of a dead or injured delta smelt. Jones Tract emergency levee repair and fish rescue are is an example of notifications that should have been given. Dissolved Oxygen crashes that result in adverse modification of critical habitat caused by or contributed to by SWP operations must also be included with this other information in a revised and recirculated EIR.

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cont.

Comment continued: The NMFS BO requires addition of salt to water within the tanker trucks to haul salvaged fish to reduce stress of transport (NMFS OCAP BO pg 657, #5). The DWR 401 Certification from the water board does not cover this discharge and this impacts of adding salts to water discharged into the delta must be addressed in the EIR.

Comment continued: In conclusion to this series of comments related to information that should be available to the EIR from DWR 's compliance with the OCAP BOs, DWR has missed the vast majority of the OCAP BO RPA implementation deadlines and is grossly out of compliance with the OCAP BO RPA implementations required for the SWP to not continue to jeopardize ESA listed fish species. DWR's breach of the OCAP BO terms is a serious offense and as a result the SWP continues to jeopardize the listed species and has resulted in a significantly compromised and deficient EIR document. If DWR had complied with the OCAP BO RPA schedule of implementation, the No Project analysis would be complete and correct. Instead, due to DWR's non-compliance with the ESA requirements to implement the OCAP BO RPAs, the SWP Contract Renewal is claiming that it is not possible to include these Projects in the No Project definition and assumptions as they are not sufficiently developed to support analysis. The regulatory agencies utilizing this EIR document to support decision making should not accept this incomplete characterization of the No Project alternative as it corrupts all of the analysis that rely on this baseline for comparison. As required by CEQA, DWR must make full use of all available data to include in the No Project definition, modeling and impact analysis comparison. Since all of these OCAP BO RPAs are delinquent anyway and the agencies (DWR, CA DFW, USFWS and NMFS) in Project is resulting in continued jeopardy of ESA listed species from SWP operations, DWR must apply all of their human, technical and financial resources into becoming compliant with the OCAP BOs - to the exclusion of utilizing conflicting resources for the SWP Contract Renewals which would add further delays to compliance. Once the work to become compliant with the OCAP BOs is completed the SWP would have the benefit of avoiding jeopardy for the ESA listed species during the period of proposed contract renewal operations. Another likely benefit of completing the OCAP BO RPAs prior to the SWP Contract Renewal EIR advancing is that in the process of completing these compliance plans it is likely that new and more beneficial project alternatives would be identified and developed. An example of this would be the OCAP BO RPA required improvements to the south delta intake channels and fish screens. As the detailed designs and plans required by the OCAP BO RPAs are developed, it is likely that a more significant and comprehensive approach would be developed that not only exceeded the requirements of the OCAP BO fish salvage improvement goals, but became an important component of a new and more viable project alternative - see comments on south delta criteria fish screen alternative.

Comment continued: It is clear from the on-going failures of DWR to comply with the OCAP BiOps and the lack of sanctions on them by FWS and NMFS, that NMFS and FWS are failing to enforce their own OCAP BiOps. FWS and NMFS must immediately redress their lack of enforcement of the OCAP BiOps with DWR. FWS and NMFS should start this process by requiring that the OCAP BiOp RPAs are implemented prior to, not after, SWP Contract Renewals. Further, if DWR officers, representatives and staff continue to fail to apply even good faith efforts to implement the OCAP BO RPAs as expeditiously as possible, FWS and NMFS should begin pursuing civil and criminal penalties. 5-43 cont.

The Draft Environmental Impact Statement (EIS) for the Coordinated Long-Term Operation of the Central Valley Project (CVP) and State Water Project (SWP) (ES.3, line 17) acknowledges that many of the provisions of the RPAs identified in the biological opinions require further study and monitoring and further environmental documentation necessary before any future facilities can be constructed or modified. Therefore the assumption of RPA implementation prior to SWP Contract Renewal must take supremacy. 5-44

The EIR failed to identify significant impacts of continuing SWP operations. These ongoing significant impacts include, but are not limited to: salt accumulation in the SWP service area from salts delivered in the SWP water supply and alternative water supplies which are over-relied upon due to SWP contract amounts which are consistently not met; salmonid genetic introgression from straying from SWP operations, continuing blockage of upstream passage by the physical presence of Oroville Dam and the fish barrier dam and from Oroville hatchery operations which introgress spring- and fall-run Chinook salmon; depletion of downstream sediment and large wood debris load contribution from upstream tributaries by capture from Oroville Dam resulting in downstream degradation of fisheries and riparian habitat as well as salmonid spawning gravel; and many other impacts - see related comments. 5-45

See CEQA Guidelines, § 15126.4[a][1][D] "EIRs must discuss significant effects of mitigation measures,..." The EIR incorrectly concluded, without adequate supporting justification, that the contract renewal had no significant impacts so no mitigations were identified. The contract renewal does have significant on-going environmental impacts that must be mitigated. In this lack of detail and reliable determination of the general types and magnitudes of impacts from mitigation measures, the EIR is materially deficient and must be revised to provide this detail and recirculated for public comment. 5-46

One type of on-going impact of the contract renewal would be continued delivery of salts in the irrigation water to agricultural service areas of the SWP. Increased Electrical Conductivity (EC) from salinity in SWP irrigation water is bioaccumulative in plants and results in reduced yields and ultimately accumulation of salts in the soil results in conversion of farmland to a non-farmable condition. Some areas of the SWP service area will reach this unfarmable concentration of salts in the proposed SWP Contract Renewal project period. The degradation of soil quality from imported salts from continued irrigations from the contract renewal results in a change in land use from farmland to non-farmland. A change in land use is always determined to be a significant impact which must be mitigated. This material and significant impact is not identified, evaluated, quantified, disclosed or mitigated in the current draft EIR. The draft EIR must be revised to correct this deficiency and recirculated with this material new information. 5-47

Not all chemical components that contribute to EC are sodium salts. There are positively charged ions that contribute to EC and include sodium, calcium, potassium, and magnesium. Negatively charged ions that contribute to EC include chloride, sulfate, carbonate, and bicarbonate, nitrates, and phosphates. Several of these other non-sodium salts do bioacumulate in humans and wildlife, e.g. Nitrates (that is why there are nitrate standards in drinking water quality). Sodium salts are bioaccumulative in plants and will cause yield loss in commercial crops and mortality and changes in native and wild plant types that will occur based on their salt tolerance. These plant community changes from salt accumulation in turn cause changes in wildlife habitat quality and quantity and species distribution for foraging habitat. These inaccuracies in the EIR must be disclosed in a revised and recirculated public draft. 5-48

The CA Water Fix EIR/S determined that the No Project condition, which the SWP contract renewal proposes to perpetuate, results in a significant degradation of water quality conditions. "At the Banks pumping plant, the frequency with which DOC concentration would exceed 3 mg/L 36 would increase from 64% under Existing Conditions to 69% under the No Project Alternative (ELT) for the 16-year period (and increase from 57% to 68% during the drought year period)..." (4.2-35 line 36) This change is over a 10% increase in the frequency of exceedance of an important drinking water quality requirement for the water supply for over 22 million Californian's. This is obviously a significant impact and this glossing over impact calls is a consistent error and deficiency in this EIR. A 10% change in conditions, flows or water quality degradation (regardless of water quality exceedance) is often a threshold utilized for water resource project impact criteria for California environmental EIRs and EISs, 5-49 e.g. Lower Yuba River Accord, Lower American River Accord, Oroville Facilities Relicensing. This is impact is significant and DWR must adopt the same significance criteria for impacts analysis as they have used for other similar projects and/or provide rationale for why they have departed from their previous standards, practices and conventions - see related comments. Any degradation of water quality standards related to a beneficial use is a significant impact.

The CA Water Fix EIR/S determined that the No Project condition, which the SWP contract renewal proposes to perpetuate, results in a significant degradation of water quality conditions. "Elevated ambient water temperatures in the Delta, and thus an increase in Microcystis bloom duration and magnitude, are expected under the No Project Alternative (ELT), relative to Existing Conditions." (4.2-44, line 36) The CA Water Fix analysis shows that the SWP contract renewals would result in additional and on-going significant degradation of water quality. The EIR must be revised to provide and complete analysis of impacts of the contract renewal and the analytical level of rigor and approach must be consistent with the CA Water Fix impact analysis. These significant impacts must be identified, evaluated, disclosed, and mitigated. 5-49 cont.

The 2008 FWS OCAP BiOp RPAs required implementations of habitat restorations, predation management and physical changes to the south delta intakes in addition to the changed water operations to avoid jeopardy of the species from extinction from the continued operation of the CVP/SWP facilities - see related comments. DWR has mostly complied with the altered water operations, but have failed to plan or implement the habitat restorations, predation rate management and intake modifications for increased salvage survival rates that are also required by the OCAP BiOp RPAs. DWR remains in violation of the ESA as defined by the required RPAs in the OCAP BiOp. Since the BiOp concluded that these restoration Projects were required to avoid jepeoardy and these Projects have not been implemented it is logical to conclude from the BiOp analysis that the species may go extinct if the SWP contracts are renewed. In direct contradiction to these other findings, the SWP Contract Renewal EIR concluded it had no significant impacts. One of these analyses is wrong and since the OCAP BO carries the force of law, we must conclude that it is the EIR analysis that is wrong and it must be corrected to be consistent with the OCAP BO analysis and conclusions. DWR must revise their EIR so the analysis approach, methodology and conclusions are consistent with the OCAP BO analysis on this same species for this same time period and assumptions. 5-50

The SWP project currently results in frequent and significant violations of water quality standards in the delta. The affected and harmed water rights holders in the delta have senior water rights to the SWP. The SWP has no right to degrade the water quality and beneficial uses of water of these senior water rights holders and the SWP Contract Renewal project proposes to perpetuate those water quality violations and impairment of senior water rights. The SWP operations caused water quality impacts are avoidable by operating the SWP in a manner that does not violate water quality standards. This may result in less water deliveries, but that is what is required in order to avoid significantly impacting the senior water rights of the other delta water diverters. The SWP Contract Renewals must include alternatives that implement reduced contract delivery amounts and reconfigured operations so that it avoids and minimizes this impact. To the extent that these impacts are not reduced below significant levels, the EIR must develop and propose appropriate mitigation measures. Once the reduced water delivery alternatives have been developed and evaluated and the remaining significant impacts have been mitigated, the revised EIR must be recirculated to disclose this material new information. 5-51

The SWP Contract Renewal No Project definition is in error as the continuation of the current plans and policies of DWR is to not renew the contracts. If contract renewal was a continuation of an existing plan or policy, there would have been language in the contract that established a mechanism or on-going commitment to contract renewal or the contracts would have been in perpetuity. The original contract does not include any language regarding subsequent contract renewals. The lack of inclusion 5-52 of language in the original contract regarding any expectation for the renewal makes it clear that the policy of DWR at the time of the original contract initiation was to allow DWR at the future time (now) of contract expiration to have the opportunity to re-evaluate from scratch without prejudice or pre-decision the terms under which any potential new contract might or might not be issued. Since no expectation for contract renewal was included in the contract, the renewal of these contracts cannot be considered the No-Project. Literally, "No-Project" means if one to do nothing and in the event that nobody did anything, these contracts would expire at their end of term and would not be renewed. 5-52 cont.

The Proposed Project is for new water supply contracts, not contract renewals - see above comment. The Water Supply Delivery Contracts are for goods and services to be provided by the State. As such, there must be a competitive and open bidding process for the water supply contracts. The State has failed to follow its own laws and procedures for an contract bid process. Bidders must apply and prove their qualifications, including their financial resources to fulfill their portions of the contract responsibilities. Once qualified, the bidders must put forth proposals for the State to evaluate on an unbiased ranking system. The State would then consider awards of contracts based on the proposal evaluations. The current project circumvents these legal requirements of the State contract bidding and award process.

The SWP Contract Renewal incorrectly assumes that the water supply contract renewal will be approved in the same quantities as the existing contracts. This lack of consideration of a fundamental variable in the contract as an alternative is not reasonable. The renewal of the contract at the current contract water supply delivery amounts also does not meet the criteria of reasonably foreseeable for inclusion in the No Project or Cumulative as there are no guarantees in the current contract that the contracts will be renewed or renewed at the existing delivery quantities. It is much more likely that, if the contracts are renewed at all, the contract amounts would be lower than the current amounts as the lower delivery amounts would make the contracts consistent with the requirements of the 2009 Delta Reform Act and of the 2014 California Water Project Plan to reduce reliance on Delta water supplies. If the SWP Water Supply Contact Renewal wants to include continued operations assumptions beyond 2035 when the current contracts expire, DWR must adopt a range of scenarios to analyze from contract renewals with some delivery reduction (to be consistent with current plans and policies such as the Delta Reform Act) to scenarios where they are not renewed at all. 5-53

The EIR claims that there are no environmental impacts resulting from the contract renewals. This is an incorrect conclusion of the EIR. The contract renewal will result in the continued violation of water quality standards in the delta including Dissolved Oxygen (DO). There are a number of readily available water quality impact assessment tools. DSM2-QUAL is an existing modeling tool which has been developed and tested for use in dissolved oxygen assessments in the Delta. "The ability of the model to simulate the dissolved oxygen sag on a reach of the San Joaquin River near Stockton was recently demonstrated. DSM2-Qual was capable of capturing diurnal variations of important constituents such as dissolved oxygen, phytoplankton, temperature, and nutrients under the unsteady conditions of the estuary. Variations were realistic, although lack of a large temporal variation in observed data was somewhat of an impediment to testing the model's full capacity to predict field conditions. Tests of the model's capability to distinguish between alternatives in terms of incremental changes in water quality were encouraging (Rajbhandari 1995). The model has great potential for use as a practical tool for analysis of the impacts of water management alternatives." (http://baydeltaoffice.water.ca.gov/modeling/deltamodeling/delta/reports/annrpt/1998/chpt3.html) Take note that the quote on the utility of this model for analyzing DO in the delta is from DWR's Bay Delta Office. The conclusion that this tool was useful in distinguishing incremental changes from alternatives was documented in 1995 which was 21 years ago so the best available science must be well advanced from this fully functional level from over 20 years ago. For the EIR, the model would not be used to predict field conditions, but in a comparative mode from the baseline environmental conditions as compared to alternatives to quantify the relative change due to the alternatives. This tool, even back in 1995, was well capable of being useful for the EIR impact assessment. Modeling is an essential tool for evaluating such an important water quality constituent which is an essential criteria for suitable fish habitat in an area that many listed species share as designated critical habitat. The problem of DO is dynamic, complex and is unevenly distributed geographically which makes spatial modeling of DO an essential component of any environmental impacts analysis which must utilize the best available science as CEQA analysis requires. The EIR fails to utilize best available science and to conduct analyses of the impacts of continued SWP water deliveries resulting from the water supply contract renewal. 5-54

Another on-going impact of the SWP Contract Renewals that the ERI failed to identify or disclose is the continuation of off-gassing from Lake Oroville which contributes greenhouse gas emissions to impact Climate Change. This material omission must be addressed in a revised and recirculated public draft EIR. 5-55

The SWP Contract Renewals results in an increase in the reliance upon the delta as a water supply as it assumes that there is no improvement in regional water supply independence in the next 50 years (see related comments) which is in direct contradiction to this 23 CCR Section 5003 requirement. As such, the proposed project and other alternatives which include full contract delivery amounts from the original contract are not consistent with current plans, policies and state laws. Alternatives which include reduced delivery quantities must be included in the EIR so that the project is not in conflict with these laws and all alternatives which do not include reductions of water supply deliveries from the delta must be dropped from further consideration in the final EIR. 5-56

The SWP Contract Renewal is growth inducing (see related comments) but does not evaluate those impacts or locate urban development wisely as the growth it induces furthers dependence upon delta water supply exports which is in direct contradiction to this 23 CCR Section 5010 requirement. Not all of the current water supply contract amounts are built out, so the unbuilt increment of water supply included in the contract renewal is growth inducing. The EIR is deficient as it does not include this impact analysis, disclosure and mitigation. 5-57

CEQA requires (see CEQA Guidelines Section 15125(d)) that a "...EIR shall discuss any inconsistencies between the proposed Project and applicable general plans and regional plans." Contract renewal at current contract water supply delivery amounts conflicts with regional and municipal general plans that include (as they are required to by law) a reduced dependence upon delta water supplies in the future. 5-58

The SWP Contract Renewal (incorrectly - see related comments) represents that the renewal of the contract is part of the No Project condition. Therefore, the SWP Contract Renewal should have exactly the same No Project definition as the California Water Fix EIR/S No Project. The California Water Fix EIR/S No Project analysis concluded that the No Project as compared to the existing condition resulted a number of significant (and some unavoidable significant) impacts. The SWP Contract Renewal Project therefore would have the same significant impacts. The SWP Contract Renewal EIR is inconsistent with the California Water Fix project EIR/S findings and the final EIR must be revised to be consistent with Ā=¤8Ĥ[illegible]v[illegible]8Ĥ[illegible]Ā沖 Ą 5-59

CEQA's requires that whenever feasible, agency decision makers must adopt mitigation available to reduce a project's significant impacts to a less-than-significant level. The SWP contract renewal perpetuates significant impacts which were documented in the CA Water Fix EIR/S No Project condition. The SWP contract renewal fails to identify and evaluate these impacts or to mitigate impacts to a less than significant level when it is feasible to do so. The project could reduce significant (and unavoidable according the CA Water Fix) water quality impacts (e.g. salinity, DO, blue' green algae, Se, Pb, Hg, Chloride, Bromide, etc.) to less-than-significant if they reduce the water supply contract delivery amounts or they don't do the project at all (which must be the No Project condition for comparison of impacts - see related comments). 5-60

The SWP Contract Renewal is in direct conflict with the legal requirements of the Delta Plan for reduced reliance on delta water supplies. The SWP Contract Renewal increases reliance upon the delta water supplies by making the delta water supplies more reliable farther into the future.

DWR initiated a process to extend the SWP Water Supply Contracts starting in April 16, 2014. Several public meetings were held involving initial negotiations and culminated in the submittal of public scoping comments ending October 14, 2014. Several public meetings were held in early 2015, but then negotiations continued only in private meetings that the public was excluded from. Of the 23 meetings DWR says it held on the development of the Agreement in Principle (NOP pg2) the public was only included in a hand full of those meetings. DWR shut the public out of the process for the development of the Agreement in Principle with the contracting water agencies. This water supply contract renewal process is definitely not a transparent process for the public as required by the Delta Plan and therefore, DWR, and the SWP Contract Renewal project is not compliant with the Delta Plan. 5-61

The new contract renewal and alternatives do not include any aspect of management or reduction of invasive species to comply with this important Delta Plan requirement.

Summary of Delta Plan Requirement Compliance by the SWP Contract Renewals - Of the 24 or so criteria for certification of compliance with the Delta Plan, the project complies with exactly none of them. The Delta Stewardship Council must not certify the SWP Contract Renewal as being compliant with the Delta Plan. 5-62

Appendix A - Agreement in Principle

The Agreement in Principle (AIP) is used in the EIR as a predecisional document in its entirety. This agreement was utilized as a basis for screening out other alternatives which would have reasonably met the purpose of the project which was to let out new water supply contracts. The process also predecisionally excluded other potential contractors from competing for the water supply contracts - 5-63 see related comments. The agreement precluded consideration of alternative reduced water supply contract delivery amounts which should have been considered as reasonable alternatives. It is appropriate for this agreement to be used to define the proposed project, but not as a basis for screening criteria to artificially limit the range of alternatives which could reasonably meet the objectives of the project, which is to renew the water supply contracts. The use of the AIP as the basis for screening other potential project alternatives is in violation of CEQA requirements for consideration of all reasonable alternatives which meet the project objectives. 5-63 cont.

Objective 3(d) - Proposes the SWP contractors would no longer be responsible for some of the fish and wildlife costs of the SWP. This provision is in conflict with the Davis-Dolwig Act as the SWP contractors are responsible for all operating costs related to their water deliveries, including the costs of mitigation of impacts from the SWP project and operations. The Proposed Project must be modified to remove this aspect of the AIP from the definition as it is in direct conflict with existing law. 5-64

Appendix B - NOP

Pg 2,p2 - "The SWP is also operated to improve water quality in the Sacramento-San Joaquin Delta, control floodwaters, generate electricity, provide recreation, and enhance fish and wildlife." The SWP Contract Renewal project included extending the contract period for water supplies for the benefit of the water contractors, but did not include any provisions for protecting or enhancing any of the other stated project purposes. The SWP operations frequently and routinely violate water quality standards in the delta. The SWP contract renewal EIR must include alternatives that accomplished the other stated project objectives to renew the water supply contracts but also do so in a manner that protect water quality in the delta rather than only proposing project alternatives that will result in a perpetuation of the SWP water quality violations. 5-65

Pg 2, last paragraph - "The AIP does not represent a commitment by DWR or the Contractors to approve a proposed project or to extend the Contracts..." This is an untrue statement as the project EIR did not include any alternatives that did not include extension of the contracts. The AIP was used as a basis to screen out alternatives that did not extend the contracts and therefore was predecisional. 5-66

Pg 3, Project Objectives - Of the three project objectives identified, none of them preclude the reasonable consideration of some quantity of reduced water supply delivery contract amounts. Without a reasonable objective that precludes consideration of reduced water supply delivery amounts, DWR has no supporting rationale not to include one or several project alternatives that do address reduced water supply contract amounts. There is ample reason to include a reduced contract amount alternative as this alternative would be the only one that is compliant with current legal requirements to reduce future water supply reliance upon the delta - see related comments. 5-67

Pg 3, Project Area - the SWP facilities and service area may be correct for the project area definition, but it is incorrect as a boundary for considering the environmental impacts of the project. The project impact analysis area must include areas that are downstream of the diversion and downstream of the service areas so flow affects and water quality impacts in these areas can be assessed, disclosed and mitigated. The current EIR is deficient for not including these affected geographic areas and impacts. 5-68

Pg 3, Proposed Project - "Extend the term of the 29 Water Supply Contracts to December 31 , 2085." This is nearly a 70 year contract extension from current day. This is an unreasonable duration of contract due to the uncertainty of the affects from climate change. The CA Water Fix late long term future analysis only extended 50 years and the long-term analysis was limited in scope due to climate change uncertainty. It is imprudent for the state to make delivery commitments so far in the future with such a significant amount of uncertainty in its ability to fulfill future commitments in conditions that are largely unknown and the impacts of which are currently unquantifiable and in some cases, unknowable. 5-69

Pg 3, Environmental Baseline - The California Water Fix just spend millions of $s characterizing and describing the existing condition and No Project condition of the SWP. The SWP Water Contract Renewal is inconsistent with this other contemporary DWR EIR document as it did not rely upon the same definitions or utilize the same materials. The project must be brought into consistency with the California Water Fix EIR or DWR must explain in each instance the supporting rationale for the differences. 5-70

Pg 9 - Reviewing agencies should also have included the Sacramento Valley Regional Water Quality Control Board for review of consistency with the Delta Water Quality Control Plan and Delta Flow Standards. It should have also included the SWRCB for discharge permits and water quality. 5-71

Pg 16 - 26 - All of the Scoping Comments provided by Central and South Delta Water Agencies are herein incorporated by reference. 5-72

Pg 33, p1 - "Scare tactics are currently being used to coerce SWP contractors into supporting the... ...Bay---Delta Conservation Plan (BDCP)." It is not clear from this comment the method of delivery of this coercion, but it clearly implies that contract renewals may be withheld if water contractors do not support or endorse the BDCP project. Any coercion like this, if true, would clearly be illegal and in conflict with DWR's mission statement to deliver water and in violation of its ethical standards and code of conduct. If there is any requirement for a water contractor to support the BDCP (CA Water Fix) in order to execute a SWP Contract Renewal, then this requirement must be included as part of the proposed project description. 5-73

EIR Document

7.2 - It is interesting that none of the project objectives include delivery of water. An alternative that delivered no water at all would still meet the stated project objectives. Given that, it is reasonable that the project alternatives should have included an alternative with reduced contract amounts.

7.3.1 - An unstated, but required project objective for all project subject to CEQA is that they must be compliant and consistent with all existing laws, regulations and policies. To not include alternatives which reduce reliance upon delta water supplies is to be inconsistent with and in direct conflict with the Delta Reform Act - see related comments. None of the arguments in the EIR which were put forward to justify not including a reduced contract amount make any sense. We understand that Table A amounts are allocated by the amount of water available. That fact does not make any difference in that the maximum amount of water delivery in Table A for the contracts should be a lesser amount so that it is consistent with the Delta Reform Act. Pg 7-3, p4 "Reducing Table A amounts proportionately for all the Contractors by amendment would not change the amount of water being delivered to the Contractors..." This statement is incorrect as reduced Table A maximum amounts would result in reduced deliveries in which full water supplies were available. This infrequent outcome of reduced deliveries is desirable from two important standpoints. First, it would make the alternative with the reduced maximum contract amounts consistent with the requirement for the water contractors to reduce their dependence on delta water supplies as is currently legally required. Second, the outflows of water from the delta would be increased and the larger flushing flows have environmental benefits. This second benefit would make the reduced contract delivery amount the environmentally superior alternative as compared to the environmental impacts of the other alternatives. 5-74

Pg7-5, p3 " The proposed project is separate and independent from the California WaterFix project. The proposed project would need to occur regardless of the outcome of California WaterFix." There are several things wrong with these statements. First, the document is predecisional in representing only the proposed project and not considering that it may be other alternatives which would be approved. Second, the nature of the SWP and water deliveries with or without the CA Water Fix project would be very different. The CA Water Fix EIR/S shows that the amount of water delivered 5-75 would change in different water year types as compared to the No Action condition. This would mean that the amount of water that was available through the SWP would be different with and without the CA Water Fix. This difference would impact Table A allocations and actual water deliveries under the SWP contracts with and without the CA Water Fix. Therefore, the SWP contract renewal and the environmental impacts from the water deliveries from the contact agreements are interdependent upon the CA Water Fix. Because the CA Water Fix would make a difference in the water deliveries and environmental impacts of the SWP Contract Renewal, the EIR must include an alternative that represents a scenario where the CA Water Fix and the associated difference in water deliveries is represented, evaluated, and disclosed. 5-75 cont.

7.4.1 "Upon receipt of Article 4 letters from the Contractors (at least 6 months prior to the existing expiration date for each Contract) the term of the Contracts would be extended beyond their current expiration dates." It is unreasonable for the EIR No Project alternative that the contract would be extended for 50 years beyond their expiration dates. It would be much more reasonable for the EIR to assume that the function of the article 4 provision was to allow a one year period to complete negotiations on the new water supply contracts. Based on the unsupportable assumption that the contract would be extended for 50 years based on the contractor letter, it is much more appropriate to assume that the SWP would stop deliveries (or stop after a year if there is a provision for a contractor letter provision in the current water contracts) when the contracts expired under the No Project condition. The EIR must disclose the materials that support their No Project assumptions of continued water deliveries for 50 years under expired contracts or the EIR analysis must be redone based on a No Project that does not deliver water after the contracts expire (or deliver water for only one year after the contracts expire). 5-76

The EIR should have included an alternative in which the Contractors pay off the existing debt of the SWP, DWR divests itself from the SWP and the Water Contractors take over the operations of the SWP. This has been proposed previously for both the SWP and the CVP. DWR has even conducted a study of this SWP divestiture scenario. This SWP turnover to the Water Contractors would obviate the need for the SWP Water Supply Delivery Contracts. This alternative would meet or obviate the need for each of the project objectives. The project objectives as they are addressed by a DWR SWP divesture to the Contractors: 1) DWR would not need to finance SWP expenditures, 2)DWR would not need to maintain financial reserves for the SWP, 3) would obviate the need for simplified accounting with the Contractors, and 4)it would obviate the need for better coordination between DWR and the Contractors. 5-77

7-11, p1 "... the extent and nature of such indirect impacts are speculative and not analyzed further in this EIR." True, CEQA does not require in-depth analysis of future events which are unquantifiable, but it does require the disclosure of the likely outcomes of the indirect impacts of the project, or in this case, the No Project. As an example, it would be speculative to estimate the amount of service disruption that might occur in the event of delayed maintenance, but it is not speculative to identify and discuss that delayed maintenance would logically increase the frequency, duration and potential severity of service outages. These are logical and predictable (if unquantifiable) indirect effects of the No Project. The implications of increased frequency of service outages can then be discussed non-speculatively as we know that there are economic, social, environmental and human health and safety impacts from service outages. These implications of the project must be identified, qualitatively discussed and disclosed and just because these impacts cannot be quantified, does not make them speculative to the point that it is an excuse not to discuss or disclose them. The EIR must be revised to address this deficiency and the document recirculated for public comment. 5-78

7.4 - The list of alternatives does not identify the Proposed Project. Later in this section all of the alternatives except the Proposed Project are compared to the project objectives in an "Impact Analysis". It is an appropriate discussion to evaluate how well the alternatives meet the project objectives, but it is inappropriate to call this evaluation and "impact analysis". The document is inconsistent in that it does not make or disclose the evaluation of how well the Proposed Project meets the project objectives. This omission and inconsistent treatment of the alternatives must be corrected in a revised and recirculated EIR.	5-79
7.1.4.2 - This whole section makes no sense. The No Project does not have to satisfy the project objectives and the impacts of a project are not determined by how they affect the accomplishment of the project objectives. The No Project does have real and significant environmental consequences and they are not discussed at all here. In the absence of the analysis and disclosure of the environmental consequences of the alternatives, this EIR is incomplete and deficient.	5-80
7.1.4.2 " While it is uncertain how far beyond 2035 the Contracts would be extended under this alternative, the year 2085 was chosen for the Contract term (which is the same as the proposed project)." There is no supporting rationale provided for the assumption that the contracts would be extended for 50 years and the EIR seems to have chosen the expiration of the extended contract to coincide with the proposed project duration for the convenience of a more simplified EIR analysis rather than a reasoned and supported extension period. It would be much more reasonable to assume the extension would be for one year to allow for contract renewal negotiations to be completed rather than to assume that an expired contract is honored under the same terms for 50 additional years. The No Project definition must be revised to a more reasonable and supportable definition of only being extended one year and the EIR analysis must be revised.	5-81
7.1.4.2 Objective2 - The No Project is being compared to the Proposed Project. This is an inappropriate comparison as the required CEQA comparison is of all the alternatives, including the Proposed Project, to the No Project. The comparison provided in the EIR is backwards and must be revised to the required comparisons.	5-82
7.4.7.1. " Similar to the proposed project, Alternative 7 would not result in any direct physical environmental impacts because it would not would not create new water management measures or alter the existing authority to build new or modify existing facilities, or change water allocation provisions of the current Contracts." The EIR makes this assertion of no physical environmental impacts for the Proposed Project and the other alternatives many times in this document. In each instance, this assertion is wrong and fundamentally flawed as it ignores the on-going incremental impacts of continued SWP operations and water deliveries. In many comments submitted herein we have detailed many types of physical and environmental impacts of the continued water deliveries and SWP operations. Perhaps the most simple impact of continued operations to understand is that continued operations from the extended contract will continue water diversions that result in take of threatened and endangered species. This take, occurs with each increment of quantity of water that is delivered over time. It does not happen all at once, but it is incremental and is a very real physical consequence of the continued operation of the SWP that the EIR must address. The EIR must be revised to address environmental consequences of all of these on-going and incremental impacts and all of these erroneous claims of no physical impacts from continued operations must be removed from the revised and recirculated EIR.	5-83
7.4.7.2 - Although Contractors not signing the contract extension is not necessarily a desirable outcome from DWR's perspective, it is possible that none of the Contractors will agree to the contract extension. This very real possible scenario must be evaluated as an alternative outcome of the project. CEQA does not allow the dismissal of potential alternatives by the project proponent just because they are not desirable outcomes.	5-84

Table 7-2 - Again, the comparisons to the Proposed Project are incorrect. CEQA requires all alternatives, including the Proposed Project, to be compared to the No Project, not the other way around as the EIR consistently commits this error. The EIR must be revised and recirculate with the correct CEQA comparisons. 5-85

5.1.1 Methods of analysis - This section does not describe or disclose the analytical methods that were used in the EIR. It cites where significance criteria for CEQA come from and provides some financial background but does not give any information on the qualitative approach or quantitative tools utilized. It also fails to describe the process of analytical comparisons of the alternatives to the No Project. Perhaps this is why the EIR has gotten its comparisons backwards in so many places in the document. This section should have defined and justified the geographic area of potential project environmental impacts. This area is larger than the service area as there are upstream and downstream consequences to SWP operations - see related comments. This section must be revised as it is currently incomplete and does not fulfill the function of disclosure of the content that should reside under this section heading. 5-86

5.1.1.3 - "...the proposed project was determined to not cause a change in physical conditions; and therefore, no impacts would occur and no mitigation measures are proposed." There are on-going incremental impacts of continuing SWP operations and water deliveries that have real and significant physical environmental consequences - see related comments. This document is incomplete and deficient for not addressing these impacts. 5-87

5.1.1.3 - "The proposed project does not change hydrology, regulations, or climate change, all factors that could affect water supply delivery by the SWP." Actually it does in several ways. The irrigation in the SWP service areas changes the local air temperatures and humidity and published scientific papers have identified that these changes in air temperature and humidity from the SWP and CVP affect the amount of snowpack in the Sierras and precipitation as far as the Colorado River Basin. This was discussed in the BDCP EIS/R. The SWP additionally affect hydrology by its highly variable water supply deliveries which causes over-reliance on alternative groundwater supplies which has resulted in a severe subsidence that occurs in the SWP service area. The reduced groundwater table that is a consequence of the SWP deliveries (and inconsistency thereof) have altered the ground and surface water interactions in the service areas. In the 1960s surface flows of tributaries in and downstream of the SWP service areas were frequent and abundant due to the local water tables being close to the surface. Now with the depleted groundwater tables, any surface flows that would have occurred now are quickly absorbed by the lower groundwater tables. This impact on surface water hydrology is an indirect, but real consequence of the SWP water deliveries. The continued operations of the SWP also contribute to climate change from greenhouse gas emissions from Lake Oroville and the SWP other storage and conveyance facilities - see related comments. In a way, the project also changes regulations in that it is not compliant with the Delta Reform Act to reduce reliance upon delta water supplies. By perpetuating the reliance upon the delta water supplies at its current level and not being Delta Reform Act compliant, the project is affectively changing the regulation by ignoring it and perpetuating the non-compliant condition. 5-88

5.2 - The EIR discusses the impacts of the Proposed Project, but does not seem to address the other alternatives. It does not discuss the impacts as in a comparison to the No Project. 5-89

5.2.1.4 - The aesthetics analysis misses that there will be a visual impact from the degradation of farmland from accumulated salts from SWP water deliveries that will result in some areas during the proposed project period to result in the conversion of aesthetically pleasing farmland into ugly unfarmed and un-irrigated scrub brush. This is a significant impact and it is missing its mitigation. 5-90

5.2.2.4 - "Because the proposed project would not result in construction or modification of SWP facilities, it would not affect surrounding land uses or result in development that could conflict with zoning for agricultural or forestry uses or result in the loss or conversion of these resources. Further, because water allocation would not change, there would be no change in land uses associated with SWP deliveries including, conversion of agricultural land uses to urban uses or to nonagricultural use." This analysis is incomplete and flawed in that it ignores the impacts of the on-going salt accumulation in agricultural soils in the SWP service area that are a direct result of salt in water delivered by the SWP under the Water Supply Contracts. These salts affect the quality and yield of the crops grown which have economic and social impacts. In areas where salt accumulation is already a factor in the lands productivity, salt accumulation during the proposed project period will in some cases result in soil quality that is no longer farmable at all. The environmental setting description of farmland failed to identify that some of the farmland conversion that is happening now is due to salt accumulation and the continued deliveries of water supply with salts in them will continue to accelerate this trend. Not only does this impact of land conversion from salt accumulation change the designation of prime farmland to non-farmland which is a significant impact which must be mitigated, but it also affects minority and under-privileged populations of farm workers and county tax revenues and associated social services. 5-91

5.2.2.4 - Another consequence of the project to farmland is the overdraft of alternative groundwater supplies that result from the inconsistent water supply deliveries of the SWP. This reliance upon local groundwater when the SWP deliveries are low increases the salt accumulation of the soils as the water quality of the groundwater is almost always worse than the SWP water supplies delivered. The overdraft of the groundwater as a result of the inconsistent SWP deliveries has resulted in significant land subsidence in the SWP service areas. This subsidence has caused impacts to surface flows (another type of hydrology impact of the project that the EIR failed to identify, evaluate or mitigate), damaged infrastructure (roads and canal structures and flow capacity), groundwater pumping costs and well viability, and disrupted municipal groundwater supplies. The groundwater depletion from the inconsistent SWP deliveries also has upset the surface and groundwater hydraulic balance such that surface flows now quickly are depleted to groundwater recharge when before the SWP project was initiated, the surface and groundwater hydraulics were in balance and allowed sustained surface water flows. This causes a significant impact to surface water hydrology, water rights, water quality and habitat quality (i.e. no water equals no fish). The BOR Remand EIS agriculture section addressed the environmental consequences of the variability of the CVP water deliveries in detail and that content is incorporated by reference herein. 5-92

5.2.4.4 - The EIR claims there are no biological impacts from continuing operations of the SWP from the contract renewals. This is a very inaccurate conclusion as there are many impacts to fish, wildlife and habitat from the SWP operations and water deliveries. The south delta intakes for the SWP do not have criteria compliant fish screens and there is take of T&E species from the intake operations. The contract renewal continues the incremental take of these listed species. This is a significant impact that the SWP does not even have a legal permit to cover. Water quality violations in the delta from the SWP operations will also continue to adversely modify designated critical habitat for a number of listed species of fish. These adverse designated critical habitat alterations from the continued SWP operations include salinity, dissolved oxygen, water temperature, turbidity, mercury, selenium, toxic algal blooms, etc. These on-going adverse environmental impacts from the continued operations of the SWP from the contract renewals also include continued habitat quality degradation below Oroville dam for sediment and large woody debris depletion from capture of upstream contributions by Lake Oroville. The contract renewal will result in the continued genetic introgression of salmonid runs from continued blockage of upstream passage and from hatchery operations of Lake Oroville. Continued 5-93 genetic introgression of salmonids between tributaries from straying of adults during immigration from altered water temperatures and flows from the operations of the SWP. The degraded groundwater table from the inconsistent SWP water deliveries affects surface water hydrology - see comments for agricultural resources. The SWP indirectly has eliminated sustained surface flows in and downstream of their service areas and the continuation of the SWP operations from the contract renewal will perpetuate this condition and continue to degrade habitat quality and convert habitat to different, lower value types, e.g. convert warm-water fisheries habitat to no fish habitat, convert riparian habitat to upland and desert habitat. There are other ongoing habitat and wildlife impacts from the contract renewal. The conversion of irrigated farmland to non-irrigated idled non-farmland from salt accumulation in SWP water deliveries - see ag impact comments - also changes terrestrial habitat quality, type and distribution. 5-93 cont.

5.2.5.4 - There would be ongoing and incremental cultural resource impacts from the contract renewals as the operations of Lake Oroville for the SWP result in water level fluctuations that erode and expose cultural sites in the fluctuation zone of the reservoir. These cultural resources are lost to erosion or theft from by the public visiting the reservoir. This is a significant impact of the contract renewal that was not identified, evaluated, disclosed or mitigated in the EIR. 5-94

5.2.6.4 - There may not be additional power requirements from the contract renewal, but the contract renewal results in the continuation of the power demand and grid load from the SWP operations. 5-95

5.2.7.4 - The Contract Renewal will result in the degradation of soil quality and erodability from salt accumulation from continued SWP water deliveries with a salt load - see ag section comments. Salt impacted soils defloculate and lose their cohesive properties which make them very susceptible to wind erosion which would be another significant soil resource impact which the EIR failed to identify, evaluate, disclose or mitigate. 5-96

5-77, p3 "Water applied in the western part of the San Joaquin Groundwater Basin for crop irrigation and wetland management via federal, State, and local water projects causes salts in the soil to be leached out of the soil (DWR 2013). Salt is purposefully leached below the root zone to maintain salt balance in the root zone, such that most leached salt ends up in the groundwater (Reclamation et al. 2013)." This is all true and correct and will continue to occur as an environmental consequence of continued irrigations from the SWP Contract Renewals. The entire EIR has missed this impact of the project even though it identifies this SWP impact in the environmental settings. 5-97

Letter 5

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October 13, 2014

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Sacramento, CA 95814

Re: Comments on the Notice of Preparation of an EIR for the "Water Supply Contract Extension Project."

Dear Mr. Alvarez:

Please see the attached comments submitted on behalf of the Central Delta Water Agency on the above-referenced matter.

Thank you for considering these comments and concerns.

Very truly yours,

Dante John Nomellini, Jr.
Attorney for the CDWA

Enclosure

Attachment to

Central Delta Water Agency's Comments on the Notice of Preparation of an EIR for the "Water Supply Contract Extension Project."

10/13/14

Our public scoping comments are organized into the following categories to address issues related to: contract duration, water supply contract amounts, relationship of the SWP contract renewals to the CVP/SWP Coordinated Operating Agreement (COA), federal nexus with the contract renewal project and need for federal agency involvement in the environmental review and subsequent permitting of the project, water-rights related issues, Notice of Preparation procedural errors, impact topics for the EIR to address, and funding issues.

Contract Duration:

1. **The proposed 70 year duration is extreme and incorporates too much future uncertainty**. Climate change was not anticipated in 1960s original contract development, but consideration of climate change is now a requirement of CEQA and NEPA and DWR has adopted protocols and standards for consideration of climate change for all of their projects. Sea level rise was also not anticipated in 1960s original contract development, but consideration is now a requirement of CEQA and NEPA and DWR has adopted protocols and standards for consideration of sea level rise for all of their projects. Subsidence of canals was anticipated in the original engineering of the SWP, but subsidence-caused loss of conveyance capacity over time and its affect on water supply deliveries was not accounted for in the original SWP water supply contracts, see "Contract Delivery Amounts, comment 10" below. Potential loss of conveyance capacity and system reliability from invasive mussel (e.g. quaga and zebra) colonization of the SWP pumps and canals was also not anticipated or included in the original SWP water supply contracts. There have been profound changes to demographics, industry water use, water demand, ground water depletions, water transfers and water market economics, crop types grown, crop production practices, geographic distribution of crop types grown and population geographic distribution changes that were not anticipated in the original SWP water supply contracts. State Water Project Bulletin 132-06, pg 4, "Some changes have occurred since the long-term water contracts were signed in the 1960s. These changes include population growth variations, differences in local use, local water conservation programs, and conjunctive-use programs." There are potential projects currently under consideration that would fundamentally alter the SWP infrastructure, e.g. BDCP and Sites Reservoir, which may or may not occur. Each of these above factors must be addressed in the SWP water supply contract renewal and each represent a significant amount of uncertainty in the magnitude of water supply impact. A shorter duration contract period, e.g. 30 years, must be evaluated so that the conditions under the contract period are more certain and predictable. 5-98
2. **The original contract period of 75 years was to provide a long duration of repayment on the original SWP construction cost.** The original SWP construction cost is scheduled to be repaid by the end of the original contract duration in 2035. Only smaller subsequent projects that extended the SWP after the original construction should be financed by bonds occurring later than 2035. Since the relative costs of these later SWP bond funded projects are much smaller 5-99

than the original SWP construction cost, the extreme 75 year duration of contract period is not warranted. The smaller subsequent SWP expansion costs can be funded by bonds of shorter duration, so a 30 year contract period (or shorter) also must be evaluated. 5-99 cont.

Contract Delivery Quantities:

1. **The SWP water supply delivery contract amounts must address how much water is spilled/leaked/evaporated in the SWP system.** The current SWP water supply delivery contract amounts do not address how much water is spilled/leaked/evaporated in the SWP system from the point of diversion to the point of water delivery in the SWP service area. "The July 1997 Journal American Water Works Association cites examples of more than 45 percent leakage." "DWR estimates that up to 700,000 acre-feet of leakage occurs in California each year from nonvisible leaks." (http://www.water.ca.gov/wateruseefficiency/leak/) Estimates range from 25-50% of the water diverted by the SWP is spilled, leaked and evaporated prior to delivery to service areas. This SWP rate of water loss results in unnecessary environmental impacts from increased quantities of water diversions and other impacts. This current SWP system loss also represents perhaps the largest single water conservation opportunity that exists in the state of California at this time. The structure of how the SWP water supply contracts are renewed must be changed so that the economic opportunities of reducing SWP water system losses are shared with the water contractors and service areas. The EIR must include alternatives which allocate SWP system water losses to the Service Area Contractors proportionate to the amount of water losses associated with their water delivery. As an example, service areas near the SWP water diversions would only share a small portion of the losses that occur from the point of diversion to the point of delivery while service areas at the farthest reaches of the SWP system would share proportionately more in the system losses in their water delivery contract amounts. With the current water contract structure and given the reported rates of SWP conveyance losses above, the environmental impacts from the SWP south delta water diversions for Southern California water contractors is as much as 45% higher per Acre Foot than for water contractors that take delivery near Tracy. In order to compensate for the disproportionate impacts per acre foot of water delivered between the near system and far system SWP water contractors, the water contract amounts must be for the quantity of water diverted by the SWP on behalf of the water contractor, not based on the quantity of water that is actually delivered. By making the water contract based on the amount diverted for each water contractor and on not the amount delivered, there will be motivation for the contractors and SWP to more aggressively address water losses that occur in the SWP. This is similar in concept to the project where Metropolitan Water District of Southern California (MWD) paid for system improvements to reduce water conveyances losses for Imperial Irrigation District and in return, MWD got an equivalent amount of water supply transferred to them for the water that was saved from loss in the IID conveyance system. If the water contractors pay to improve parts 5-100

of the SWP system and reduce their proportionate losses, then their effective amount of water supply goes up. This mechanism for water conservation and for equalizing the environmental impacts per acre foot of water delivered for the various water contractors is completely missing from the current water supply contracts and must be included in the EIR alternatives. 5-100 cont.

2. **Surplus water is not to become permanent demand.** Surplus water that has been delivered to water contractors from interrupted service or other causes must not be allowed to be incorporated into the contract renewal water supply contract delivery amount. Surplus water deliveries are growth inducing and this option must be dropped in the water supply contract renewals or the environmental impacts of this growth inducement must be evaluated, disclosed, and mitigated. 5-101
3. **The current contract allows use of excess capacity.** The use of excess capacity is growth inducing and encourages water transfers/sales arbitrage from northern to southern California. Excess capacity usage is growth inducing and this option must be dropped in the water supply contract renewals or the environmental impacts of this growth inducement and other environmental and beneficial use-related impacts must be evaluated, disclosed, and mitigated. Water transfer requirements allow "temporary transfers" of one year of duration or less to be exempt from CEQA. (Bulletin 160-93, The California Water Plan Update, October 1994) The SWP contract renewals must address the repeated use of one year transfers to side-step the CEQA requirements which circumvent the environmental review of impacts that occur from these repeated water transfers. The SWP contract renewal EIR must stipulate that any water transfer that is repeated for more than one year must undergo CEQA review, otherwise the SWP is precipitating impacts which have not been analyzed or disclosed and is in violation of CEQA. 5-102
4. **The original water supply contract provides no guarantee of water amounts in subsequent water supply contract renewals.** The DWR Proposed Project sets forth deliveries at the same as the existing contract amounts. Delivery amounts in the original and amended contracts were not guaranteed to be renewed in succeeding contracts. Because water supply amounts were not guaranteed in subsequent SWP contract renewals, the EIR must include alternatives that do not have the same water supply delivery amounts in the water supply contract renewals. 5-103
5. **DWR has failed to construct a SWP that ever was capable of meeting the current water supply contract amounts.** MWD Contract Amendment 1/1/2005, Article 1n "This recognition that full Annual Table A amounts will not be deliverable under all conditions does not change the obligations of the State under this contract, including but not limited to, the obligations to make all reasonable efforts to complete the project facilities, to perfect and protect water rights, and to allocate among contractors the supply available in any year, as set forth in Articles 6(b), 6(c), 16(b) and 18, in the manner and subject to the terms and conditions of those articles and this contract." MWD Contract Amendment 1/1/2005, Article 6c "State shall make all reasonable efforts consistent with sound fiscal policies, reasonable construction schedules, and proper operating procedures to complete the project facilities necessary for delivery of project water to the District in such manner and at such times that said delivery can commence in or before the 5-104

year specified in subdivision (a) of this article, and continue in the amounts designated in Table A." MWD Contract Amendment Article 16b – "The State shall make all reasonable efforts to perfect and protect water rights necessary for the System and for the satisfaction of water supply commitments under this contract." The reasonable efforts of the State have not resulted in the satisfaction of water supply as the SWP chronically under-delivers the current contract amounts. It is therefore "reasonable" that the delivery amounts committed to in the contract renewal should be an amount that the project can reasonably and consistently deliver. The SWP water supply contract renewal Table A amounts must revised down to levels that the currently constructed SWP system is capable of delivering so DWR is not consistently in violation of the terms of the agreement as it is under the current contracts as it is identified above. 5-104 cont.

6. **The SWP was never built out as originally authorized, so the original contract water supply delivery amounts cannot be supported.** The SWP plan was by the year 2000 to have developed projects in the North Coast sufficient to supplement flows into the Delta by 5 million acre feet annually. These projects were not constructed. As a result, SWP capacity falls short by an annual amount of at least 5 million acre feet thereby providing no firm yield and less than an adequate supply to meet water supply and water quality obligations in the Delta and other areas of origin. The future system capacity conditions under which the original water supply delivery contract entitlements were set were never fulfilled and this is why the SWP chronically under-delivers on its current water supply deliveries under the current contracts. The EIR must include alternatives that consider water supply delivery amounts less than the current contracts and be based on amounts the current and reasonably foreseeable future system can actually deliver.
7. **SWP Water Supply Contract "over-promising and under-delivering" causes groundwater over-drafting and subsidence.** "…drought conditions during 1976–77 and 1987–92, and drought conditions and regulatory reductions in surface-water deliveries during 2007–10, decreased surface-water availability, causing pumping to increase, water levels to decline, and renewed compaction. Land subsidence from this compaction has reduced freeboard and flow capacity of the Delta-Mendota Canal, the California Aqueduct, and other canals that deliver irrigation water and transport floodwater." (Pg 1, "Land Subsidence along the Delta-Mendota Canal in the Northern Part of the San Joaquin Valley, California, 2003–10", Michelle Sneed, Justin Brandt, and Mike Solt; Scientific Investigations Report 2013–5142.) Agricultural water users develop their water use demand based on more or less average annual water deliveries. In some years the level of water demand and the level of water delivery are not seriously divergent and in conflict and therefore reliance upon groundwater as an alternative water supply is not substantial. In drought years with significantly curtailed SWP water deliveries (like 2014 as an example), farmers are forced to make up SWP water delivery shortfalls with groundwater resources. This all too frequent practice has resulted in an increase in the rate of groundwater resource depletion and subsidence rather than a reduction in groundwater depletion and subsidence which the SWP implementation was supposed to accomplish. The only way the SWP 5-105

can avoid this impact from building up a water supply demand (over-promising) that it rarely fulfills (under-delivering) and the resulting groundwater over-draft-related impacts is for DWR to renew the SWP water supply delivery contracts for a substantially reduced amount of water such that the amount of water delivered in a drought year does not result in a groundwater withdrawal that exceeds the effective and sustainable groundwater recharge rate. Any greater water supply delivery promises by the SWP than what would exceed this balanced groundwater alternative water supply demand are inherently unsustainable and will result in significant groundwater and irreversible subsidence-related impacts. This balanced sustainable groundwater alternative water supply SWP delivery quantity must be included as an alternative in the EIR. This "sustainable groundwater alternative" SWP water delivery amount can be calculated for each SWP service area groundwater basin using the following generalized methodology. First, determine the current size (TAF) and annual groundwater recharge for each groundwater basin for the 82 year period of hydrologic record. Second, determine the safe and sustainable annual quantity of groundwater yield (including maximum rate of groundwater withdrawal without collapsing water bearing strata) in each basin. Now add the groundwater basin (with size, recharge rates and maximum sustainable rates of withdrawals) as a "reservoir" for each groundwater basin and SWP service area to CALSIM (or in a post processing module for analyzing CALSIM results). Next, using the 82 year period of record and the CALSIM model, optimize the amount of SWP water deliveries for each groundwater basin/SWP service area. Determine the amount of SWP water delivery that does not accrue into an over-draft of the groundwater basin at any time during the 82 year period of record. The maximum SWP delivery amount that does not result in over-drafting the groundwater in any year in the 82 year hydrologic period of record will be the maximum contract delivery amount for that groundwater basin and SWP service area for use in the "sustainable groundwater" EIR alternative. 5-105 cont.

8. **Water contract renewal supply amount alternatives must address the over-subscription of surface water supplies.** The EIR alternatives must include an amount of water delivery that reflects the current 5 time oversubscription of mean annual runoff and oversubscription of surface water supplies by 1000% of California's major river basins ("100 years of California's water rights system: patterns, trends and uncertainty", Theodore E Grantham and Joshua H Viers 2014 *Environ. Res. Lett.* 9 084012). DWR is a junior water rights holder and should not perpetuate the oversubscription of surface water rights. Based on this level of surface water right over-subscription and DWR's junior water rights, the EIR alternative must consider a contract amount that cuts back water supply deliveries to 10% or less of the current DWR water right to reflect the proportional amount of surface water supply that actually exist. 5-106

9. **The Water contract renewal supply amounts must not exceed what the SWP can "dependably" deliver.** MWD Contract Amendment 1/1/2005, Article 58 – "Determination of Dependable Annual Supply of Project Water to be Made Available by Existing Project Facilities" "This report will set forth, under a range of hydrologic conditions, estimates of overall delivery capability of the existing project facilities and of supply availability to each contractor in 5-107

accordance with other provisions of the contractors' contracts. The range of hydrologic conditions shall include the delivery capability in the driest year of record, the average over the historic extended dry cycle and the average over the long-term. The biennial report will also include, for each of the ten years immediately preceding the report, the total amount of project water delivered to all contractors and the amount of project water delivered to each contractor." Dictionary.com defines "dependable" as, "capable of being depended on; worthy of trust; reliable" and defines "reliable" as "able to be trusted; predictable or dependable" SWP water supply delivery quantities have not been predictable or reliable, are not depended or relied upon because the amount of SWP water deliveries chronically fall far short of the current contract amounts and therefore alternative water supplies must be regularly relied upon to compensate for the SWP delivery shortfalls. DWR must include alternatives in the EIR based on these reports for water delivery quantities that were determined to be "dependable". Methods to calculate the water delivery amounts that are dependable should include the bottom quartile of last 10 years of deliveries or 75% probability of exceedance whichever is less (which would be more conservative from a standpoint of water supply dependability). Another method to identify this "dependable" water supply delivery amount is to look at the operational record of the SWP and identify the lowest water delivery which occurred since the start of SWP operations. This SWP historical water delivery operational record for dependable water supply delivery amount must be adjusted to reflect the current OCAP BO, D1641 and Wanger Remand operating criteria. The SWP has not demonstrated that it can dependably deliver even that lowest amount of water, so lower amounts and even no deliveries except in above normal and wet years must also be included as project contract delivery alternatives. 5-107 cont.

10. **The SWP conveyance capacity has changed since the original water supply contract.** Subsidence from groundwater overdraft (caused by SWP under-deliveries, see Contract Delivery Quantities, comment 1) has reduced the conveyance capacity of large portions of the SWP canal system. "The overall length of the Central Valley portion of the canal is 280 miles (450 km) with 200 miles (320 km) in areas of significant subsidence." "LAND SUBSIDENCE AND THE CALIFORNIA STATE WATER PROJECT" Clifford V. Lucas and Laurence B. James, California Department of Water Resources, Sacramento, California, Publication n°121 of the International Association of Hydrological Sciences Proceedings of the Anaheim Symposium, December 1976. If subsidence continues at its current pace (it is reasonable to assume it will as a continuation of current policies and practices), large sections of the aqueduct will no longer be viable (based on engineering, maintenance, and economics) to be raised to compensate for subsidence. The proposed contract duration and proposed water delivery quantities must take into account the current reduced capacities as compared to the original capacities and contracted water delivery quantities as well as incorporate reductions in future water delivery quantities that match with future reductions in water delivery capacity from further future subsidence impairment of the conveyance capacities. 5-108

11. **The Bay Delta Conservation Plan would alter SWP operations and water contract delivery capacities.** The SWP water supply contract renewal EIR must include alternatives for each of the water supply delivery amounts that would result from the implementation of any of the current BDCP alternatives. If this EIR does not include those alternative delivery amounts that would result from the implementation of the BDCP, the environmental impacts of the contract renewals will not be disclosed and would be piece-mealed which is in violation of both NEPA and CEQA legal requirements. 5-109

12. **Restoration of Original Standard Contract Provisions.** Restoration of the standard provisions and recovery of the Kern Water Bank should be considered as a separate alternative. Contractors should not be allowed to take Article 21 water unless they have first utilized (not transferred) Table A entitlements. Article 21 water should not be allowed to support permanent demand. Water contractors should not be allowed to profit from sale, transfer, lease or in any other manner from project water. 5-110

SWP/CVP Coordinated Operating Agreement (COA):
Coordinated CVP/SWP operations, funding and water deliveries are based on the COA. The COA is grossly out of date and has not been updated since 1986. Since funding and water supply deliveries are dependent upon the COA and water supply and funding are part of the SWP water supply contract renewals, the COA must be updated as part of the scope of the SWP water supply contract renewals project. If the COA is updated independently of this project, then the SWP Contracts would have to be amended and an environmental impact of those changes in water deliveries and operations evaluated. If this EIR does not include the COA update and the resulting adjustments made to SWP delivery amounts the contract renewal impacts will not be fully disclosed and this would result in piece-mealing the environmental impacts of the contract renewals which is in violation of both NEPA and CEQA legal requirements. 5-111

Federal Nexus of the SWP Contract Renewals:
There are several federal nexus' for the SWP contract renewal including coordinated SWP water delivery operations with the CVP, joint facilities with the CVP, operational interties and water supply exchanges, and funding through bonds issued under the Central Valley Project Act (CVPA). These federal nexus with the SWP water contract renewal all provide sufficient cause for the environmental review to comply with federal Environmental Impact Statement requirements. The project environmental document must therefore also include an EIS and appropriate federal lead agencies. 5-112

1. The COA provides a federal nexus for the SWP water supply contract renewal as any SWP changes in water deliveries will affect CVP operations and water deliveries and visa versa. Because the SWP contract renewal impacts the CVP operations and water deliveries and visa versa, Reclamation must be a lead federal agency on the EIS component of the SWP contract renewal environmental review. The proposed changes to the SWP contracts will likely require a change in the COA necessitating federal action.
2. Changes in SWP water supply deliveries and on-going impacts of continuing current water deliveries have impacts on federal listed species, so USFWS and NMFS should also be federal lead agencies for the EIS.

3. San Luis Reservoir is a joint SWP/CVP facility and is an integral facility of the SWP water contract deliveries. Any changes in SWP operations or deliveries would affect San Luis Reservoir operations, costs, available storage capacity and environmental impacts. Reciprocally, any changes in CVP operations relative to San Luis Reservoir also affect the SWP water deliveries and costs.
4. SWP and CVP current and planned reasonably foreseeable interties and their affects on operations and water supplies also establish a federal nexus for the SWP contract renewal.
5. Some of the water bonds for facilities used in SWP water deliveries were issued under the CVPA. See MWD Contract Amendment 1/1/2005, Article 28e. This SWP funding through a federal project also creates a federal nexus that triggers the requirement for an EIS component to the SWP contract renewal environmental review.
6. The Agreement In Principle (AIP) Concerning Extension of SWP Water Supply Contracts, is DWR's Proposed Project for the SWP water contract renewal. AIP article XIV, dated June 18, 2014 says that, "...Contractor participation in the BDCP and DHCCP will be addressed through a separate public negotiation and environmental review process to develop appropriate SWP water supply contract amendments." (Emphasis added) The BDCP is a joint federal and state project, so this joint federal and state negotiation with SWP water contractors for the SWP water contract renewals is a clear federal nexus for the SWP contract renewal project. The AIP proposed method of addressing these negotiations as an amendment to the SWP water contracts is clearly an attempt to piece-meal the environmental impacts of the water contract renewal. Piece-mealing of environmental impacts by proposing to do a contract amendment concurrently with the contract renewal is against CEQA and NEPA regulations. 5-112 cont.

SWP Water Rights:
DWR water rights are subordinate to senior rights and conditioned on compliance with statutory requirements as well as permit conditions. The SWP, as a junior water rights holder is not allowed to impair the water quality or quantity of the senior water rights holders from the operational impacts of their diversions.

"Area of Origin Statutes during the years when California's two largest water projects, the Central Valley Project and State Water Project, were being developed, area of origin legislation was enacted to protect local Northern California supplies from being depleted as a result of the projects. County of origin statutes provide for the reservation of water supplies for counties in which the water originates when, in the judgment of the State Water Resources Control Board, an application for the assignment or release from priority of State water right filings will deprive the county of water necessary for its present and future development. Watershed protection statutes are provisions which require that the construction and operation of elements of the Federal Central Valley Project and the State Water Project not deprive the watershed, or area where water originates, or immediately adjacent areas which can be conveniently supplied with water, of the prior right to water reasonably required to supply the present or future beneficial needs of the watershed area or any of its inhabitants or property owners. 5-113

The Delta Protection Act of 1959 declares that the maintenance of an adequate water supply in the Delta--to maintain and expand agriculture, industry, urban, and recreational development in the Delta area and provide a common source of fresh water for export to areas of water deficiency--is necessary for the peace, health, safety, and welfare of the people of the State, subject to the County of Origin and Watershed Protection laws. The act requires the State Water Project and the federal CVP to provide an adequate water supply for water users in the Delta through salinity control or through substitute supplies in lieu of salinity control.

In 1984, additional area of origin protections were enacted covering the Sacramento, Mokelumne, Calaveras, and San Joaquin rivers; the combined Truckee, Carson, and Walker rivers; and Mono Lake. The protections prohibit the export of ground water from the combined Sacramento River and Sacramento-San Joaquin Delta basins, unless the export is in compliance with local ground water plans. Also, Water Code Section 1245 holds municipalities liable for economic damages resulting from their diversion of water from a watershed." (http://www.waterplan.water.ca.gov/previous/b160-93/b160-93v1/ifrmwk.cfm)

DWR is not compliant with their junior water rights requirements as the SWP operations frequently impair Delta water quality and take non-surplus water from the Delta in violation of the Delta Protection Act of 1959 (among other laws and regulations). Transfers of water supplies through the SWP from conjunctive use of groundwater substitution for surface water supplies are not consistent with local groundwater plans. Water contractors supplied through the SWP are liable for any direct or indirect damages from diverting water from a watershed. These damages may include injury, damage, destruction or decrease in value of any such property, business, trade, profession or occupation resulting from or caused by the taking of any such lands or waters, or by the taking, diverting or transporting of water from such watershed. (Water Code 1245) 5-113 cont.

The SWP Water Supply Contract Renewal EIR must consider the water supply, water rights, water quality impairments and other water beneficial use impacts associated with the continuation of SWP diversions of south delta water. The conditions of waters in the delta including direction of flows, water quality and impacts to agriculture, drinking water supplies and fisheries resources are a direct consequence of the SWP south delta facilities water diversions.

Notice of Preparation (NOP) Procedural Errors:
There are several procedural, noticing, timing and availability issues with the NOP.

1. The original NOP link to the proposed project description was broken and unavailable in the original publication. DWR e-mailed out a revised NOP to a few selected recipients, but did not republish the corrected NOP in the newspapers. This means that general public was never given the opportunity to review the proposed project description and only the few members of the public that DWR selected were given the corrected link to the proposed project.
2. By not putting the proposed project description in the NOP and instead relying upon a (broken) link to a website, DWR denied access to review the proposed project description to any member of the public that does not have ready access to a computer. This biases the public participation process against the more disadvantaged public. This is a public participation and environmental justice issue that DWR must address by reissuing a complete NOP that includes the proposed project description. 5-114
3. DWR only provided two business days between the revised NOP e-mail and the public scoping meeting. This is an inadequate amount of time for the public (those few who received the corrected NOP e-mail) to review the proposed project prior to the public scoping meeting. Two business days is not adequate public notice to review a project and another more reasonably scheduled public scoping meeting must be held, e.g. one month from the date of revised

newspaper publishing of the NOP would be a reasonable amount of notice to the public to attend the scoping meeting.

4. Thirteen business days (excluding Columbus Day holiday) is an insufficient amount of time from the public scoping meeting to the close of public scoping comment period to complete the review of the proposed project and all the relevant related materials, e.g. current SWP contracts (27 + a hundred or so amendments), climate change and sea-level rise documents related to the SWP water contract deliveries, CVP/SWP Coordinated Operating Agreement, groundwater overdraft and subsidence, original SWP authorizations, SWP phase II plans that were never completed and their system capacity implications, and other projects which could affect the SWP contracts such as the BDCP and intertie projects, etc. The pertinent documents to review to provide informed public scoping comments total in the thousands of pages. The proposed project is for a 75 year duration, so surely the public should be given more than thirteen business days to make scoping comments. After DWR issues the revised NOP (per the preceding comments) and holds a new Public Scoping Meeting(s), DWR should allow at least one full month after the meetings for the development of public scoping comments. 5-114 cont.

Impact Analysis Topics:

The SWP contract renewal EIR must address the entire scope of impacts from on-going water deliveries, including, but not limited to: salt accumulation, soils productivity, groundwater quality degradation, groundwater saltwater intrusion, groundwater overdraft, groundwater recharge rates, changes in groundwater pumping costs and economic impacts, changes in direction or magnitude of groundwater hydraulic gradient, subsidence, subsidence impacts to infrastructure, discharge water quality, additional raw and discharge water treatment and economic impacts, surface and groundwater beneficial uses of water, surface water quality degradation, growth inducement from use of SWP excess capacity, terrestrial and aquatic species, creation of wetland habitat at locations of canal leaks and loss of this habitat when leaks are fixed, contribution to groundwater recharge from canal leaks, reservoir fisheries and fish populations upstream of terminal dams, reservoir drawdown impacts on warmwater fish reproductive success rates and population sustainability, impacts of carryover water storage drawdown on warmwater fisheries, and on-going degradation of fish population genetic integrity. 5-115

Significance Criteria:

The EIR must use a full range of significance criteria which are consistent with DWR's use in other similar environmental documents. These similar environmental documents which DWR should use the superset of significance criteria from include: South Delta Improvement Program, Monterey Accord, Oroville Relicensing, CALFED, and BDCP. To use anything less than the synthesis of the significance criteria from these recent and similar projects would be an inconsistent application of policy, procedure and science. 5-116

On-Going Impacts of the SWP Operations and Environmental Compliance:

The SWP contract renewal will result in the continuation of the water delivery operations of the SWP. SWP water delivery operations have current and on-going environmental impacts which must be identified, characterized, evaluated, quantified, mitigated and disclosed in the EIR, see "Impact Analysis Topics" comments above. Current and on-going impacts of the operations of the CVP/SWP are covered by the current FWS and NMFS OCAP Biological Opinions (BO) compliance for on-going impacts of the SWP. As part of the Environmental Setting of the EIR, the document must include an accounting of the SWP and DWR compliance with the Reasonable and Prudent Actions (RPAs) that are legal requirements of the current OCAP BOs. The BO RPAs have many deadlines for submittal of letters of intent and 5-117 communications, studies, reports, plans, pilot projects, facilities and operational implementations for and to FWS and NMFS. Most of these deadlines have already past and it is relevant to the renewal of SWP contracts to disclose the status of OCAP BO RPA compliance as this compliance is the basis for DWR being able to continue to operate the SWP without causing jeopardy for several ESA species. If DWR and the SWP are not compliant with the current OCAP BO RPAs, then the contracts must not be renewed for their current contract amounts until compliance has been achieved, because the current level of water operations requires the implementation of the BO RPAs in order to avoid a jeopardy impact call on endangered species from the SWP operations. Alternatively, substantially reduced contract delivery amounts in the SWP contract renewal could contribute considerably to compliance with the BO RPA intent as water operations impacts on endangered species would be significantly reduced. This reduced water delivery contract amount approach to BO compliance would require a new OCAP BO to be issued. 5-117 cont.

The SWP Over-Estimates Net Delta Outflows:
SWP operations and resulting water delivery amounts are often constrained by net delta outflow requirements. The Net Delta Outflow Index (NDOI) that the SWP and CVP are currently using is grossly over-reporting net delta outflow so water supply deliveries are currently higher than the current operating requirements of the SWP should result in. The EIR must include an evaluation of the accuracy of the Delta Net Outflow Index accuracy and an adjustment for the water supply delivery quantities that would result from correctly adhering to the operational constraints of the SWP from Delta Net Outflow Index requirements. "While the NDOI is, at best, an estimate of Delta outflow, there are stations that accurately measure actual Delta outflow. The United States Geological Survey (USGS) has established a series of stations in the Delta to measure flow and water quality parameters." "Four of the USGS gaging stations... accurately measure Net Delta Outflow (NDO)." (*"The Case of the Missing Delta Outflow",* California Sportfishing Protection Alliance) DWR's own analysis of NDOI ("Dayflow") estimates vs. the new more accurate USGS gage measurements concludes that the "Dayflow under estimates flow during wet periods and over estimates flow during dry periods." (http://www.water.ca.gov/dayflow/docs/2013_Comments.pdf) This DWR report means that during the majority of the SWP diversion season (spring through fall), DWR systematically over estimates NDOI and systematically diverts more water than regulatory operational constraints would allow if NDO was correctly accounted for. This regular exceedance of regulatory constraints on the SWP operations must be evaluated in the SWP contract renewal EIR and contract water supply delivery amount alternatives must include amounts that would not result in the SWP violation of these operational requirements. 5-118

The Bay Delta Conservation Plan (BDCP) is not "reasonably foreseeable":
The BDCP has not even completed the public draft and is not approved or funded, so the BDCP does not meet the test of being reasonably foreseeable and cannot be included in the Existing Condition, the No Project or cumulative alternatives in the EIR. 5-119

Project Funding:
In addition to the proposed project, "pay as you go" after 2035, the SWP Contract Renewal EIR must also evaluate continuation of the existing funding methodology. None of the funding from this project or bonds issued related to it should be used to fund any water system improvements or conservation efforts in any way related to the BDCP project and efforts. 5-120

Response to Comment 5-1

The comment suggests that the DEIR for the proposed project is incomplete until the outcome of several issues is known. See the responses to comments in Letter 5.

Response to Comment 5-2

The comment pertains to other projects and legal matters and does not address the environmental analysis contained in the DEIR. The uncertainty regarding these other projects and legal proceedings would not affect the proposed financial amendments to the Contracts. See Response to Comment 5-11 for discussion of the definition of the proposed project. See also Master Responses 3 and 4 for more information on relationship of the proposed project to the California WaterFix project and DWR's compliance with environmental regulations and permits, respectively.

Response to Comment 5-3

See Response to Comment 5-11 for discussion of the definition of the proposed project.

Response to Comment 5-4

As stated in the DEIR on page 4-2, the proposed project would not create new water management measures, alter the existing authority to build new or modified existing facilities, or change water allocation provisions in the Contract. As further stated on page 5-7 of the DEIR, DWR would continue its practice of providing separate CEQA compliance at the time that a project to modify or construct new SWP facilities is proposed. See also Responses to Comments 5-2 and 5-11.

Response to Comment 5-5

See Responses to Comments 5-1 through 5-4 and 5-11.

Response to Comment 5-6

The proposed project is based on the negotiated AIP between DWR and the Contractors. The Contract Amendment reflects the principles in the AIP that are the subject of the DEIR analysis. The proposed contract extension amendment was posted on the contract extension website in June 2018 and is included as Exhibit A to this FEIR. Please see Response to Comment 5-11 for discussion of the definition of the proposed project.

Response to Comment 5-7

See Responses to Comments 5-98 through 5-112 addressing the attachment referred to in this comment. The attachment to the comment is included in Exhibit B to this FEIR.

Response to Comment 5-8

See Master Response 1 for a discussion of the No Project Alternative.

Response to Comment 5-9

The project area includes those facilities and service areas as indicated in Chapter 2, State Water Project on Figures 2-1 and 2-2. The environmental analysis in the DEIR is not limited to the areas shown in these figures dependent on the topical area and environmental setting as explained in the subsections of Chapter 5. For example, the environmental setting for air quality is based on the jurisdictions of each air quality management agency and is not based on the boundaries of service areas. Please see Response to Comment 5-11 for discussion of the definition of the proposed project and Response to Comment 5-4 for discussion of environmental review of future SWP facilities. See Response to Comment 5-21 for more information on baseline and environmental setting. As described in Response to Comment 4-1, Contractor participation in California WaterFix will be addressed through a separate public negotiation and environmental review process to develop appropriate SWP Contract amendments. See also Master Response 3 for further discussion of the relationship between the proposed project and California WaterFix and the separate Contract amendment process.

Response to Comment 5-10

See Responses to Comments 4-5 and 5-9.

Response to Comment 5-11

Under CEQA Guidelines Section 15378, "project" means the whole of an action, which has a potential for resulting in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment…" Under Guideline Section 15124(b), the project description is required to include a statement of objectives sought by the proposed project. The statement of objectives "will help the lead agency develop a reasonable range of alternatives to evaluate in the EIR and will aid the decision makers in preparing findings or a statement of overriding considerations, if necessary. The statement of objectives should include the underlying purpose of the project."

During the public negotiation sessions, DWR and the Contractors identified the financial management problems facing the SWP due to, among other things, the difficulties of selling revenue bonds with maturity dates beyond 2035, making more difficult to affordably finance SWP construction projects such as capital repairs or improvements. These problems are discussed on pages 1-1 to 1-2, 3-1 to 3-3 and 4-1 of the DEIR. To address these problems, DWR and the Contractors negotiated the proposed project objectives during that early public negotiation sessions. These objectives are found on pages ES-3 and 4-2 of the EIR:

1. Ensure DWR can finance SWP expenditures beyond 2035 for a sufficiently extended period to provide for a reliable stream of revenue from the Contractors and to facilitate ongoing financial planning for the SWP.
2. Maintain an appropriate level of reserves and funds to meet ongoing financial SWP needs and purposes.
3. Simplify the SWP billing process.
4. Increase coordination between DWR and the Contractors regarding SWP financial matters.

DWR and the Contractors used the objectives to develop the proposed project through public negotiations. DWR and 25 Contractors have agreed to the AIP. DWR and the Contractors have the discretion to select the project objectives consistent with the problems they are trying to address, especially the difficulty in financing capital repairs and improvements. (In re Bay-Delta Programmatic Environmental Impact Report Coordinated Proceedings, 43 Cal. 4th 1143 (2008).) The DEIR did not limit the analysis of the environmental impacts as suggested by the comment. Chapter 5 of the DEIR identified and analyzed potential direct and indirect environmental impacts associated with the proposed changes to the term length and financing terms of the Contract reflected in the negotiated AIP.

Response to Comment 5-12

Under state water rights laws, DWR is required to respect senior water rights when operating the SWP, including water rights established under Water Code section 11460 et seq. (the Watershed Protection Statutes). The proposed project does not modify the SWP's water rights and does not change the requirement that DWR respect senior water rights. In addition, the Contract recognizes in Article 18 (c) that if a party establishes a water right under the Watershed Protection Statutes and DWR enters into a water supply Contract with that party affecting DWR's ability to make SWP deliveries to the Contractors, DWR is required in certain circumstances to make adjustments to the Transportation Charges and Annual Table A amounts reflecting the water deliveries to the party. The proposed project does not change Article 18 (c), which remains in effect during the extended term of the Contract. Please see pages 5-126 to 5-128 of the DEIR for discussion of the water rights and water quality systems.

Response to Comment 5-13

Water quality impacts were addressed in Section 5.2.12 of the DEIR. Further DWR's water rights obligations stipulate salinity control and DWR's water rights are unchanged by the proposed project.

Response to Comment 5-14

Please see Response to Comment 5-11 for discussion of the definition of the proposed project. Existing SWP regulatory requirements are also covered in Chapter 5 of the DEIR under each resource topic, including biological resources (see Section 5.2.4). DWR's operation of the SWP complies with all relevant regulations, including California and federal ESA, and State Water Board flow standards. This compliance will be on-going with or without the proposed project.

Response to Comment 5-15

Please see Response to Comment 5-11 for discussion of the definition of the proposed project. Impacts to water supply were evaluated in Section 5.2.18 of the DEIR.

Water service provisions and SWP operations, including water management practices, are described on pages 2-10 through 2-18 of the DEIR. The comment suggests that water supplied under the Contracts should be reduced pro-rata by the quantities of water required to be supplied for other purposes. As explained on page 2-12 in Chapter 2, State Water Project of the DEIR, the Contracts already provide for proportionate reductions of deliveries of each Contractor's annual Table A amount in the event water is not available to meet all Contractors requests, so reducing the permanent Table A amounts is not necessary. See also Master Response 6 for more information on reducing Table A amounts.

Response to Comment 5-16

See Response to Comment 5-11 for discussion of the definition of the proposed project.

Response to Comment 5-17

See Response to Comment 5-11 for discussion of the definition of the proposed project. As noted in Response to Comment 5-11, during the public negotiation sessions, DWR and the Contractors identified the financial management problems facing the SWP due to, among other things, the difficulties of selling revenue bonds with maturity dates beyond 2035, making more difficult to affordably finance SWP construction projects such as capital repairs or improvements. To address these problems, DWR and the Contractors negotiated the proposed project objectives and used the objectives to develop the proposed project through public negotiations. DWR and 25 Contractors have agreed to the AIP that provides the proposed project evaluated in the DEIR.

Response to Comment 5-18

See Response to Comment 5-15.

Response to Comment 5-19

See Response to Comment 5-11 for discussion of the definition of the proposed project.

Response to Comment 5-20

See Response to Comment 5-11 for discussion of definition of the proposed project. See also responses to comments in Letter 5. The attachments to the comment is included in Exhibit B to this FEIR.

Response to Comment 5-21

The comment seeks CEQA review of all ongoing SWP impacts to the environment. The proposed project would amend certain provisions of the Contract to meet the stated project objectives. (See page ES-3 for the project objectives.) The EIR addresses the environmental impacts of the proposed project, and it is not required to address the impacts identified in the comment. The proposed project does not modify or expand ongoing SWP operations or authorize new facilities.

The construction and operations of the SWP were authorized by the California Legislature, and construction work started in the Oroville area in 1957. By 1973, construction of the SWP facilities required to initiate water service to all local public agencies that contracted for water deliveries was essentially competed by 1973. SWP operations and water deliveries first commenced in 1962 and have continued to the present. CEQA Guideline section 15261, subdivision (a) recognizes a statutory exemption for projects carried out before CEQA became effective, November 23, 1970. SWP operations are part of an ongoing project approved before CEQA took effect. With regards to the additions DWR has made to the SWP since the enactment of CEQA, DWR has evaluated the environmental impacts of those additions on the environment in accordance with CEQA. Any proposed changes to the SWP in the future would require separate CEQA compliance for that project.

Response to Comment 5-22

As described on page 4-7 of the DEIR, the proposed project would not change SWP operations, therefore, no permits or approvals are required for the proposed project, except for approvals by the Contractors and DWR to execute the Contract amendments. Also, as described on page 4-7 of the DEIR, operation of the SWP is subject to ongoing environmental regulations including for water rights, water quality and endangered species protection, among other State and federal laws. Continuing operations of the SWP is reasonably foreseeable as deliveries of SWP waters supplies are important to meet existing water demands for all of the Contractors and Article 4 of the Contracts provides for continued service, upon notice from Contractors. See Response to Comment 5-21. Therefore, not continuing operations would be speculative and was not analyzed in the DEIR. See Master Response 1 for a discussion of the No Project Alternative.

Response to Comment 5-23

See Master Response 1 for a discussion of the No Project Alternative and Master Response 2 for discussion of the range of alternatives evaluated in the DEIR. Page 2-12 of the DEIR describes the annual Table A amounts. As described on page 4-2 of the DEIR, the proposed project would not create new water management measures, alter existing authority of DWR to build new or modify existing facilities, or change water allocation provisions of the Contract. Pages 7-3 and 7-4 discusses why an alternative that reduces Table A amounts was rejected because it does not address the project objectives.

Response to Comment 5-24

See Response to Comment 5-23.

Response to Comment 5-25

See Master Response 2 for a discussion of the range of alternatives evaluated in the DEIR. DWR believes it is in compliance with all existing regulatory requirements, including those pertaining to operation of the SWP under the BiOps. See also Master Response 4 for more information on regulatory compliance and Master Response 3 discussion of relationship to California WaterFix. As described on page 4-1 of the DEIR, the proposed project would not create new water management measures, alter existing authority of DWR to build new or modify existing facilities, or change water allocation provisions of the Contract. Page 5-29 of the DEIR discusses the long-term coordinated operation of the SWP and CVP BiOps as part of the regulatory setting. Any reasonable and prudent measures undertaken as part of the BiOps prior to the proposed project NOP would be part of the existing conditions.

Response to Comment 5-26

See Master Response 1 for a discussion of the No Project Alternative.

Response to Comment 5-27

The CEQA baseline for assessing significance of impacts of any proposed project is normally the environmental setting, or existing conditions, at the time a NOP is issued. Therefore, because the proposed project would not result in amendments that would change existing operation and maintenance of the SWP, or result in changes to DWR's existing or future regulatory permits or permitting requirements, the proposed amendments to the Contracts would have no impacts on water quality (see Section 5.2.15, Surface Water Hydrology and Water Quality of the DEIR). See also Response to Comment 5-11 and Master Response 4 for more information on the definition of the project and regulatory compliance, respectively. See Response to Comment 5-21 for more information on the baseline.

Response to Comment 5-28

As stated in the DEIR on page 4-2, the proposed project would not create new water management measures, alter the existing authority to build new or modified existing facilities, or change water allocation provisions in the Contract. Because the proposed project would not make changes to SWP water allocations, it would not make the Contractors even more reliant on Delta water supplies provided by the SWP; and therefore, reduced water allocations are not analyzed as part of the proposed project or as one of the alternatives. Please see Response to Comment 5-11 for discussion of the definition of the proposed project. See Master Response 2 for discussion of the range of alternatives evaluated in the DEIR. See also Master Response 6 for a discussion of reduced Table A amounts.

Response to Comment 5-29

The State Water Board is responsible for updating the Bay-Delta Plan, including the flow criteria in the Plan. DWR complies with the current flow criteria and will comply with any modifications to the flow criteria implemented through DWR's water rights. As stated in the DEIR on page 4-2, the proposed project would not create new water management measures, alter the existing authority to build new or modified existing facilities, or change water allocation provisions in the Contract. Please see Response to Comment 5-11 for discussion of the definition of the proposed project.

Response to Comment 5-30

See Responses to Comments 5-28 and 5-29. As noted in Response to Comment 5-28, because the proposed project would not make changes to SWP water allocations, reduced water allocations are not analyzed as part of the proposed project or as one of the alternatives. As stated in Response to Comment 5-29, the State Water Board is responsible for updating the flow criteria contained in the Bay-Delta Plan. DWR's operation of the SWP complies with all relevant regulations, including California and federal ESA, and State Water Board flow standards. This compliance will be on-going with or without the proposed project.

Response to Comment 5-31

See Master Response 4 for more information on regulatory compliance and Master Response 3 discussion of relationship to California WaterFix.

Response to Comment 5-32

Although DWR is of the opinion that the proposed project would be consistent with the Delta Plan if it were a covered action, the proposed project is not a covered action. That is because the proposed project would amend and add financial provisions to the current contract, but would not create new water management measures, alter the existing authority to build new or modify existing facilities, change water allocation provision, or alter current or future SWP operations.

Response to Comment 5-33

See Master Response 4 for more information on regulatory compliance. As described on page 4-7 of the DEIR, the proposed project would not change SWP operations, therefore, no permits (including an Incidental Take Permit by California Department of Fish and Wildlife [CDFW]) or approvals are required for the proposed project, except for approvals by the Contractors and DWR to execute the Contract amendments. Also, operation of the SWP is subject to ongoing environmental regulations including for water rights, water quality and endangered species protection, among other State and federal laws. This compliance will be on-going with or without the proposed project.

Response to Comment 5-34

See Master Response 2 for a discussion of the range of alternatives evaluated in the DEIR. See also Master Response 4 for more information on regulatory compliance.

Response to Comment 5-35

Please see Response to Comment 5-11 for discussion of the definition of the proposed project. The proposed project would amend certain financial provisions of the Contracts and extend the term of the Contracts to 2085 based on the AIP. Alternatives to the proposed project, as described in Chapter 7 of the DEIR, include versions which do not include fundamental elements of the AIP. For example, the DEIR included alternatives with different contract terms than the proposed project and with and without financial provisions (Alternative 3 and 4, respectfully). See Master Response 1 on the No Project

Alternative and Master Response 2 for a discussion of the range of alternatives evaluated in the DEIR. Page 2-12 of the DEIR describes the annual Table A amounts. As described on page 4-2 of the DEIR, the proposed project would not create new water management measures, alter existing authority of DWR to build new or modify existing facilities, or change water allocation provisions of the Contract. Pages 7-3 and 7-4 discusses why an alternative that reduces Table A amounts was rejected because it does address the project objectives. See Master Response 5 on recirculation of DEIR.

Response to Comment 5-36

As noted in Response to Comment 5-27, the proposed project would not result in amendments that would change existing operation and maintenance of the SWP, or result in changes to DWR's existing or future regulatory permits or permitting requirements.

As stated in the DEIR on page 4-2, the proposed project would not create new water management measures, alter the existing authority to build new or modified existing facilities, or change water allocation provisions in the Contract. Please see Response to Comment 5-11 for discussion of the definition of the proposed project. See also Response to Comment 5-21 for more information on the baseline.

Response to Comment 5-37

The DEIR, on page 1-3, identified the SWP Contractors as the responsible agencies under CEQA. The DEIR further notes that the Contractors could use the EIR as part of their discretionary approval process of the Contract amendments. The CEQA Guidelines Section 15082(b)(1)(B) requires responsible and trustee agencies to inform the lead agency of their statutory responsibility in response to the NOP for the proposed project. Beyond the Contractors, there are no agencies with statutory jurisdiction over the proposed project. Therefore, there is no requirement for recirculation based on this fact. The list of agencies that provided comments on the NOP is listed on page ES-3 and the letters are included in Appendix B of the DEIR.

Response to Comment 5-38

As described on page 4-1 of the DEIR, the proposed project study area was defined as areas encompassing SWP operations and facilities, as well as Contractor Service areas to address whether implementation of the proposed project would affect areas in the State connected with operation and management of the SWP. Pursuant to the CEQA Guidelines Sections 15082 and 15206, DWR provided copies of the NOP to the county clerks' offices and libraries located within the study area (see Appendix B of the DEIR).

In addition, the NOP and the Notice of Availability of the DEIR was published in the newspapers of general circulation in the project area.

Response to Comment 5-39

Please see Response to Comment 5-11 for discussion of the definition of the proposed project. The proposed project would amend certain financial provisions of the Contracts and extend the term of the Contracts to 2085 based on the AIP. Alternatives to the proposed project, as described in Chapter 7 of the DEIR, include versions which do not include fundamental elements of the AIP. For example, the DEIR included alternatives with different contract terms than the proposed project and with and without financial provisions (Alternative 3 and 4, respectfully). An alternative that considers reduced Table A deliveries was included in the DEIR but, as described on pages 7-3 and 7-4, reducing Table A amounts proportionality for all the Contractors by amendment would not change the amount of water being delivered to the Contractors nor would it change the financial health of the SWP as it would not affect any of the other Contract financial provisions that address SWP billing provisions and reimbursements. Therefore, reducing Table A deliveries was rejected because it does not address project objectives. See Master Response 2 for a discussion of the range of alternatives evaluated in the DEIR. See also Response to Comment 5-28 which notes that because the proposed project would not make changes to SWP water allocations, reduced water allocations are not analyzed as part of the proposed project or as one of the alternatives. See Response to Comment 5-32 for discussion of proposed project consistency with the Delta Reform Act.

Response to Comment 5-40

As noted in Response to Comment 5-27, the proposed project would not result in amendments that would change existing operation and maintenance of the SWP, or result in changes to DWR's existing or future regulatory permits or permitting requirements. Therefore, the proposed amendments to the Contracts would not affect terrestrial or aquatic biological resources (see DEIR Section 5.2.4 Biological Resources). Please see also Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives. See Response to Comment 5-21 for more information on the baseline.

See Master Response 4 for more information on regulatory compliance. Operation of the SWP is subject to ongoing environmental regulations including for water rights, water quality and endangered species protection, among other State and federal laws. This compliance will be on-going with or without the proposed project.

Response to Comment 5-41

Please see Response to Comment 5-11 for discussion of the definition of the proposed project. Impacts to biological species were evaluated in Section 5.2.4 of the DEIR. Furthermore, DWR's operation of the SWP complies with all relevant regulations, including California and federal and State ESA. This compliance will be on-going with or without the proposed project. See also Responses to Comments 5-21 and 5-27 for more information on the baseline for the analysis.

As it relates to alternatives, please see Master Response 2 for discussion of the range of alternatives evaluated in the DEIR. As previously stated, the proposed project would not change the operation of the SWP. Therefore, the suggested alternative of a fish screen and other facilities at Clifton Court Forebay to minimize predation and protect listed species would not meet CEQA Guidelines Section 1526.6 on the selection of a reasonable range of alternatives.

Response to Comment 5-42

The public and agency review and comment process for preparation of the EIR is described in detail on pages 1-3 through 1-4 of the DEIR and it is consistent with requirements contained in the CEQA Guidelines. For clarification, under the proposed project, DWR is not pursuing any permits because as stated in the DEIR on page 4-2, the proposed project would not create new water management measures, alter the existing authority to build new or modified existing facilities, or change water allocation provisions in the Contract. Please see Response to Comment 5-11 for discussion of the definition of the proposed project. Furthermore, operation of the SWP would be subject to ongoing environmental regulations with or without the proposed project.

The DEIR did include an analysis of an alternative that contemplated a shorter Contract term – 2065 instead of 2085 (see pages 7-13 through 7-15). As stated on page 7-13 of the DEIR, similar to the proposed project, through 2065, Alternative 2 would not result in any direct physical environmental impacts because it would not create new water management measures, alter the existing authority to build new or modified facilities are change water allocation provisions of the current Contract.

Response to Comment 5-43

See Responses to Comments 5-25 and 5-31. See also See Master Response 4 for more information on regulatory compliance. Operation of the SWP is subject to ongoing environmental regulations including for water rights, water quality and endangered species protection, among other State and federal laws. This compliance will be on-going with or without the proposed project.

The commenter provides a list of projects associated with the Operations Criteria and Plan (OCAP) BiOps Reasonable and Prudent Alternatives (RPA) requirements, including Lower Putah Creek, Lisbon Weir Improvements and other projects associated with the Yolo Bypass, fish salvage efficiencies studies, fish predation studies, creation or restoration of 8,000 acres for Delta smelt habitat, and other activities associated with BiOp requirements. As noted in the comment, planning and implementation of actions to comply with the BiOps are ongoing. The proposed project would not have any effect on the progress made to implement provisions of the OCAP BiOps requirements.

Response to Comment 5-44

See Master Response 4 for more information on regulatory compliance. DWR has worked, and will continue to work, in coordination with Reclamation, on complying with the current or any future OCAP BiOps DEIR, the proposed project would not create new water management measures, alter existing authority of DWR to build new or modify existing facilities, or change water allocation provisions of the Contract. Extending the Contracts or changing the financial provisions does not obligate the SWP to deliver any more water to the Contractors than is allowable under all State and federal regulations.

Response to Comment 5-45

Please see Response to Comment 5-11 for discussion of the definition of the proposed project. Please see Responses to Comments 5-21 and 5-27 for more information on the baseline for the analysis. See also responses to comments in Letter 5.

Response to Comment 5-46

Please see Response to Comment 5-11 for discussion of the definition of the proposed project. Chapter 5 of the DEIR identified and analyzed potential direct and indirect environmental impacts associated with the proposed changes to the term length and financing terms of the Contract reflected in the negotiated AIP. As stated on page ES-4 the results of the analysis in Chapter 5 found that the proposed project would result in no impact on any of the resource topics because it would amend and add financial provisions to the Contracts and would not create new water management measures, alter the existing authority to build new or modify existing SWP facilities, or change water allocation provisions of the Contracts. As a result, no mitigation measures were required or recommended and there is no need to discuss potential significant effects of mitigation measures or recirculate the DEIR. See also Responses to Comments 5-21 and 5-27 for more information on the baseline for the analysis.

Response to Comment 5-47

See Responses to Comments 5-11 and 5-46 for discussion of the definition of the proposed project and the impact analysis and conclusions in the DEIR. See also Master Response 5 addressing how recirculation of the DEIR is not required.

Response to Comment 5-48

See Responses to Comments 5-11 and 5-46 for discussion of the definition of the proposed project and the impact analysis and conclusions in the DEIR. See also Master Response 5 addressing how recirculation of the DEIR is not required.

Response to Comment 5-49

See Responses to Comments 5-11 and 5-46 for discussion of the definition of the proposed project and the impact analysis and conclusions in the DEIR. See Master Response 1 for a discussion of the No Project Alternative and Master Response 3 for discussion of the relationship of the proposed project to California WaterFix.

Response to Comment 5-50

See Responses to Comments 5-25, 5-40 and 5-44 and Master Response 4 for more information on regulatory compliance.

Response to Comment 5-51

The proposed project would not amend the Contract articles related to Table A water deliveries or otherwise change the operation and management of the SWP. Therefore, the alternative suggested in the comment would not meet CEQA Guidelines Section 15126.6(c) on the selection of a reasonable range of alternatives. See Responses to Comments 5-11, 5-27 and 5-46 for discussion of the definition of the proposed project and the impact analysis and conclusions in the DEIR. As it relates to alternatives, please see Master Response 2 for discussion of the range of alternatives evaluated in the DEIR. See also Master Response 5 addressing how recirculation of the DEIR is not required.

Response to Comment 5-52

Article 4 of the existing Contracts, described in footnote 1 on page 1-1of the DEIR, gives each Contractor a right to extend its Contract on generally the same fundamental terms as in the current Contract (including among other things, the same quantities of water to be delivered, the same quality of water to be delivered, and the same cost of service), by providing a notice to DWR at least 6 months in advance of the Contractor's contract expiration date. Extension of the Contract through the exercise of rights under Article 4 is addressed in the No Project Alternative. See Master Response 1 on the No Project Alternative and Master Response 2 for a discussion of the range of alternatives evaluated in the DEIR.

Response to Comment 5-53

As described in response 5-52, Article 4 of the existing Contracts, described in footnote 1 on page 1-1 of the DEIR, gives each Contractor a right to extend its Contract on generally the same fundamental terms as in the current Contract (including among other things, the same quantities of water to be delivered, the same quality of water to be delivered, and the same cost of service), by providing a notice to DWR at least 6 months in advance of the Contractor's contract expiration date. See Response to Comment 5-52. An alternative that considers reduced Table A deliveries was included in the DEIR but, as described on pages 7-3 and 7-4, reducing Table A amounts proportionality for all the Contractors by amendment would not change the amount of water being delivered to the Contractors nor would it change the financial health of the SWP as it would not affect any of the other Contract financial provisions that address SWP billing provisions and reimbursements. Therefore, reducing Table A deliveries was rejected because it does not address project objectives. Please see Response to Comment 5-11 for discussion of the definition of the proposed project and Master Response 2 for discussion of the range of alternatives evaluated in the DEIR and Response to Comment 5-28. As noted in Response to Comment 5-28, because the proposed project would not make changes to SWP water allocations, reduced water allocations are not analyzed as part of the proposed project or as one of the alternatives. See also Master Response 6 for a discussion of reducing Table A deliveries.

As it relates to consistency with the Delta Reform Act, see Response to Comment 5-32.

Response to Comment 5-54

See Responses to Comments 5-11 and 5-46 for discussion of the definition of the proposed project and the impact analysis and conclusions in the DEIR. See also Responses to Comments 5-13, 5-22, and 5-27 for information related to water quality.

Response to Comment 5-55

As described on page 4-1 of the DEIR, the proposed project would not create new water management measures, alter existing authority of DWR to build new or modify existing facilities, or change water allocation provisions of the Contract. Analysis of the proposed project in the DEIR included analysis of GHG emissions in Section 5.2.8 of the DEIR. See Responses to Comments 5-11 and 5-46 for discussion of the definition of the proposed project and the impact analysis and conclusions in the DEIR. See also Master Response 5 addressing how recirculation of the DEIR is not required.

Response to Comment 5-56

As described on page 4-1 of the DEIR, the proposed project would not create new water management measures, alter existing authority of DWR to build new or modify existing facilities, or change water allocation provisions of the Contract. See page 6-7 of the DEIR, which describes how the proposed project would not result in direct or indirect growth inducement. See Response to Comment 5-28 which notes that because the proposed project would not make changes to SWP water allocations, reduced water allocations are not analyzed as part of the proposed project or as one of the alternatives. See Response to Comment 5-32 for discussion of consistency with the Delta Reform Act.

Response to Comment 5-57

As stated in Chapter 6, Other CEQA Considerations page 6-7, the proposed project would not result in Contract amendments for new water management measures; alter the existing authority to build new or modify existing facilities; or change water allocation provisions of the Contracts. The proposed project would not construct new or modified SWP facilities or result in DWR having jurisdiction over water supply management by the in Contractors. No housing is proposed as part of the proposed project or required as a result of it, nor would the project provide substantial new permanent employment opportunities. Furthermore, because the proposed project would not develop new water conveyance or storage facilities or change water supply allocations, it would not remove obstacles to growth and the proposed project would not result in direct or indirect growth inducement. As further stated on page 5-7 of the DEIR, DWR would continue its practice of providing separate CEQA compliance at the time that a project to modify or construct new SWP facilities is proposed.

Response to Comment 5-58

Please see Response to Comment 5-11 for discussion of the definition of the proposed project. As described on page 5-152, local General Plans include goals, policies, and actions to ensure sustainable growth and development across diverse environments, communities, and jurisdictions within California. The proposed project would not change any goals or policies relating to the provision of water supply in any of the jurisdictions where the SWP is located, as no physical changes would occur as a result of the proposed project. Furthermore, because the proposed project would not amend water supply provisions of the Contracts, the Contractors would provide water supply in their respective services areas in the same manner as they do today, providing local jurisdictions with projected water supplies for planning purposes. Because the proposed project would not make changes to SWP water allocations, it would not make the Contractors more reliant on Delta water supplies. See Response to Comment 5-32 for discussion of consistency with the Delta Reform Act.

Response to Comment 5-59

As described in Response to Comment 5-52, Article 4 of the existing Contracts, described in footnote 1 on page 1-1of the DEIR, gives each Contractor a right to extend its Contract on generally the same fundamental terms as in the current Contract (including among other things, the same quantities of water to be delivered, the same quality of water to be delivered, and the same cost of service), by providing a notice to DWR at least 6 months in advance of the Contractor's Contract expiration date.

Extension of the Contract through the exercise of rights under Article 4 is addressed in the No Project Alternative. See Master Response 1 for a discussion of the No Project Alternative and Master Response 3 for discussion of the relationship of the proposed project to California WaterFix.

Response to Comment 5-60

See Responses to Comments 5-11 and 5-46 for discussion of the definition of the proposed project and the impact analysis and conclusions in the DEIR. See Master Response 1 for a discussion of the No Project Alternative and Master Response 3 for discussion of the relationship of the proposed project to California WaterFix. See responses to related comments in Letter 5.

As it relates to consistency with the Delta Reform Act, see Response to Comment 5-32.

Response to Comment 5-61

In compliance with the Monterey Settlement Agreement, DWR notified and invited the public to each of the 23 public negotiation meetings held. Included in the meeting notices was the location of the meetings, mailing address for written comment, and access to a conference line for attending meetings remotely. In addition, DWR held two public scoping meeting on the NOP with information on the meeting date and location published in newspapers and county clerks' offices across the majority of the state (see Response to Comment 5-38). The CEQA Guidelines Section 15082(c)(1) requires only one public scoping meeting for projects of statewide significance. The public and agency review and comment process for preparation of the EIR is described in detail on pages 1-3 through 1-4 of the DEIR. All documents, including the public negotiation notices, are accessible on the project website at https://water.ca.gov/Programs/State-

Water-Project/Management/Water-Supply-Contract-Extension. Please see also Response to Comment 5-11 for further discussion of the public negotiation process.

Response to Comment 5-62

The proposed project only involves changes to the Contract financial provisions and extending the contract term. It would not create new water management measures, alter the existing authority to build new or modify existing SWP facilities, or change water allocation provisions of the Contracts. Therefore, there is no need to include management or reduction of invasive species to comply with the Delta Plan. See Response to Comment 5-32 for discussion of consistency with the Delta Reform Act.

Response to Comment 5-63

See Response to Comment 5-11 for discussion of the definition of the proposed project. As noted in Response to Comment 5-11, during the public negotiation sessions DWR and the Contractors identified the financial management problems facing the SWP due to, among other things, the difficulties of selling revenue bonds with maturity dates beyond 2035, making more difficult to affordably finance SWP construction projects such as capital repairs or improvements. To address these problems, DWR and the Contractors negotiated the proposed project objectives during the early public negotiation sessions. DWR and the Contractors used the objectives to develop the proposed project through public negotiations. DWR and 25 Contractors have agreed to the AIP which defined the proposed project evaluated in the DEIR (see pages ES-2 and 1-2). DWR and the Contractors have the discretion to select the project objectives consistent with the problems they are trying to address, especially the difficulty in financing capital repairs and improvements.

As discussed in Response to Comment 5-53, an alternative that considers reduced Table A deliveries was included in the DEIR; however; as described on pages 7-3 and 7-4, reducing Table A amounts proportionality for all the Contractors by amendment would not change the amount of water being delivered to the Contractors nor would it change the financial health of the SWP as it would not affect any of the other Contract financial provisions that address SWP billing provisions and reimbursements. Therefore, reducing Table A deliveries was rejected because it does not address project objectives. Please see Master Response 2 for discussion of the range of alternatives evaluated in the DEIR and Master Response 6 for a further discussion of reducing Table A amounts. See responses to related comments in Letter 5.

Response to Comment 5-64

AIP Section XIII (Objective 3D) would not alter the Contractor responsibility for fish and wildlife preservation costs. In this regard, language regarding Contractor responsibility for fish and wildlife preservation costs from the Davis-Dolwig Act would be set out in the Contract extension amendment. In addition, as described on page 4-6 in subsection 4.4.4 Enhanced Funding Mechanisms and New Accounts, the proposed project would continue DWR's Contract administration regarding the development of public recreation as including both capital and operation and maintenance costs in compliance with the Davis-Dolwig Act (Water Code Section 11910 et seq.) requirement that the costs of the development of public recreation not be included in the prices, rates, and charges for water and power.

Response to Comment 5-65

Please see Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives. Water quality impacts were addressed in Section 5.2.12 of the DEIR. See Master Response 2 for discussion of the range of alternatives evaluated in the DEIR. DWR's operation of the SWP complies with all relevant regulations including water quality standards in the Delta when operating the SWP. This compliance will be on-going with or without the proposed project.

Response to Comment 5-66

See Response to Comment 5-11 for discussion of the definition of the proposed project. As noted in Response to Comment 5-11, during the public negotiation sessions DWR and the Contractors identified the financial management problems facing the SWP due to, among other things, the difficulties of selling revenue bonds with maturity dates beyond 2035, making more difficult to affordably finance SWP construction projects such as capital repairs or improvements. To address these problems, DWR and the Contractors negotiated the proposed project objectives during that early public negotiation sessions. DWR and the Contractors used the objectives to develop the proposed project through public negotiations. DWR and 25 Contractors have agreed to the AIP which defined the proposed project evaluated in the DEIR (see pages ES-2 and 1-2). DWR and the Contractors have the discretion to select the project objectives consistent with the problems they are trying to address, especially the difficulty in financing capital repairs and improvements.

Response to Comment 5-67

As discussed in Response to Comment 5-53, an alternative that considers reduced Table A deliveries was included in the DEIR; however; as described on pages 7-3 and

7-4, reducing Table A amounts proportionality for all the Contractors by amendment would not change the amount of water being delivered to the Contractors nor would it change the financial health of the SWP as it would not affect any of the other Contract financial provisions that address SWP billing provisions and reimbursements. Therefore, reducing Table A deliveries was rejected because it does not address project objectives. Please see Response to Comment 5-11 for discussion of the definition of the proposed project and Master Response 2 for discussion of the range of alternatives evaluated in the DEIR. See also responses to Comments 5-63 and 5-64.

Response to Comment 5-68

As noted in Response to Comment 5-9, the project area includes those facilities and service areas as indicated in Chapter 2, State Water Project on Figures 2-1 and 2-2. The environmental analysis in the DEIR is not limited to the areas shown in these figures dependent on the topical area and environmental setting as explained in the subsections of Chapter 5. For example, the environmental setting for air quality is based on the jurisdictions of each air quality management agency and is not based on the boundaries of service areas. Please see also Response to Comment 5-11 for discussion of the definition of the proposed project.

Response to Comment 5-69

Please see Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives. Please see also Master Response 2 for discussion of the range of alternatives evaluated in the DEIR. An alternative was evaluated that considered a shorter term with the Contracts ending in 2065. The analysis is included in the DEIR on pages 7-13 through 7-15. As noted on page 7-15, this alternative (Alternative 2) would meet the objectives of the proposed project but to a lesser degree because it represents a shorter contract term than desired by DWR and the Contractors.

Response to Comment 5-70

DWR is not aware of any inconsistencies between this DEIR and EIRs on other DWR projects that would affect the analysis in this DEIR. It should be noted that the DEIR cites other DWR EIRs, including the California WaterFix EIR, as sources of information. See Master Response 3 for discussion of the relationship of the proposed project to California WaterFix.

Response to Comment 5-71

See Response to Comment 5-37, beyond the Contractors, there are no agencies with statutory jurisdiction over the proposed project. Please see also Response to Comment

5-65. As noted in Response to Comment 5-65, water quality impacts were addressed in Section 5.2.12 of the DEIR. DWR's operation of the SWP complies with all relevant regulations, including water quality standards in the Delta. This compliance will be ongoing with or without the proposed project.

Response to Comment 5-72

The comment refers to a comment letter provided during the public scoping period in response to the NOP. As described on page ES-3, DWR reviewed all scoping comments received on the NOP in preparing the DEIR. Issues raised were addressed, as appropriate, in compliance with CEQA. NOP comment letters are included in Appendix B. In addition, each section in Chapter 5 summarizes the types of comments received on the NOP that were taken into consideration in preparing the technical analysis.

Response to Comment 5-73

The proposed project does not require Contractors to support BDCP (now California WaterFix) in order to execute the renewal of the Contract. As described in Response to Comment 4-1, Contractor participation in California WaterFix will be addressed through a separate public negotiation and environmental review process to develop appropriate Contract amendments. Please see also Response to Comment 5-11 for discussion of the definition of the proposed project, development of project objectives, and discussion of the public negotiation process for the AIP. See also Master Response 3 for discussion of the relationship of the proposed project to California WaterFix.

Response to Comment 5-74

As discussed in Response to Comment 5-53, an alternative that considers reduced Table A deliveries was included in the DEIR; however; as described on pages 7-3 and 7-4, reducing Table A amounts proportionality for all the Contractors by amendment would not change the amount of water being delivered to the Contractors nor would it change the financial health of the SWP as it would not affect any of the other Contract financial provisions that address SWP billing provisions and reimbursements. Therefore, reducing Table A deliveries was rejected because it does not address project objectives. Please see Response to Comment 5-11 for discussion of the definition of the proposed project and Master Response 2 for discussion of the range of alternatives evaluated in the DEIR. Please see also Response to Comment 5-32 for discussion of consistency of the proposed project with the Delta Reform Act. See Master Response 6 for further discussion of reducing Table A amounts.

Response to Comment 5-75

As discussed on pages 5-7, 5-8, and 7-5, a separate EIR/EIS was prepared to address the impacts of California WaterFix. The proposed project is an independent project that would occur with or without California WaterFix. See also Response to Comment 5-11 for discussion of the definition of the proposed project. Furthermore, as described in Response to Comment 4-1, Contractor participation in California WaterFix will be addressed through a separate public negotiation and environmental review process to develop appropriate Contract amendments. See Master Response 2 for discussion of the range of alternatives evaluated in the DEIR and Master Response 3 for discussion of the relationship of the proposed project to California WaterFix.

Response to Comment 5-76

See Response to Comment 5-69. As described on pages 7-9 and 7-10 of the DEIR, Article 4 gives each Contractor a right to extend its Contract on generally the same fundamental terms as in the current Contract, including the same quantities of water delivered, by providing notice to DWR at least 6 months in advance of the Contract expiration date. Extension of the Contract through the exercise of rights under Article 4 is addressed in the No Project Alternative which does not include an assumption as to the length of an extended term. However, DWR chose to evaluate a no project alternative that extends through 2085 for purposes of comparison with the proposed project. See Master Response 1 for a discussion of the No Project Alternative. The option to continue service under Article 4 of the Contracts is also described on page 1-1 of the DEIR and is shown in full in the example Water Supply Contract presented in Appendix A of the DEIR.

Response to Comment 5-77

The divestiture of the SWP would be an activity that would be enormously more complicated than extending the term of the existing Contracts, not to mention the political, environmental and legal issues that such a proposal would encounter. Accordingly, it is not reasonably foreseeable or feasible to expect that such an activity could be accomplished in the period of time required to address the current issues prompting the proposed project, even assuming there would be an interest in doing so. Further, the alternative suggested in the comment would not meet CEQA Guidelines Section 15126.6(c) on the selection of a reasonable range of alternatives. See Master Response 2 for more on the reasonable range of alternatives.

Response to Comment 5-78

See Master Response 1 for discussion of the No Project Alternative and Master Response 5 for discussion of recirculation. As discussed on page 7-10 and 7-11 of the DEIR, it is reasonable to assume that the indirect impacts of the No Project Alternative would likely be greater than the impacts of the proposed project, including the potential indirect effects of increased frequency of service outages. However, the extent and nature of such indirect impacts are speculative and not analyzed further in the DEIR.

Response to Comment 5-79

See Master Response 1 for discussion of the No Project Alternative and Master Response 5 for discussion of recirculation. DEIR Chapter 4, Project Description, provides information on the project objectives and how the proposed project meets those objectives. See also Response to Comment 5-11. Table 7-1 "Summary of Alternatives Considered," on page 7-7 of the DEIR provides a summary of all alternatives considered, including the proposed project. Table 7-2 "Comparison of Alternatives to Proposed Project," on page 7-27 provides information on how the proposed project and the alternatives meet the project objectives. The impacts of the proposed project are discussed in Chapter 5 Environmental Analysis. The impacts of each alternative are discussed in Chapter 7 Alternatives. This impact analysis is separate from the discussion on each alternative's ability to meet the project objectives.

Response to Comment 5-80

See Master Response 1 for discussion of the No Project Alternative and Master Response 2 for the range of alternatives evaluated in the DEIR. Six alternatives to the proposed project (including the No Project Alternative) were developed and analyzed in the DEIR for their ability to meet project objectives; and the proposed project received a full analysis in the DEIR. Each alternative (including the No Project Alternative) to the project was “screened” or evaluated to see if the alternative would feasibly attain most of the basic project objectives and avoid or substantially lessen significant environmental impacts. Table 7-2 "Comparison of Alternatives to Proposed Project", provides a summary of how each alternative compares to the proposed project. Page 7-9 of the DEIR describes the potential environmental impacts of the No Project Alternative.

Response to Comment 5-81

See Response to Comment 5-76.

Response to Comment 5-82

The impacts of the proposed project are discussed in Chapter 5 "Environmental Analysis." The potential impacts of each alternative are discussed in Chapter 7 "Alternatives." Section 7.5 "Environmentally Superior Alternative" provides a summary of how each alternative compares to the proposed project with respect to the impacts and the ability to meet project objectives. As stated on page 7-10 and 7-11 of the DEIR, the No Project Alternative (Alternative 1) could result in indirect impacts. See Master Response 1 for discussion of the No Project Alternative and Master Response 2 for the range of alternatives evaluated in the DEIR.

Response to Comment 5-83

Please see Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives. Please also see Response to Comment 3-2 for a discussion of Alternative 7.

Response to Comment 5-84

Twenty-five of the Contractors signed the AIP, so the likelihood of not a single Contractor signing the extension amendment seems remote. See Master Response 1 for discussion of the No Project Alternative and Master Response 2 for the range of alternatives evaluated in the DEIR.

Response to Comment 5-85

The EIR must evaluate the comparative merits of the alternatives, including the “no project” alterative. Section 15126.6(d) of the CEQA Guidelines states:

> "The EIR shall include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project. A matrix displaying the major characteristics and significant environmental effects of each alternative may be used to summarize the comparison. If an alternative would cause one or more significant effects in addition to those that would be caused by the project as proposed, the significant effects of the alternative shall be discussed, but in less detail than the significant effects of the project as proposed."

The impacts of the proposed project are discussed in Chapter 5 Environmental Analysis. As discussed on page 5-3 of the DEIR, the physical and regulatory setting provides a point of reference for assessing the environmental impacts of the proposed project. The potential impacts of each alternative are discussed in Chapter 7 Alternatives. Chapter 7 of the DEIR also presents the Environmentally Superior Alternative and provides a summary of how each alternative compares to the proposed project with respect to the impacts and the ability to meet project objectives. Table 7-2 on page 7-27 of the DEIR is a comparison to the proposed project to determine the Environmentally Superior Alternative.

Response to Comment 5-86

In addition to noting the use of CEQA standards of significance as the criteria used to determine the level of significance of an impact, the Method of Analysis section describes the financial implications to the Contractors with implementation of the proposed project and the assumptions for the analysis (pages 5-3 through 5-8 of the DEIR). Furthermore, the DEIR describes how the project area includes those facilities and service areas as indicated in Chapter 2, State Water Project on Figures 2-1 and 2-2. The environmental analysis in the DEIR is not limited to the areas shown in these figures dependent on the topical area and environmental setting as explained in the subsections of Chapter 5. For example, the environmental setting for air quality is based on the jurisdictions of each air quality management agency and is not based on the boundaries of service areas. See also Response to Comment 5-21 for more information on baseline and environmental setting and Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives.

Response to Comment 5-87

Please see Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives.

Response to Comment 5-88

Please see Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives. Please see also Responses to Comments 5-21 and 5-27 for further information on the baseline.

Specifically, as it relates to climate change and its effects on SWP deliveries, as described on page 5-6 of the DEIR, because SWP water supply would not change under the proposed project and would continue to be delivered to the Contractors consistent with current Contracts, the proposed project does not change hydrology, regulations, or climate change, all factors that could affect water supply delivery by the SWP. DWR would continue to maintain and operate the SWP and deliver available supplies to the Contractors consistent with the Contract terms, including Table A deliveries, Article 21 deliveries, and all regulatory requirements. Therefore, no changes in the conditions of resources associated with the SWP would be expected.

Response to Comment 5-89

Alternatives to the proposed project are evaluated in Chapter 7 of the DEIR. See Master Response 2 for further discussion of the range of alternatives evaluated in the DEIR. Under CEQA, as defined in Section 15126.6 (d), the EIR is to include sufficient information about each alternative to allow meaningful evaluation, analysis and comparison with the proposed project. The comparison of impacts is not of the alternatives to the No Project Alternative as asserted in the comment.

Response to Comment 5-90

As noted in Response to Comment 5-27, because the proposed project would not result in amendments that would change existing operation and maintenance of the SWP, or result in changes to DWR’s existing or future regulatory permits or permitting requirements, the proposed amendments to the Contracts would have no impacts on visual resources (see DEIR Section 5.2.1 Aesthetics). Please see also Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives. See Response to Comment 5-21 for more information on the baseline.

Response to Comment 5-91

As noted in Response to Comment 5-27, the proposed project would not result in amendments that would change existing operation and maintenance of the SWP, or result in changes to DWR’s existing or future regulatory permits or permitting requirements. Therefore, the proposed amendments to the Contracts would have no impacts on agricultural resources (see DEIR Section 5.2.2 Agricultural and Forest Resources). Please see also Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives. See Response to Comment 5-21 for more information on the baseline.

Response to Comment 5-92

As noted in Response to Comment 5-27, the proposed project would not result in amendments that would change existing operation and maintenance of the SWP, or result in changes to DWR’s existing or future regulatory permits or permitting requirements. Therefore, the proposed amendments to the Contracts would not result in a change to the rate and amount of groundwater pumping and associated land subsidence (see DEIR Section 5.2.9 Groundwater Hydrology and Water Quality and 5.2.7 Geology, Soils and Mineral Resources). Please see also Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives. See Response to Comment 5-21 for more information on the baseline.

Response to Comment 5-93

As noted in Response to Comment 5-27, the proposed project would not result in amendments that would change existing operation and maintenance of the SWP, or result in changes to DWR's existing or future regulatory permits or permitting requirements. Therefore, the proposed amendments to the Contracts would not affect terrestrial or aquatic biological resources (see DEIR Section 5.2.4 Biological Resources). Please see also Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives. See Response to Comment 5-21 for more information on the baseline.

Response to Comment 5-94

As noted in Response to Comment 5-27, the proposed project would not result in amendments that would change existing operation (including reservoir operations) and maintenance of the SWP, or result in changes to DWR's existing or future regulatory permits or permitting requirements. Therefore, there would be no change in the fluctuation of reservoir levels and resulting exposure of cultural resources (see DEIR Section 5.2.5 Cultural Resources). Please see also Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives. See Response to Comment 5-21 for more information on the baseline.

Response to Comment 5-95

As noted in Response to Comment 5-27, the proposed project would not result in amendments that would change existing operation and maintenance of the SWP, or result in changes to DWR's existing or future regulatory permits or permitting requirements. Therefore, there would be no change in energy use (see DEIR Section 5.2.6 Energy). Please see also Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives. See Response to Comment 5-21 for more information on the baseline

Response to Comment 5-96

As noted in Response to Comment 5-27, the proposed project would not result in amendments that would change existing operation and maintenance of the SWP, or result in changes to DWR's existing or future regulatory permits or permitting requirements. Therefore, the proposed amendments to the Contracts would not result in a change to salt loading and soil erodibility (see DEIR Section 5.2.7 Geology, Soils and Mineral Resources). Please see also Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives. See Response to Comment 5-21 for more information on the baseline.

Response to Comment 5-97

See Responses to Comments 5-91 and 5-96.

Response to Comment 5-98

As described in Response to Comment 5-88, specifically as it relates to climate change and its effects on SWP deliveries, as described on page 5-6 of the DEIR, because SWP water supply would not change under the proposed project and would continue to be delivered to the Contractors consistent with current Contracts, the proposed project does not change hydrology, regulations, or climate change, all factors that could affect water supply delivery by the SWP. DWR would continue to maintain and operate the SWP and deliver available supplies to the Contractors consistent with the Contract terms, including Table A deliveries, Article 21 deliveries, and all regulatory requirements. Therefore, no changes in the conditions of resources associated with the SWP would be expected.

Please see also Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives. See Response to Comment 5-21 for more information on the baseline. See also Master Response 2 for more information on DWR’s ability to define the project.

Response to Comment 5-99

Please see Master Response 2 for discussion of the range of alternatives evaluated in the DEIR. An alternative was evaluated that considered a shorter term with the Contracts ending in 2065. The analysis is included in the DEIR on pages 7-13 through 7-15. As noted on page 7-15, this alternative (Alternative 2) would meet the objectives of the proposed project but to a lesser degree because it represents a shorter contract term than desired by DWR and the Contractors.

Response to Comment 5-100

As noted in Response to Comment 5-27, the proposed project would neither result in amendments to the Contracts that would change existing operation and maintenance of the SWP nor alter articles of the Contracts relative to water supply management. Please see Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives and Response to Comment 5-21 for more information on the baseline.

Response to Comment 5-101

The proposed project would neither result in amendments to the Contracts that would change existing operation and maintenance of the SWP nor alter articles of the

Contracts relative to water supply management. Please see Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives. See also Master Response 2 for more information on DWR's ability to define the project.

Response to Comment 5-102

The proposed project would neither result in amendments to the Contracts that would change existing operation and maintenance of the SWP nor alter articles of the Contracts relative to water supply management. Please see Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives. See also pages 6-6 and 6-7 in Chapter 6, Other CEQA Considerations in the DEIR for the analysis on growth inducement.

Response to Comment 5-103

Amendments to the Contracts have occurred in the past to a variety of articles, including those relative to water supply management. The proposed project would neither result in amendments to the Contracts that would change existing operation and maintenance of the SWP nor alter articles of the Contracts relative to water supply management. Please see Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives. See also Master Response 2 for more information on DWR's ability to define the project. See also Master Response 6 for more information on reduced Table A amounts.

Response to Comment 5-104

Amendments to the Contracts have occurred in the past to a variety of articles, including those relative to water supply management. The proposed project would neither result in amendments to the Contracts that would change existing operation and maintenance of the SWP nor alter articles of the Contracts relative to water supply management. See Chapter 7, Alternatives page 7-3 and 7-4 for an explanation of why an alternative to reduce Table A amounts was rejected from analysis in the DEIR. Please see Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives. See also Master Response 6 for more information on reduced Table A amounts.

Response to Comment 5-105

The proposed project would neither result in amendments to the Contracts that would change existing operation and maintenance of the SWP nor alter articles of the Contracts relative to water supply management. See Chapter 7, Alternatives page 7-3 and 7-4 for an explanation of why an alternative to reduce Table A amounts was rejected from analysis in the DEIR. Please see Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives. See also Response to Comment 5-92 (subsidence).

Response to Comment 5-106

The proposed project would neither result in amendments to the Contracts that would change existing operation and maintenance of the SWP nor alter articles of the Contracts relative to water supply management. See Chapter 7, Alternatives page 7-3 and 7-4 for an explanation of why an alternative to reduce Table A amounts was rejected from analysis in the DEIR. Please see Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives. See also Master Response 6 for more information on reduced Table A amounts.

Response to Comment 5-107

The proposed project would neither result in amendments to the Contracts that would change existing operation and maintenance of the SWP nor alter articles of the Contracts relative to water supply management. See Chapter 7, Alternatives page 7-3 and 7-4 for an explanation of why an alternative to reduce Table A amounts was rejected from analysis in the DEIR. Please see Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives. See also Master Response 6 for more information on reduced Table A amounts.

Response to Comment 5-108

The proposed project would neither result in amendments to the Contracts that would change existing operation and maintenance of the SWP nor alter articles of the Contracts relative to water supply management. See Chapter 7, Alternatives page 7-3 and 7-4 for an explanation of why an alternative to reduce Table A amounts was rejected from analysis in the DEIR. Please see Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives. See also Response to Comment 5-92 (subsidence).

Response to Comment 5-109

See Response to Comment 5-75. A separate EIR/EIS was prepared to address the impacts of California WaterFix. The proposed project is an independent project that would occur with or without California WaterFix. See also Response to Comment 5-11 for discussion of the definition of the proposed project. Furthermore, as described in Response to Comment 4-1, Contractor participation in California WaterFix will be addressed through a separate public negotiation and environmental review process to develop appropriate Contract amendments. See Master Response 2 for discussion of the range of alternatives evaluated in the DEIR and Master Response 3 for discussion of the relationship of the proposed project to California WaterFix and the separate Contract amendment process.

Response to Comment 5-110

As noted in Response to Comment 5-27, the proposed project would not result in amendments that would change existing operation and maintenance of the SWP, or result in changes to DWR's existing or future regulatory permits or permitting requirements. Please see Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives and Master Response 2 for discussion of the range of alternatives evaluated in the DEIR.

Response to Comment 5-111

As noted in Response to Comment 5-27, the proposed project would not result in amendments that would change existing operation and maintenance of the SWP, or result in changes to DWR's existing or future regulatory permits or permitting requirements. Please see Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives. See also See Master Response 4 for more information on regulatory compliance. Operation of the SWP is subject to ongoing environmental regulations including for water rights, water quality and endangered species protection, among other State and federal laws. This compliance will be on-going with or without the proposed project.

Response to Comment 5-112

See Response to Comment 5-11 for discussion of the definition of the proposed project. As noted in Response to Comment 5-11, during the public negotiation sessions DWR and the Contractors identified the financial management problems facing the SWP due to, among other things, the difficulties of selling revenue bonds with maturity dates beyond 2035, making more difficult to affordably finance SWP construction projects such as capital repairs or improvements. To address these problems, DWR and the Contractors negotiated the proposed project objectives during that early public negotiation sessions. DWR and the Contractors used the objectives to develop the proposed project through public negotiations. DWR and 25 Contractors have agreed to the AIP which defined the proposed project evaluated in the DEIR (see pages ES-2 and 1-2). DWR and the Contractors have the discretion to select the project objectives consistent with the problems they are trying to address, especially the difficulty in financing capital repairs and improvements.

As noted in Response to Comment 5-27, the proposed project would not result in amendments that would change existing operation and maintenance of the SWP, or result in changes to DWR's existing or future regulatory permits or permitting requirements. Therefore, there would be no change in the coordinated SWP water delivery operations with the CVP and no federal nexus that would require the preparation of a National Environmental Policy Act (NEPA) document.

As described in Response to Comment 5-75 a separate EIR/EIS was prepared to address the impacts of California WaterFix. The proposed project is an independent project that would occur with or without California WaterFix. Furthermore, as described in Response to Comment 4-1, Contractor participation in California WaterFix will be addressed through a separate public negotiation and environmental review process to develop appropriate Contract amendments.

Response to Comment 5-113

DWR's operation of the SWP complies with all relevant regulations. This compliance will be on-going with or without the proposed project. As stated in the DEIR on page 4-2, the proposed project would not create new water management measures, alter the existing authority to build new or modified existing facilities, or change water allocation provisions in the Contract. Please see Response to Comment 5-11 for discussion of the definition of the proposed project and Response to Comment 5-12 on Area of Origin. See Response to Comment 5-32 for discussion of the Delta Reform Act.

Response to Comment 5-114

See Response to Comment 5-38 for information on the noticing and posting of the NOP for the DEIR. There is no requirement under CEQA to provide an internet link to an electronic copy of the NOP as part of notification procedures. Further, there is no requirement under CEQA to extend the scoping period beyond 30 days as per CEQA Guidelines Section 15082. The NOP was prepared and noticed consistent with CEQA and was included, along with all comments received on the NOP in Appendix B of the DEIR.

Response to Comment 5-115

As noted in Response to Comment 5-27, the proposed project would not result in amendments that would change existing operation and maintenance of the SWP, or result in changes to DWR's existing or future regulatory permits or permitting requirements. Please see Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives. Please see also Responses to Comments 5-21 and 5-27 for further information on the baseline.

Response to Comment 5-116

See Response to Comment 5-86 for discussion of methods used in the analysis, including standards of significance. The comment does not provide specifics as to how the proposed project DEIR is inconsistent with other DWR EIR documents. As noted in Response to Comment 5-70, the DEIR cites other DWR EIRs, as appropriate including the California WaterFix EIR, as sources of information.

Response to Comment 5-117

As noted in Response to Comment 5-27, the proposed project would not result in amendments that would change existing operation and maintenance of the SWP, or result in changes to DWR's existing or future regulatory permits or permitting requirements. DWR's operation of the SWP complies with all relevant regulations. This compliance will be on-going with or without the proposed project. Please see Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives. See also Response to Comment 5-43. See also Master Response 2 for more information on DWR's ability to define the project.

Response to Comment 5-118

As noted in Response to Comment 5-27, the proposed project would not result in amendments that would change existing operation and maintenance of the SWP, or result in changes to DWR's existing or future regulatory permits or permitting requirements. Please see Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives. Please see also Responses to Comments 5-21 and 5-27 for further information on the baseline. See also Master Response 2 for more information on DWR's ability to define the project.

Response to Comment 5-119

As described in Response to Comment 5-75 and on page 6-3 of the DEIR, a separate EIR/EIS was prepared to address the impacts of California WaterFix. Therefore, it is appropriate to include in the cumulative impact analysis. However, as further discussed, the proposed project is an independent project that would occur with or without California WaterFix. Therefore, it was rejected as an alternative to the proposed project (see pages 7-5 and 7-6 of the DEIR). See Master Response 3 for discussion of the relationship of the proposed project to California WaterFix.

Response to Comment 5-120

The No Project Alternative assumes that DWR would take no action and DWR and the Contractors would continue to operate and finance the SWP under the Contracts to

December 312, 2035 (see pages 7-6 and 7-9 of the DEIR. See also Master Response 2 for discussion of the range of alternatives evaluated in the DEIR.

As described in Response to Comment 5-75 a separate EIR/EIS was prepared to address the impacts of California WaterFix. The proposed project is an independent project that would occur with or without California WaterFix. Furthermore, as described in Response to Comment 4-1, Contractor participation in California WaterFix will be addressed through a separate public negotiation and environmental review process to develop appropriate Contract amendments. See Master Response 3 for discussion of the relationship of the proposed project to California WaterFix and the separate Contract amendment process.

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Letter 6

california water impact network
California Sportfishing Protection Alliance · CSPA · Since 1983
AquAlliance
Defending Northern California Waters

October 15, 2016

Ted Alvarez
State Water Department Analysis Office
Department of Water Resources
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Sacramento, CA 94236-0001
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Subject: Comments on DEIR for Water Supply Extension Contract Project

Dear Mr. Alvarez;

We appreciate the opportunity to comment on the proposed SWP contract extension project that includes amending certain provisions of the State Water Resources Development System (SWRDS) Water Supply Contracts (SWP Contracts) to among other things, extend the term of the contracts.

1. CEQA and the Definition of the Project: We believe the entire SWP contract must be included in CEQA analysis.

The Project as defined by DWR is to extend the full SWP contracts for 50 years while conducting an environmental review on only the financial sections of the contract. This is a blatant violation of CEQA as it leaves the bulk of the contract intact but without analysis of the potential consequences to the environment of extending the existing contractual obligations. Thus the proposed Project is not properly defined. This piece-meal approach is a direct violation of CEQA. *The potential consequences can only be evaluated in the context of some proposed project. The urgency for extending the contracts now is not well justified in the DEIR. The only project that would require the extensions at this early date is the Twin Tunnels (BDCP_DHCCP_CWF). That is because the construction is estimated to begin in 2020 and the period of construction is estimated to take at least 15 years; hence, the extended contracts must be in place by 2020 well before the 2035 expiration of the existing contracts. No other project on the horizon requires such early action.* 6-1

While implying that the only contract change of consequence is financial, DWR proceeds to propose one significant change to the content of the contract. That is the elimination of Article 1, (hh). This is the section of the original contracts that names the projects authorized for construction. There is no mention of Tunnels in this list. The Contract Extension Project proposes to delete the one clause that limits the extent of Delta Transfer Facilities that could be pursued after 1987. We believe Article 1 (hh) was deleted to allow the Tunnels, and anything else DWR might want to build. 6-2

The original contracts were signed beginning in 1965 before the California Environmental ↓ 6-3

Quality Act became law in 1972. A lot has changed since then. The original contracts begin to expire in 2035. The proposed extension will push the date for the contract's expiration to 2085. *The existing contracts include a take-or-pay requirement that presumably would remain if they were simply extended now. "Take-or-Pay" means that the contractor must pay all the fixed costs whether any water is delivered or not. Without the take-or-pay provision large capital investments in the SWP would be difficult to finance in the bond market. It seems that the necessity of extending the contracts now is to keep intact the take-or-pay provisions.* Examining only the financial sections of the existing contracts cannot possibly responsibly determine what the environmental consequences might be*, especially without any idea of proposed projects*. This runs afoul of CEQA's requirements that the project should encompass the whole of the action. 6-3 cont.

Change of Circumstance--Changes the Definition of the Project:
The SWP as envision some 54 years ago has changed. Any environmental review of the contracts for this project must recognize these changes. For example, there is no justification for including the original contract amounts for the full Table A. The water for these allocations can never be delivered because they simply do not exist. Climate changes, legal changes including the protection of the North Coast Rivers, under both Federal and State law, and the voters' rejection of the Peripheral Canal all have redefined the SWP and the alleged contract amounts. The Contract Table A Allocations must be refigured to reflect this.

For a major contract extension such as is being proposed, a full analysis of actual water supply available to the SWP must be completed. Prudence requires that the amounts of water assigned reflect what is really available if the SWP were operated on a "safe yield" basis. (Please refer to The Santa Barbara Report Appendix B included as Attachment 1) 6-4

This must entail a thorough analysis of how much water is actually in the Delta watershed and is legally available to the SWP taking into consideration both the Public Trust Doctrine and Senior Water Rights law. (See Attached C-WIN Quantification Analysis included as Attachment 2) The SWP was originally premised on promises to protect Areas of Origin and Senior Water Rights holders and to take only "surplus" water that would not affect the rights of those from where the water originated.

Water allocated under existing contracts has already had significant environmental repercussions as we have seen with the Pelagic Organism Decline (POD), the continued decline of the three runs of salmon and the Delta smelt as well as other listed species. Extending the contracts and continuing the full Table A Allocations without any environmental review for 50 years beyond 2035 will have considerable impacts. This is a clear violation of CEQA and the Endangered Species Act. 6-5

On its face, this attempt to extend only the financial obligations of the SWP contracts to 2085 appears to be solely for the purpose of being able to finance the proposed Twin Tunnel Project that is now winding its way, with much controversy, through the various permit processes. 6-6 Ratepayers ought to be allowed to vote on such a major change in their land based charges, property taxes and water rates and to have transparency regarding what projects are included in this 50 year extension and obligation of payments. Full disclosure demands a complete listing of all the projects proposed to be financed by this extension. 6-7

2. Extension of the Contracts allows for any large project, including the Twin Tunnels that DWR 6-8

wishes to pursue. 6-8 cont.

Although the DEIR claims that the WaterFix is “separate and independent” from the proposed project, it is clear that the WaterFix could not move forward without the completion of this contract extension. *It is doubtful that the Twin Tunnels with its extremely large capital cost and with little quantified benefit would pass muster in the bond market without the take-or-pay provision.* There is no language in the DEIR that promises a vote to opt out for/by each Contractor on large projects like the Twin Tunnels or to allow each Contractor to decide on the merits of each project as proposed in the future. 6-9

The DEIR discusses the Monterey Amendments and at 6.1.2, the Cumulative Impacts Analysis, says, “The proposed project would not affect the provisions of the Monterey Amendments specific to water allocations and water management measures or amendments that may be added to allocate costs for the California WaterFix should it be approved.” What does this mean exactly? On its face, it seems to mean that if the proposed Contract Extension Project was approved, there would be no way for any existing Contractor to get out of paying 6-10

The current SWP Contracts are not uniform as both Plumas County FC&WCD and the Empire West Side ID did not sign the Monterey Amendments and DWR honored the original contracts that they signed without a problem. 6-11

3. DWR claims that contractors would forfeit their Table A allocation if they refuse to acquiesce to the contract extensions: On what basis is this threat made? SWP Contractors and ratepayers originally anticipated their financial obligations would be met by 2035. Now DWR is suggesting these contractors must encumber their ratepayers and property taxpayers for another 50 years for some "hidden" non disclosed list of projects? How can decision makers possibly know if this is the least environmentally damaging alternative without full disclosure of what they are buying with this 50 year financial obligation? 6-12

The Executive Summary and DEIR Alternative 7 looks at what would happen if not all the Contractors sign the Project Extension and goes on to suggest veiled threats that if a Contractor chooses not to sign, they may have their water deliveries cut off at the expiration of their current contract. There is no mention in the Executive Summary or DEIR Alternative 7 about Article 4 of the current contracts, very germane to this issue. So long as a Contractor submits an Article 4 letter 6 months before his contract is to expire, DWR **must honor** the request to extend the Contract. Why is DWR threatening to cut off a Contractor’s water service? The DEIR analysis in Alternative 7 is dishonest and threatening. 6-13

Article 4 of the existing contracts states that by written notice to DWR at least 6 months prior to the expiration date of the Contract, **the Contractor can elect to receive continued service after the expiration of the term under the following conditions unless otherwise agreed to:** 6-14

(1) service of water in annual amounts up to and including the Contractor’s maximum annual Table A amount;
(2) service of water at no greater cost to the Contractor than would have been the case had the Contract continued in effect;
(3) service of water under the same physical conditions of service, including time, place, amount and rate of delivery;

6-14 cont.

(4) retention of the same chemical quality objective provision;
(5) retention of the same options to use the SWP transportation facilities as provided in Articles 18© and 55, as applicable.

The Monterey Amendments to the SWP contracts set an important precedent for non-conformity in the Contracts. According to the DEIR, Plumas County FC&WCD and the Empire West Side ID did not sign the Monterey Amendments yet these two SWP Contractors “continue to receive, without threat, SWP water from DWR in accordance with the Contracts in effect before the Monterey Amendments.

6-15

4. The financial consequences and environmental impacts to local agencies from the Contract Extension Project have not been disclosed:

Language in the existing Contracts gives DWR the authority to build new facilities or modify existing facilities as stipulated without a financial constraint imposed by the current 2035 term of the contract. *Without the contract extensions any proposed project would face the constraint of the viability of floating a revenue bond without a take-or-pay provision.* According to the DEIR, Article 51 of the current contracts stipulates that, “DWR may submit supplemental bills to the Contractors if necessary to meet unanticipated costs for revenue bond debt service and coverage, which are chargeable to the Contractors.” This has already impacted individual contractors, especially the 27 smaller ones. These 27 contractors hold only 25% of the total voting power of the SWP, with the Metropolitan Water District having a 50% share and Kern County Water Agency, 25%. Since the SWP contractors are obligated to pay even if they receive little or no water under Table A, the possibility of financial peril for all smaller contractors is very evident if the Twin Tunnels’ price tag, $20 billion to $38 billion is financed. (See the Exhibit 1, the SB Report Appendix A attached). With a large percentage of local budgets earmarked to pay SWP costs, the smaller contractors already have deferred needed maintenance, and abandoned some conservation efforts such wastewater recycling for lack of funds.

Without the Contract Extension proposed here, it is unlikely that the tunnels would be able to obtain the financing needed to move forward. So to extend the existing contracts for 50 years beyond their current term opens up considerably more potential debt risk that could be thrust on the contractors even if they didn’t want or need the project being proposed.

Sincerely,

Carolee Krieger

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Response to Comment 6-1

Please see Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives. As noted in Response to Comment 5-11, during the public negotiation sessions DWR and the Contractors identified the financial management problems facing the SWP due to, among other things, the difficulties of selling revenue bonds with maturity dates beyond 2035, making more difficult to affordably finance SWP construction projects such as capital repairs or improvements. To address these problems, DWR and the Contractors negotiated the proposed project objectives during that early public negotiation sessions. DWR and the Contractors used the objectives to develop the proposed project through public negotiations. DWR and 25 Contractors have agreed to the AIP which defined the proposed project evaluated in the DEIR (see pages ES-2 and 1-2). DWR and the Contractors have the discretion to select the project objectives consistent with the problems they are trying to address, especially the difficulty in financing capital repairs and improvements. Chapter 5 of the DEIR identified and analyzed potential direct and indirect environmental impacts associated with the proposed changes to the term length and financing terms of the Contract reflected in the negotiated AIP.

Please see also Responses to Comments 5-21 and 5-27 for further information on the baseline. As noted in Response to Comment 5-27, the proposed project would not result in amendments that would change existing operation and maintenance of the SWP, or result in changes to DWR's existing or future regulatory permits or permitting requirements.

As it relates to California WaterFix, a separate EIR/EIS was prepared to address the impacts of California WaterFix. The proposed project is an independent project that would occur with or without California WaterFix (see Response to Comment 5-75). Furthermore, as described in Response to Comment 4-1, Contractor participation in California WaterFix will be addressed through a separate public negotiation and environmental review process to develop appropriate Contract amendments. See Master Response 3 for discussion of the relationship of the proposed project to California WaterFix and the separate Contract amendment process.

Response to Comment 6-2

Article 1(hh) lists certain types of projects which, if DWR determines to undertake a project covered in such list, may be financed through the sale of water system revenue bonds. However, even if a proposed project is listed in 1(hh), DWR would not undertake such a project or finance the project through the sale of revenue bonds unless the proposed project was first reviewed and authorized in compliance with CEQA and has been the subject of consultation with the Contractors in accordance with the water supply Contracts (Article 50(g)). Article 1(hh) is not proposed for elimination under the proposed amendment. Rather, the proposed amendment would modify one item and add another item. It would modify item 8 in Article 1(hh) by eliminating the limitation that a facility must have been in existence prior to January 1, 1987 to be eligible for water system revenue bond financing for repairs, additions, or betterments to the facility. The proposed amendment would allow water system revenue bond financing for repairs, additions, and betterments to any existing facility, regardless of its date of construction, but once again only after the CEQA process and Contractor consultation process are completed. The proposed amendment would also add an item to Article 1(hh) that would allow a proposed project to be added to the list if approved by 80 percent or more of the affected Contractors, with 80 percent or more of the Table A water among those affected Contractors. However, such a project would not be undertaken or funded by water system revenue bonds unless the project was thoroughly analyzed and authorized in compliance with CEQA and the Contractor consultation process has taken place. See also Master Response 3 for a discussion on the relationship of the proposed project to California WaterFix.

Response to Comment 6-3

See Response to Comment 6-1.

Response to Comment 6-4

See Response to Comment 6-1. As discussed in Response to Comment 5-53, an alternative that considers reduced Table A deliveries was included in the DEIR; however; as described on pages 7-3 and 7-4, reducing Table A amounts proportionality for all the Contractors by amendment would not change the amount of water being delivered to the Contractors nor would it change the financial health of the SWP as it would not affect any of the other Contract financial provisions that address SWP billing provisions and reimbursements. Therefore, reducing Table A deliveries was rejected because it does not address project objectives. Please see Master Response 2 for discussion of the range of alternatives evaluated in the DEIR.

See Response to Comment 8-1 for discussion of Area of Origin. See Response to Comment 5-105 on DWR water rights. As noted, DWR's operation of the SWP complies with all relevant regulations. This compliance will be on-going with or without the proposed project.

Response to Comment 6-5

See Response to Comment 6-1. See also Responses to Comments 5-40 and 5-41. As noted, DWR's operation of the SWP complies with all relevant regulations, including California and federal ESA. This compliance will be on-going with or without the proposed project.

Response to Comment 6-6

See Responses to Comments 6-1 and 6-2. As described in Response to Comment 4-1, Contractor participation in California WaterFix will be addressed through a separate public negotiation and environmental review process to develop appropriate Contract amendments. See Master Response 3 for discussion of the relationship of the proposed project to California WaterFix and the separate Contract amendment process.

Response to Comment 6-7

See Responses to Comments 6-1 and 6-2. As described in Response to Comment 4-1, Contractor participation in California WaterFix will be addressed through a separate public negotiation and environmental review process to develop appropriate Contract amendments. See Master Response 3 for discussion of the relationship of the proposed project to California WaterFix and the separate Contract amendment process. See also Response to Comment 4-2.

See also Response to Comment 5-4. DWR will continue its practice of providing separate CEQA compliance at the time that a project to modify or construct new SWP facilities is proposed.

Response to Comment 6-8

See Responses to Comments 6-1, 6-2 and 6-7.

Response to Comment 6-9

See Response to Comment 3-2 for discussion of Alternative 7 in DEIR which evaluates an alternative of not all Contractors sign the amendment. The analysis is contained on pages 7-24 through 7-26 of the DEIR. See Responses to Comments 4-1 and 4-2. As to projects other than California WaterFix, the responsibility for determining whether to undertake any other project continues to vest in DWR as under the current contract provisions. DWR's practice is to inform and consult, as appropriate, with the Contractors before undertaking new projects.

Response to Comment 6-10

Please see Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives. As stated on page 6-4 of the DEIR (under subsection 6.1.2) because the proposed project would not change water allocation provisions in the Contract, it would not alter the provisions amended by the Monterey Amendment specific to water allocations and water management measures. As it relates to California WaterFix, as described in Response to Comment 4-1, Contractor participation in California WaterFix will be addressed through a separate public negotiation and environmental review process to develop appropriate Contract amendments. See Master Response 3 for discussion of the relationship of the proposed project to California WaterFix and the separate Contract amendment process.

Response to Comment 6-11

Although the Monterey Amendment is not part of the Plumas and Empire Contracts, the Plumas and Empire Contracts are substantially uniform with respect to the basic terms and conditions of the other Contracts.

Response to Comment 6-12

DWR has not claimed that Contractors would forfeit their Table A allocation if they do not sign the proposed project. Please see Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives. See also Response to Comment 3-2 for discussion of Alternative 7 in DEIR which evaluates an alternative of not all Contractors signing the amendment. See also Responses to Comment 6-1 and 6-2.

Response to Comment 6-13

DWR has not claimed that Contractors would forfeit their Table A allocation if they do not sign the proposed project. See Response to Comment 3-2 for discussion of Alternative 7 in DEIR which evaluates an alternative of not all Contractors signing the amendment.

Response to Comment 6-14

See Response to Comment 3-2 for discussion of Alternative 7 in DEIR which evaluates an alternative of not all Contractors signing the amendment.

Response to Comment 6-15

Please see Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives.

As described in Response to Comment 4-1, Contractor participation in California WaterFix will be addressed through a separate public negotiation and environmental review process to develop appropriate Contract amendments. See Master Response 3 for discussion of the relationship of the proposed project to California WaterFix and the separate Contract amendment process. See also Response to Comment 4-2. As to projects other than California WaterFix, the responsibility for determining whether to undertake any other project continues to vest in DWR as under the current contract provisions. DWR's practice is to inform and consult, as appropriate, with the Contractors before undertaking new projects. The attachments to the comment is included in Exhibit B to this FEIR.

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Letter 7

california water impact network

CSPA
California Sportfishing Protection Alliance
Since 1983

AQUALLIANCE
DEFENDING NORTHERN CALIFORNIA WATERS

PLANNING AND CONSERVATION LEAGUE

October 15, 2016

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Subject: Comments on DEIR for Water Supply Extension Contract Project

Dear Mr. Alvarez;

We appreciate the opportunity to comment on the proposed SWP contract extension project that includes amending certain provisions of the State Water Resources Development System (SWRDS) Water Supply Contracts (SWP Contracts) to among other things, extend the term of the contracts.

1. CEQA and the Definition of the Project: We believe the entire SWP contract must be included in CEQA analysis.

The Project as defined by DWR is to extend the full SWP contracts for 50 years while conducting an environmental review on only the financial sections of the contract. This is a blatant violation of CEQA as it leaves the bulk of the contract intact but without analysis of the potential consequences to the environment of extending the existing contractual obligations. Thus the proposed Project is not properly defined. This piece-meal approach is a direct violation of CEQA. *The potential consequences can only be evaluated in the context of some proposed project. The urgency for extending the contracts now is not well justified in the DEIR. The only project that would require the extensions at this early date is the Twin Tunnels (BDCP_DHCCP_CWF). That is because the construction is estimated to begin in 2020 and the period of construction is estimated to take at least 15 years; hence, the extended contracts must be in place by 2020 well before the 2035 expiration of the existing contracts. No other project on the horizon requires such early action.* 7-1

While implying that the only contract change of consequence is financial, DWR proceeds to propose one significant change to the content of the contract. That is the elimination of Article 1, (hh). This is the section of the original contracts that names the projects authorized for construction. There is no mention of Tunnels in this list. The Contract Extension Project proposes to delete the one clause that limits the extent of Delta Transfer Facilities that could be pursued after 1987. We believe Article 1 (hh) was deleted to allow the Tunnels, and anything else DWR might want to build. 7-2

The original contracts were signed beginning in 1965 before the California Environmental 7-3

Quality Act became law in 1972. A lot has changed since then. The original contracts begin to expire in 2035. The proposed extension will push the date for the contract's expiration to 2085. *The existing contracts include a take-or-pay requirement that presumably would remain if they were simply extended now. "Take-or-Pay" means that the contractor must pay all the fixed costs whether any water is delivered or not. Without the take-or-pay provision large capital investments in the SWP would be difficult to finance in the bond market. It seems that the necessity of extending the contracts now is to keep intact the take-or-pay provisions.* Examining only the financial sections of the existing contracts cannot possibly responsibly determine what the environmental consequences might be*, especially without any idea of proposed projects*. This runs afoul of CEQA's requirements that the project should encompass the whole of the action. 7-3 cont.

Change of Circumstance--Changes the Definition of the Project:
The SWP as envision some 54 years ago has changed. Any environmental review of the contracts for this project must recognize these changes. For example, there is no justification for including the original contract amounts for the full Table A. The water for these allocations can never be delivered because they simply do not exist. Climate changes, legal changes including the protection of the North Coast Rivers, under both Federal and State law, and the voters' rejection of the Peripheral Canal all have redefined the SWP and the alleged contract amounts. The Contract Table A Allocations must be refigured to reflect this.

For a major contract extension such as is being proposed, a full analysis of actual water supply available to the SWP must be completed. Prudence requires that the amounts of water assigned reflect what is really available if the SWP were operated on a "safe yield" basis. (Please refer to The Santa Barbara Report Appendix B included as Attachment 1) 7-4

This must entail a thorough analysis of how much water is actually in the Delta watershed and is legally available to the SWP taking into consideration both the Public Trust Doctrine and Senior Water Rights law. (See Attached C-WIN Quantification Analysis included as Attachment 2) The SWP was originally premised on promises to protect Areas of Origin and Senior Water Rights holders and to take only "surplus" water that would not affect the rights of those from where the water originated.

Water allocated under existing contracts has already had significant environmental repercussions as we have seen with the Pelagic Organism Decline (POD), the continued decline of the three runs of salmon and the Delta smelt as well as other listed species. Extending the contracts and continuing the full Table A Allocations without any environmental review for 50 years beyond 2035 will have considerable impacts. This is a clear violation of CEQA and the Endangered Species Act. 7-5

On its face, this attempt to extend only the financial obligations of the SWP contracts to 2085 appears to be solely for the purpose of being able to finance the proposed Twin Tunnel Project that is now winding its way, with much controversy, through the various permit processes. 7-6
Ratepayers ought to be allowed to vote on such a major change in their land based charges, property taxes and water rates and to have transparency regarding what projects are included in this 50 year extension and obligation of payments. Full disclosure demands a complete listing of all the projects proposed to be financed by this extension. 7-7

2. Extension of the Contracts allows for any large project, including the Twin Tunnels that DWR 7-8

wishes to pursue. 7-8 cont.

Although the DEIR claims that the WaterFix is “separate and independent” from the proposed project, it is clear that the WaterFix could not move forward without the completion of this contract extension. *It is doubtful that the Twin Tunnels with its extremely large capital cost and with little quantified benefit would pass muster in the bond market without the take-or-pay provision.* There is no language in the DEIR that promises a vote to opt out for/by each Contractor on large projects like the Twin Tunnels or to allow each Contractor to decide on the merits of each project as proposed in the future. 7-9

The DEIR discusses the Monterey Amendments and at 6.1.2, the Cumulative Impacts Analysis, says, “The proposed project would not affect the provisions of the Monterey Amendments specific to water allocations and water management measures or amendments that may be added to allocate costs for the California WaterFix should it be approved.” What does this mean exactly? On its face, it seems to mean that if the proposed Contract Extension Project was approved, there would be no way for any existing Contractor to get out of paying 7-10

The current SWP Contracts are not uniform as both Plumas County FC&WCD and the Empire West Side ID did not sign the Monterey Amendments and DWR honored the original contracts that they signed without a problem. 7-11

3. DWR claims that contractors would forfeit their Table A allocation if they refuse to acquiesce to the contract extensions: On what basis is this threat made? SWP Contractors and ratepayers originally anticipated their financial obligations would be met by 2035. Now DWR is suggesting these contractors must encumber their ratepayers and property taxpayers for another 50 years for some "hidden" non disclosed list of projects? How can decision makers possibly know if this is the least environmentally damaging alternative without full disclosure of what they are buying with this 50 year financial obligation? 7-12

The Executive Summary and DEIR Alternative 7 looks at what would happen if not all the Contractors sign the Project Extension and goes on to suggest veiled threats that if a Contractor chooses not to sign, they may have their water deliveries cut off at the expiration of their current contract. There is no mention in the Executive Summary or DEIR Alternative 7 about Article 4 of the current contracts, very germane to this issue. So long as a Contractor submits an Article 4 letter 6 months before his contract is to expire, DWR **must honor** the request to extend the Contract. Why is DWR threatening to cut off a Contractor’s water service? The DEIR analysis in Alternative 7 is dishonest and threatening. 7-13

Article 4 of the existing contracts states that by written notice to DWR at least 6 months prior to the expiration date of the Contract, **the Contractor can elect to receive continued service after the expiration of the term under the following conditions unless otherwise agreed to:** 7-14

(1) service of water in annual amounts up to and including the Contractor’s maximum annual Table A amount;
(2) service of water at no greater cost to the Contractor than would have been the case had the Contract continued in effect;
(3) service of water under the same physical conditions of service, including time, place, amount and rate of delivery;

(4) retention of the same chemical quality objective provision;
(5) retention of the same options to use the SWP transportation facilities as provided in Articles 18© and 55, as applicable.

The Monterey Amendments to the SWP contracts set an important precedent for non-conformity in the Contracts. According to the DEIR, Plumas County FC&WCD and the Empire West Side ID did not sign the Monterey Amendments yet these two SWP Contractors "continue to receive, without threat, SWP water from DWR in accordance with the Contracts in effect before the Monterey Amendments.

7-14 cont.

4. The financial consequences and environmental impacts to local agencies from the Contract Extension Project have not been disclosed:

Language in the existing Contracts gives DWR the authority to build new facilities or modify existing facilities as stipulated without a financial constraint imposed by the current 2035 term of the contract. *Without the contract extensions any proposed project would face the constraint of the viability of floating a revenue bond without a take-or-pay provision.* According to the DEIR, Article 51 of the current contracts stipulates that, "DWR may submit supplemental bills to the Contractors if necessary to meet unanticipated costs for revenue bond debt service and coverage, which are chargeable to the Contractors." This has already impacted individual contractors, especially the 27 smaller ones. These 27 contractors hold only 25% of the total voting power of the SWP, with the Metropolitan Water District having a 50% share and Kern County Water Agency, 25%. Since the SWP contractors are obligated to pay even if they receive little or no water under Table A, the possibility of financial peril for all smaller contractors is very evident if the Twin Tunnels' price tag, $20 billion to $38 billion is financed. (See the Exhibit 1, the SB Report Appendix A attached). With a large percentage of local budgets earmarked to pay SWP costs, the smaller contractors already have deferred needed maintenance, and abandoned some conservation efforts such wastewater recycling for lack of funds.

Without the Contract Extension proposed here, it is unlikely that the tunnels would be able to obtain the financing needed to move forward. So to extend the existing contracts for 50 years beyond their current term opens up considerably more potential debt risk that could be thrust on the contractors even if they didn't want or need the project being proposed.

7-15

Sincerely,

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Responses to Comments 7-1 through 7-15

See Responses to Comments 6-1 through 6-15.

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Letter 8

October 17, 2016

Ted Alvarez
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VIA EMAIL AND U.S. MAIL

Subject: Comments on Draft EIR for the Water Supply Contract Extension Project

Dear Mr. Alvarez:

8-1 On behalf of the Natural Resources Defense Council ("NRDC"), Defenders of Wildlife ("DOW"), and The Bay Institute ("TBI"), which collectively have hundreds of thousands of members and activists in California, we are writing to provide input on the Draft Environmental Impact Report ("DEIR") for the Department of Water Resources' ("DWR") Water Supply Contract Extension Project ("proposed project"). The proposed project and DEIR fail to satisfy the requirements of CEQA and DWR's obligations under state law. As we explained in our scoping comments submitted on October 13, 2014, DWR's proposal to extend the term of existing State Water Project ("SWP") contracts for an additional 50 years necessarily implicates the urgent need to modernize other contract terms to reflect the current realities of climate change, restricted surface water supplies, declining water quality and environmental health of the Bay-Delta estuary, existing statutory requirements, and other current and anticipated changes that have occurred since these contracts were originally executed. DWR's failure to address these important issues while proposing to extend the contracts to 2085 is irreconcilable with Governor Brown's recognition in the 2016 California Water Action Plan of the "broad agreement that the state's water management system is currently unable to satisfactorily meet both ecological and human needs, too exposed to wet and dry climate cycles and natural disasters, and inadequate to handle the additional pressures of future population growth and climate change."[1]

8-2 DWR's proposal and the analysis on which it is based are legally flawed. First, DWR concludes that extending SWP contracts and water deliveries for another 50 years would result in no impact on the environment. But this conclusion is based on at least two faulty assertions that fatally

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[1] http://resources.ca.gov/docs/california_water_action_plan/Final_California_Water_Action_Plan.pdf, at 1. All cited documents are incorporated herein by reference.

taint the entire analysis. The first faulty assumption is that the SWP contracts would be extended 8-2 cont.
to 2085 in any case, with or without this proposed project, "upon receipt of Article 4 letters from
the Contractors," without any other changes to the contracts. DEIR at ES-6. The second faulty
assumption is that SWP operations and facilities will not change based on the more affordable 8-3
financing and broader construction authority that the 50-year extension would provide. Second,
DWR incorrectly asserts that the "proposed project is separate and independent from the
California WaterFix project," DEIR at 6-3, which causes DWR to impermissibly piecemeal the 8-4
impacts of extending the contracts from the impacts of California WaterFix ("WaterFix"). Third,
DWR and the SWP Contractors have recognized that multiple additional modifications to the
SWP contracts will be necessary in order to implement WaterFix, but the project and DEIR also 8-5
impermissibly exclude those modifications from analysis.

DWR should reject the proposed project and prepare a new project and California Environmental Quality Act ("CEQA") analysis that considers the full suite of contract modifications and related impacts that are necessary to modernize the State Water Project and keep it functional beyond 2035. 8-6

I. The DEIR's Conclusion that the Proposed Project Would Cause No Environmental Impacts Is Flawed

A. DWR Improperly Conflates the "No Project" Alternative with the Proposed Project

The premise of the DEIR's no impacts conclusion is that the SWP contracts would be extended to 2085 with or without the proposed project because of Article 4 of the contracts. Thus, DWR defines the "no project" alternative as extension of the contracts from 2035 to 2085 with no changes to any existing contract terms or operations. DEIR at 7-6. But DWR inexplicably selects a 2085 contract extension date under this alternative, thus rendering it essentially identical to the proposed project. This selection, which is not supported by any analysis or reasoning, undermines the impact analysis. 8-7

Article 4 allows for extension of the contracts on terms that are mutually agreed to. *See, e.g.,* DEIR at 7-9. The Contractors may not simply demand that the contracts be extended indefinitely, or for 50 years as DWR assumes in the DEIR, nor does DWR have to acquiesce to such demands under Article 4. Indeed, the DEIR recognizes that "it is uncertain how far beyond 2035 the Contracts would be extended under this alternative." DEIR at 7-11.[2] But the DEIR randomly selects 2085 as the expiration date, noting that this "is the same as the proposed project." This unjustified assumption impermissibly skews the impact analysis. If a shorter date were selected, then DWR would continue to face constraints on its ability to finance and 8-8

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[2] The DEIR also recognizes that "DWR and the Contractors have made many amendments to the Contracts to address matters that have arisen over the past 55 years." DEIR at 2-12. Implementation and extension of the contracts over the next 69 years – to 2085 – should be no different, but the "no project" alternative unreasonably assumes it will be.

8-8 cont. construct additions and improvements to the SWP, leading to impacts very different from those anticipated under the proposed project, which would facilitate such construction. The DEIR acknowledges that DWR would continue to face constraints on its ability to sell bonds under this scenario, thus limiting the ability to finance significant upgrades to SWP facilities, but fails to recognize that reality in its impact analysis. *Id.* at 7-4 to 7-6.

8-9 The Ninth Circuit Court of Appeals recently held that even where a statute mandates renewal, which is not the case here, the federal equivalent of CEQA, the National Environmental Policy Act ("NEPA"), "imposes obligations on agencies considering major federal actions that may affect the environment … [and] [a]n Agency may not evade these obligations by contracting around them." *Pac. Coast Fed'n of Fishermen's Ass'ns v. U.S. Dep't of the Interior*, 2016 WL 3974183, at *2 (9th Cir. July 25, 2016). As the Ninth Circuit noted, "a 'no action' alternative is 'meaningless' if it assumes the existence of the very plan being proposed." *Id.* at *1. The court held that the United States Bureau of Reclamation ("Reclamation") violated NEPA by failing to consider an alternative that would reduce water deliveries in a renewed contract. *Id.* at *3.[3]

8-10 A reduced delivery scenario under the "no action" alternative is more likely than the one that DWR has put forward. In fact, DWR itself has recently published and commissioned documents that assert that SWP deliveries will be far less in a "no action" future, under which new facilities are not constructed and upgraded. For example, the draft Bay Delta Conservation Plan ("BDCP") prepared by DWR in 2013 projects that by 2025, Delta exports will fall to a range of 3.4-3.9 million acre-feet ("MAF") per year on average, a reduction of about 1 MAF or more on average from today's levels. *See, e.g.,* DWR, public draft BDCP, at Table 9.A-2 (Nov. 2013), http://baydeltaconservationplan.com/Libraries/Dynamic_Document_Library/Public_Draft_BDCP_Appendix_9A_-_Economic_Benefits_of_the_BDCP_and_Take_Alternatives.sflb.ashx. DWR's economic consultant for the WaterFix project recently reiterated this reduction in level of exports under a "no action" alternative, finding that Delta exports from existing SWP and Central Valley Project ("CVP") facilities are likely to decline to 3.9 MAF by 2020, "a reduction of 0.8 maf from current levels." The Brattle Group, Draft California WaterFix Economic Analysis, at 6 (Nov. 15, 2015), http://www.restorethedelta.org/wp-content/uploads/2016/09/CA-WaterFix-Economic-Analysis-Sunding.pdf. DWR has presented similar reduced SWP delivery scenarios as likely in its most recent SWP delivery capability report. DWR, 2015 SWP Delivery Capability Report, at App., https://msb.water.ca.gov/documents/86800/c97c3baa-0189-4154-bf19-aa88392026ac. Indeed, DWR's largest contractor, the Metropolitan Water District of Southern California, relied on the reduced "ECLO" SWP delivery projections from the 2015 SWP Delivery Capability Report in its 2015 Urban Water Management Plan. MWD, 2015 Urban Water Management Plan, at 2-13, http://www.mwdh2o.com/PDF_About_Your_Water/2.4.2_Regional_Urban_Water_Management

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[3] As discussed *infra* at note 5, DWR incorrectly rejected the "reduced deliveries" alternative here.

_Plan.pdf ("Under the 2015 SWP Delivery Capability Report with existing conveyance and low outflow requirements scenario, the delivery estimates for the SWP for 2020 conditions … [are] equivalent to 976 TAF for Metropolitan, under long-term average condition."); *compare with id.* (MWD estimates that this SWP delivery amount will increase to 1.2 MAF on average starting in 2030 when WaterFix is in place).

Because DWR anticipates that, without the addition of significant new SWP facilities, SWP deliveries are likely to decline significantly in the near future, the "no action" alternative should be revised to reflect a shorter contract extension and reduced delivery estimates over the life of this project. That assumption, which better matches DWR's, and its contractors' projections elsewhere, would lead to a different impact analysis than the one presented in the DEIR, with a greater disparity of future deliveries between the "no action" and "proposed project" alternatives. The DEIR should be revised to reflect those differences. 8-10 cont.

B. The DEIR Admits that the Proposed Project Will Allow DWR to Implement Projects with Potentially Significant Environmental Impacts

The DEIR states that a core purpose of the project is to "[e]nsure DWR can finance SWP expenditures beyond 2035." DEIR at ES-3. As DWR explains: "In order for DWR to sell bonds for 30 years or more, which would provide more affordable financing to the Contractors for the SWP costs associated with constructing and repairing the SWP facilities allocated to water supply, it is necessary to extend the expiration dates of the Contracts." DEIR at 1-2; *see also id.* at 4-1 (recognizing that DWR could not "as a practical matter" issue bonds with a maturity date beyond 2035 without extending the contract terms as proposed); *id.* at 5-4 ("the current Contracts require existing capital obligations to be repaid by 2035, causing a sharp increase in capital charges to contractors toward the end of the 2035 repayment period"). While the DEIR admits that this more affordable financing will increase the likelihood of modifications to the SWP that will have significant environmental impacts, it fails to analyze the impact of those reasonably foreseeable modifications. Further, the proposed project would explicitly authorize DWR to extend the physical components of the SWP beyond current facilities, and thereby increase the likelihood of projects with significant environmental impacts. 8-11

CEQA requires that an EIR identify and describe the significant indirect environmental impacts that will result from the project, including actions that are a foreseeable consequence of the project, such as the construction and modification of SWP facilities here that the contract extension would make possible. 14 Cal. Code of Regs. § 15126.2(a); *City of Hayward v. Board of Trustees of Cal. State Univ.*, 242 Cal. App. 4th 833, 859 (2015) (EIR on plan to expand campus deficient for not analyzing increased student use of parks). For example, the DEIR notes that "[c]apital projects that could be financed in whole or in part by the sale of longer term bonds (if available as the result of contract extension) include: (1) reinforcing Perris Dam at Lake Perris against seismic failure … ; (2) reconstructing the Ronald B. Robie Thermalito pump-generating plant … ; (3) implementing the Oroville hydroelectric license project; and (4) obtaining a renewed Federal Energy Regulatory Commission (FERC) license for the SWP's southern hydroelectric plants." DEIR at 5-7. Each of these anticipated projects would likely have significant environmental impacts. Similarly, the DEIR notes that: 8-11 cont.

> Because of physical and water quality limitations, the diversion at Barker Slough cannot deliver the maximum Table A water requested. In order to address these facility limitations and meet projected future water delivery needs of the North Bay Contractors, DWR is considering constructing a new intake and pumping plant facility in the Sacramento River and a new segment of [North Bay Aqueduct (NBA)] Conveyance pipeline that would be operated in conjunction with the existing Barker Slough Pumping Plant…[T]he NBA Alternate Intake Project (NBA AIP) would enable the NBA to deliver the total water supply allocation (Table A amounts) to the North Bay Contractors.

DEIR at 2-5 to 2-6; *see also* DWR, North Bay Aqueduct Alternative Intake Project, http://www.water.ca.gov/engineering/Projects/Current/NBA/. Given the current stresses on and over-allocation of the Delta ecosystem, there can be no question that increasing SWP diversions from the Delta would cause potentially significant environmental impacts.[4] Yet, that is what DWR proposes to do with the NBA AIP, a project which would be more likely to occur with the more affordable financing available under the proposed extended contract term. *See, e.g.,* Solano Cty. Water Agency, NBA AIP, http://www.scwa2.com/home/showdocument?id=918, at 5 (Solano County Water Agency discussing the challenges of funding the project, which "capital costs are estimated at about $550 million" and "is expected to be financed by the State Water Project with revenue bonds," and explaining that "[f]ull payment by SCWA and Napa County would be a significant financial burden to our rate payers"). 8-12

The DEIR anticipates that other SWP modifications will be made more likely with the contract extension, which modifications are also likely to have potentially significant environmental impacts. In fact, the DEIR notes that the contracts themselves "require DWR to make all reasonable efforts to complete the water supply facilities necessary to deliver the Table A amounts in the Contracts." DEIR at 2-12.[5] DWR's pursuit of such facilities "necessary to 8-13 deliver the Table A amounts in the Contracts," including WaterFix with its stated purpose of enabling full contract deliveries, would significantly increase diversions and exports within and upstream of the Delta, causing significant environmental impacts. *See, e.g.,* DWR Application to USACE to Implement WaterFix, at 8 (Aug. 24, 2015), https://s3.amazonaws.com/californiawater/pdfs/5n2mg_Complete_Final_CA_Water_Fix_USACE_404_Permit_Application.pdf (the "purposes of the proposed actions are to … restore and protect the ability of the SWP and CVP to deliver up to full contract amounts … consistent with the terms and conditions of water delivery contracts held by SWP contractors."). As DWR's most recent SWP Capability Report admits, "[u]nder existing conditions, the average annual delivery of Table A water … is 2,550 taf/year," far less than the nearly 4.2 MAF of annual Table A amounts in the contracts,[6] and the "future inability of the SWP to deliver water to meet demands of certain [south-of-delta] contractors is a very real concern." *Id.* at 10. 8-13 cont.

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[4] *See, e.g.,* DWR's 2015 SWP Capability Report at 1-2 (available at https://msb.water.ca.gov/documents/86800/144575dd-0be1-4d2d-aeff-8d7a2a7b21e4).

[5] The proposed project's extension of this contract provision for another 50 years also undermines DWR's asserted basis for rejecting an alternative that would reduce Table A deliveries. The DEIR states that "Reducing Table A amounts proportionately for all the Contractors by amendment would not change the amount of water being delivered to the Contractors…." DEIR at 7-3. This assertion is not true if DWR is simultaneously obligating itself through 2085, as the proposed project would do, "to make all reasonable efforts to complete the water supply facilities necessary to deliver the Table A amounts in the Contracts." Nor is it true if the proposed project increases the ability of DWR to expand SWP facilities to increase deliveries, as it would do. Thus, the DEIR also suffers from

Finally, the proposed project includes new authorization for "SWP revenue bonds to be issued to: (1) finance repairs, additions, and betterments to most facilities of the SWP without regard to whether the facilities were in existence prior to January 1, 1987, which is the current Contract requirement in Article 1(hh)(8); and (2) finance other capital projects (not already in the list in Article 1(hh) for which revenue bonds could be sold) when mutually agreed to by DWR and at least 80 percent of the affected Contractors." DEIR at 4-5 (emphasis added). This new authorization to finance and build new SWP facilities that were not in existence prior to January 1, 1987, is likely to cause significant impacts beyond those contained in the current contracts, including, but not limited to, increasing the likelihood of the new SWP diversion and conveyance facilities envisioned by WaterFix, which DWR has already acknowledged will cause significant environmental impacts. *See, e.g,* Letter from Jake Campos, STIFEL, to Mary Lou Cotton, SWPCA at 4 (March 19, 2014) (Exhibit A) (without contract amendments, "DWR's legal counsel has concluded that BDCP is not on the list of approved projects that are eligible for funding, including through bond financing"). The DEIR's failure to identify and analyze those impacts fails to comply with CEQA. 8-14

Thus, DWR's conclusions in the DEIR that the proposed project would not "alter the existing authority to build new or modify existing facilities" or "result in construction or modification of SWP facilities," DEIR at 5-96, and that "SWP water supply would not change under the proposed project" are contradicted by the facts. *See* DEIR at 5-6. The proposed project makes increased SWP water supply more likely by explicitly authorizing new facilities that are not authorized under the current contract, extending DWR's obligation to build out the SWP to achieve full Table A amounts, and making SWP expansion and extension projects more 8-15

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failing to analyze a reasonable range of alternatives, including a reduced contract amount alternative, as well as modifications to other contract terms.

[6] *Id.* at 2.

affordable. DWR's failure to analyze the impacts of these and related SWP modifications is impermissible piecemealing under CEQA. A far better solution would be to adjust Table A amounts to reflect more realistic delivery terms, now and in the future, and to omit the SWP contract term that "require[s] DWR to make all reasonable efforts to complete the water supply facilities necessary to deliver the Table A amounts." 8-15 cont.

II. The DEIR Improperly Piecemeals Reasonably Foreseeable SWP Changes and Contract Modifications with Potentially Significant Environmental Impacts

The DEIR asserts that the "proposed project is separate and independent from the WaterFix project," DEIR at 6-3, and excludes numerous other SWP contract modifications that are reasonably foreseeable.

CEQA defines a "project" as the whole of an action that has a potential for resulting in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment. The entire project being proposed must be described in the EIR, and the project description must not be artificially truncated so as to minimize project impacts. *City of Santee v. Cty. of San Diego*, 214 Cal. App. 3d 1438, 1450 (1989). A project description must include all relevant aspects of a project, including reasonably foreseeable future activities that are part of the project. *Laurel Heights Improvement Ass'n v. Regents of the University of Cal.*, 47 Cal.3d 376 (1988). Responsibility for a project cannot be avoided by limiting the title or description of the project. *Rural Land Owners Ass'n v. Lodi City Council*, 143 Cal. App.3d 1013, 1025 (1983). 8-16

The DEIR fails to meet these requirements of CEQA because, among other things, it fails to analyze the impacts of the proposed WaterFix project, even though several Contractors have admitted that the proposed SWP contract extension is a necessary condition for financing WaterFix. In addition, the DEIR excludes consideration of other contract changes that are being anticipated to enable implementation of the proposed California WaterFix project.

The SWP Contractors have recognized that the proposed project is necessary to enable financing and implementation of WaterFix. For example, in September, 2014, staff at the Metropolitan Water District of Southern California acknowledged that the proposed SWP contract amendments are a necessary step in financing what was then called the Bay Delta Conservation Plan ("BDCP"), now known as WaterFix. *See* MWD, Special Committee on Bay-Delta Presentation Re. Review Status of BDCP Cost Allocation Discussions (Sept. 23, 2014), http://edmsidm.mwdh2o.com/idmweb/cache/MWD%20EDMS/003735248-1.pdf (Exhibit B). Similarly, Kern County Water Agency staff explained in September 2013 that "DWR and SWP Contractors need to come to agreement on a contract extension that matches the term of the BDCP and provides the SWP Contractors with a more appropriate role in managing SWP expenses." Kern County Water Agency, "Resolution of Issues Necessary to Inform a 8-17

Development of a Business Case to Support a Decision on Continued Funding for the Bay Delta Conservation Plan and the Delta Habitat Conservation and Conveyance Program," at 1 (Sept. 23, 2013) (Exhibit C). 8-17 cont.

Several financing agencies similarly reiterated the need to extend the contracts to enable WaterFix. In response to a State Water Project Contractors Authority's request for proposal regarding financing the BDCP in March 2014, Morgan Stanley stated,

> "***Water Supply Contracts***. We understand that DWR's water supply contracts are in the process of being extended, likely to 2085, or 50 years from 2035 when most expire. Clearly, in order to finance the substantial costs associated with CM1 in the BDCP, the extension of these contracts is essential to allow for the amortization of financing payments over a long period of time."[7] 8-18

Raymond James echoed that the "current contracts between DWR and the water contractors … will have to be renegotiated in order to fund the tunnels…. Investors will be concerned about the extension of those terms through the life of the bonds." Raymond James and Assocs., Inc., Response to Request for Qualifications and Proposals for Underwriting Services, at 9 (March 19, 2014) (Exhibit E).

In addition, the Contractors have identified a number of other contract amendments that are likely when and if the proposed WaterFix is approved, but which are excluded from the proposed project and DEIR. For example, in a November 2013 presentation, the State Water Contractors identified a number of recommended alternatives for financing WaterFix, all of which require SWP contract amendments. State Water Contractors Management Briefing to DHCCP SWP Cost Allocation Working Group, at 9 (November 8, 2013) (Exhibit F) ("Contract Amendment Likely Needed to Reflect Different Cost Allocations and Different Water Supply Deliveries, and Allowance for Annual Sales"); *see also id.* at 13 ("SWP Contract Amendment Needed" for Alternative 2C); *id.* at 17 (Alternative 4A "Would Require Contract Amendment"). On April 1, 2014, the State Water Contractors considered another set of financing options for WaterFix, all of which, again, would require amendments to existing SWP contracts. State Water Contractors Presentation to SWP Cost Allocation Workgroup, April 1, 2014 (Exhibit G). 8-19

DWR and the Contractors have indicated that they will make financing decisions on WaterFix by the end of this year. Those pending, near-term decisions are likely to have a significant impact on the scope of amendments needed to SWP contracts, but also the range of impacts associated with those impacts. *See, e.g.,* Email from Stephen Arakawa Re. Kern County Proposal on BDCO [*sic*] Cost Allocation, January 30, 2014 (Exhibit H) (Kern County Water Agency propose financing strategies for a smaller, "urban-only" 6,000 cubic feet per second ("cfs") WaterFix facility because Kern is not supportive of the current 9,000 cfs approach). DWR should suspend the current SWP contract amendment proposal until these discussions are final and the full suite of amendments and impacts can be considered in a comprehensive fashion, as CEQA requires.

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[7] Morgan Stanley, "State Water Project Contractors Authority: Response to Request for Qualifications and Proposals for Underwriting Services," at 8 (March 19, 2014) (Exhibit D).

The attempt by the DEIR to separate the WaterFix financing and related issues to some future analysis runs afoul of CEQA's requirements to define the project to encompass the whole of the action. It must be revised in a recirculated CEQA analysis. 8-19 cont.

We appreciate the opportunity to provide our input and urge DWR to address these issues in a revised project and EIR.

Sincerely,

Katherine S. Poole	Rachel Zwillinger	Gary Bobker
Senior Attorney	Water Policy Advisor	Rivers & Delta Program Director
Natural Resources Defense Council	Defenders of Wildlife	The Bay Institute

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Response to Comment 8-1

The comment suggests that DWR should modernize other Contract terms to reflect changes in circumstances since the Contracts were originally executed. The comment does not specify which other terms DWR should modernize or how they should be modernized.

As discussed on page 2.3, DWR has entered into Contracts with each of the twenty-nine Contractors. Although not identical, the Contracts are substantially uniform. During the public negotiation sessions, DWR and the Contractors identified the problems facing the SWP financial management due to the difficulties of selling revenue bonds with maturity dates beyond 2035, including that it has become more difficult to affordably finance SWP construction projects such as capital repairs or improvements. These problems are discussed on pages 1-1 to 1-2, 3-1 to 3-3 and 4-1 of the DEIR. To address these problems, DWR and the Contractors negotiated the proposed project objectives during that early public negotiation sessions. These objectives are found on pages ES-3 and 4-2 of the DEIR.

DWR and the Contractors have the discretion to select the project objectives consistent with the problem they are trying to address, especially the difficulty in financing capital repairs and improvements and the need to address other financial issues. (In re Bay-Delta Programmatic Environmental Impact Report Coordinated Proceedings, 43 Cal. 4th 1143 (2008).) DWR and the Contractors identified the problems facing the financing of SWP capital repairs and improvement due to the difficulties in selling revenue bonds with maturity dates beyond 2035, and the problem could be addressed by amending the financial provisions of the Contract and the term of the Contract. The problem is discussed on pages 3-1 to 3-3 and 4-1 of the DEIR. The objectives reflect the desire of DWR and the Contractors to address these specific problems. See also Master Response 2 for more on DWR's ability to define the project.

DWR and the Contractors did not agree in the objectives to amend the non-financial provisions of the Contracts. However, DWR and the Contractors have already made several significant amendments to the Contracts since the original Contracts have been executed reflecting changes in circumstances, including the Monterey Amendment discussed on page 3-7 of the DEIR. Executed in 1995, the Monterey Amendment made significant changes to Contract's water supply and water transfer provisions in addition to making changes to its financial terms. In addition, in 2013 DWR and certain Contactors amended the water supply provisions of the Contracts to reflect changes in circumstances for SWP Contactors located in Northern California and the area of origin. DWR and the Contractors are not precluded by the proposed project from negotiating additional amendments to the Contracts that may reflect changes in circumstances in the future.

Response to Comment 8-2

As described in Response to Comment 3-2 and on pages 7-9 and 7-10 of the DEIR, Article 4 gives each Contractor a right to extend its Contract on generally the same fundamental terms as in the current Contract, including the same Table A amounts of water, by providing notice to DWR at least 6 months in advance of the Contract expiration date. Extension of the Contract through the exercise of rights under Article 4 is addressed in the No Project Alternative which does not include an assumption of extending the Contracts for any specific number of years beyond the expiration date. Under the No Project Alternative, as described on page 7-6 of the DEIR, once Contractors submit their Article 4 letters to extend their Contract expiration dates the extended Contract expiration date is determined and this option is available before the end of each subsequent expiration date. The option to continue service under Article 4 of the Contracts is also described on page 1-1 of the DEIR and is shown in full in the example Water Supply Contract presented in Appendix C of the DEIR.

Response to Comment 8-3

See Responses to Comments 4-1 and 4-2. The responsibility for determining whether to undertake any other project continues to vest in DWR as under the current contract provisions. DWR’s practice is to inform and consult, as appropriate, with the Contractors before undertaking new projects. See also Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives. See also Master Response 2 for more on DWR’s ability to define the project.

Response to Comment 8-4

The proposed project is an independent project that would occur with or without California WaterFix (see Response to Comment 5-75). A separate EIR/EIS was prepared to address the impacts of California WaterFix. Furthermore, as described in Response to Comment 4-1, Contractor participation in California WaterFix will be addressed through a separate public negotiation and environmental review process to develop appropriate Contract amendments. See Master Response 3 for discussion of the relationship of the proposed project to California WaterFix and the separate Contract amendment process.

Response to Comment 8-5

See Response to Comment 8-4.

Response to Comment 8-6

See Response to Comment 8-1. In addition, see Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives. See also Master Response 2 for more on DWR's ability to define the project.

Response to Comment 8-7

As described in Response to Comment 3-2 and on pages 7-9 and 7-10 of the DEIR, Article 4 gives each Contractor a right to extend its Contract on generally the same fundamental terms as in the current Contract, including the same quantities of water delivered, by providing notice to DWR at least 6 months in advance of the Contract expiration date. Extension of the Contract through the exercise of rights under Article 4 is addressed in the No Project Alternative. Under the No Project Alternative, as described on page 7-6 of the DEIR, once Contractors submit their Article 4 letters to extend their Contract expiration dates the extended Contract expiration date is determined. The option to continue service under Article 4 of the Contracts is also described on page 1-1 of the DEIR and is shown in full in the example Water Supply Contract presented in Appendix A. See Master Response 1 for a discussion of the No Project Alternative. The No Project Alternative is not "essentially identical" to the proposed project as it does not meet all the project objectives and will have greater environmental impacts as described in Section 7.4.1 of the DEIR.

See also Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives.

Response to Comment 8-8

The DEIR analyzed a shorter contract extension term date on pages 7-13 to 7-15 in Chapter 7, Alternatives. See Response to Comment 8-7 regarding a Contractor's ability to exercise its right in accordance with Article 4 of the Contract to extend the expiration date of its Contract and why water service is likely to continue to at least 2085. As described on page 7-10 of the DEIR, impacts associated with deferred operation and maintenance and repair are speculative at this time as it is unknown how deferred maintenance and repair would affect SWP facilities and, in turn, affect SWP water service.

Response to Comment 8-9

An alternative that considers reduced Table A deliveries was included in the DEIR but, as described on pages 7-3 and 7-4, reducing Table A amounts proportionality for all the Contractors by amendment would not change the amount of water being delivered to the Contractors nor would it change the financial health of the SWP as it would not affect any of the other Contract financial provisions that address SWP billing provisions and reimbursements. Therefore, reducing Table A deliveries was rejected because it does not address project objectives. Please see Response to Comment 5-11 for discussion of the definition of the proposed project and Master Response 2 for discussion of the range of alternatives evaluated in the DEIR. See Master Response 6 for more on reducing Table A amounts. See Master Response 1 for a discussion of the No Project Alternative. See also Response to Comment 5-53.

Response to Comment 8-10

See Master Response 1 for a discussion of the No Project Alternative and Master Response 2 for discussion of the range of alternatives evaluated in the DEIR. As described on page 7-9 of the DEIR, the No Project Alternative would not create new water management measures or change water allocation provisions of the Contracts. Also, pages 7-3 and 7-4 of the DEIR address why an alternative that reduces Table A amounts was rejected because it does not address the project objectives. See also Response to Comment 8-9. See Master Response 6 for more on reducing Table A amounts. As noted in Response to Comment 5-42, the DEIR did include an analysis of an alternative that contemplated a shorter Contract term – 2065 instead of 2085 (see pages 7-13 through 7-15). As stated on page 7-13 of the DEIR, similar to the proposed project, through 2065, Alternative 2 would not result in any direct physical environmental impacts because it would not create new water management measures, alter the existing authority to build new or modified facilities or change water allocation provisions of the current Contract.

See Master Response 3 for discussion of the relationship of the proposed project to California WaterFix.

Response to Comment 8-11

As described in Response to Comment 4-1, Contractor participation in California WaterFix will be addressed through a separate public negotiation and environmental review process to develop appropriate Contract amendments. See Master Response 3 for discussion of the relationship of the proposed project to California WaterFix and the separate Contract amendment process. See also Response to Comment 4-2. As to projects other than California WaterFix, the responsibility for determining whether to undertake any other project continues to vest in DWR as under the current contract provisions. And it is important to reiterate that any project or activity proposed for repair, construction, or acquisition beyond 2035, just like any project or activity undertaken before 2035, would require a review and determination in compliance with the CEQA whether or not to proceed. DWR's practice is to inform and consult, as appropriate, with the Contractors before undertaking new projects.

Response to Comment 8-12

The comment discusses a separate project, the North Bay Aqueduct Alternate Intake Project (NBA AIP), which has not yet completed the CEQA review process and does not address the environmental analysis of the proposed project in the DEIR. The comment discusses potential financing of the NBA AIP that was quoted from the Solano County Water Agency's website.

See also Response to Comment 4-2. As to projects other than California WaterFix, the responsibility for determining whether to undertake any other project continues to vest in DWR as under the current contract provisions. DWR's practice is to inform and consult, as appropriate, with the Contractors before undertaking new projects.

Response to Comment 8-13

As stated in the DEIR on page 4-2, the proposed project consists of amendments to the financial provisions of the Contracts. The proposed project would not create new water management measures, alter the existing authority of DWR to build new or modify existing facilities, or change water allocation provisions of the contract. Furthermore, the biological opinions govern exports from the SWP, not the contracts. Please see Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives.

As described in Response to Comment 4-1, Contractor participation in California WaterFix will be addressed through a separate public negotiation and environmental review process to develop appropriate Contract amendments. See Master Response 3 for discussion of the relationship of the proposed project to California WaterFix and the Contract amendment process. See also Response to Comment 4-2. As to projects other than California WaterFix, the responsibility for determining whether to undertake any other project continues to vest in DWR as under the current contract provisions. And it is important to reiterate that any project or activity proposed for repair, construction, or acquisition beyond 2035, just like any project or activity undertaken before 2035, would require a review and determination in compliance with the CEQA whether or not to proceed. DWR's practice is to inform and consult, as appropriate, with the Contractors before undertaking new projects.

Response to Comment 8-14

See Responses to Comments 8-13 and 6-2.

Response to Comment 8-15

See Responses to Comments 8-13 and 6-2. An alternative that considers reduced Table A amounts was included in the DEIR but, as described on pages 7-3 and 7-4, reducing Table A amounts proportionality for all the Contractors by amendment would not change the amount of water being delivered to the Contractors nor would it change the financial health of the SWP as it would not affect any of the other Contract financial provisions that address SWP billing provisions and reimbursements. Therefore, reducing Table A deliveries was rejected because it does not address project objectives. Further, the development of SWP facilities was enacted as part of statutory authority under the Burns-Porter Act (Water Code Section 12930 et seq.), and is not authorized directly by the Contracts. See Master Response 6 for more on reducing Table A amounts.

Response to Comment 8-16

See Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives. See also Response to Comment 5-53. The goal of reliable water supply is likely the goal of any water planning project in the state. The proposed project is not the sole project in California tasked with solving this present and the ongoing dilemma of ensuring reliable water supplies in California. Instead, the proposed project is focused on the future financial stability necessary for operation and maintenance of the SWP. Although the proposed project, if approved, would be a critically important tool for managing California's water resources, it is not a statewide solution to California's water supply reliability problems. Therefore, the DEIR does not include other projects like California WaterFix, and the DEIR does not result in the piecemealing of the proposed project. See Responses to Comments 8-1 and 8-4. See also Master Response 2 for more on DWR's ability to define the project.

Response to Comment 8-17

As discussed in Response to Comment 8-4, the proposed project is an independent project that would occur with or without California WaterFix (see Response to Comment 5-75). A separate EIR/EIS was prepared to address the impacts of California WaterFix. Furthermore, as described in Response to Comment 4-1, Contractor participation in California WaterFix will be addressed through a separate public negotiation and environmental review process to develop appropriate Contract amendments. See Master Response 3 for discussion of the relationship of the proposed project to California WaterFix and the separate Contract amendment process. The attachments to the comment is included in Exhibit B to this FEIR.

Response to Comment 8-18

As discussed in Response to Comment 8-4, the proposed project is an independent project that would occur with or without California WaterFix (see Response to Comment 5-75). As described in Response to Comment 4-1, Contractor participation in California WaterFix will be addressed through a separate public negotiation and environmental review process to develop appropriate Contract amendments. See Master Response 3 for discussion of the relationship of the proposed project to California WaterFix and the separate Contract amendment process. The attachment to the comment is included in Exhibit B to this FEIR.

Response to Comment 8-19

See Responses to Comments 8-1 and 8-4. See also Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives. The attachments to the comment is included in Exhibit B to this FEIR.

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CENTER FOR
FOOD SAFETY

October 17, 2016

VIA ELECTRONIC MAIL

California Department of Water Resources
Attn: Ted Alvarez
State Water Project Analysis Officer
SWP Support Branch
1416 9th Street, Room 1620
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Comments on the Department of Water Resources Draft Environmental Impact Report for the Water Supply Contract Extension Project

To Department of Water Resources ("DWR"):

The Center for Food Safety ("CFS") appreciates the opportunity to comment on the Draft Environmental Impact Report ("DEIR") for the Water Supply Contract Extension Project ("Project"). CFS and its members depend on the sustainable and equitable operation of the State Water Project ("SWP") and take great interest in the Project for the opportunity—and obligation—that the Project presents to mitigate the SWP's environmental impacts. These comments are submitted on behalf of CFS, as well as its members, volunteers, and employees.

CFS is a nonprofit, public interest advocacy organization dedicated to protecting human health and the environment by curbing the proliferation of harmful food production technologies and promoting sustainable agriculture, including impacts to water resources. In furtherance of this mission, CFS uses legal actions, groundbreaking scientific and policy reports, books and other educational materials, and grassroots campaigns on behalf of its 750,000 farmer and consumer members across the country.

I. INTRODUCTION

The Project seeks to finance capital expenditures to the SWP beyond the 2035 expiration date set in the current contracts by signing long-term extensions for each contract. (DEIR at ES-1.) The SWP is the largest state-owned, multi-purpose, user-financed water storage and delivery system in the United States. (*Id.* at 2-2.) DWR constructed and currently operates and 9-1 maintains the SWP, which conveys water to twenty-nine water contractors. (*Id.* at ES-1.) The contractors receive water service from the SWP in exchange for paying the costs that are associated with constructing, operating, and maintaining the SWP facilities. (*Ibid.*) DWR finances capital expenditures on the SWP by selling revenue bonds with terms of up to thirty years or more. However, according to DWR, it has become more challenging to finance expenditures because it is getting difficult to sell long-term revenue bonds beyond 2035, the date the contracts begin to expire. (*Ibid.*) Thus, the Project seeks to amend the financial sections of the contracts to ensure that DWR can finance SWP expenditures beyond 2035. (*Id.* at ES-3.) 9-1 cont.

Notwithstanding the importance of conveying water to a large portion of California's population, the SWP has contributed to a substantial decline in the Sacramento-San Joaquin Delta watershed ("Bay-Delta") ecosystem for the past fifty years. Water delivery is estimated in each of the contracts and included in a schedule for each contractor that sets forth the maximum annual amount of water that may be requested, which is known as the annual Table A amounts. (*Id.* at 2-12.) The contracts require DWR to make all reasonable efforts to deliver the full Table A amounts; however, the Table A amounts are much higher than those the SWP is capable of providing. This is one of the leading causes of the precipitous decline in the health of the Bay-Delta. 9-2

Realizing the crisis facing the Bay-Delta, the California State Legislature passed the Sacramento-San Joaquin Delta Reform Act of 2009 ("Delta Reform Act") to ensure that all projects involving the Bay-Delta will meet the coequal goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Bay-Delta ecosystem. Despite the fact that the SWP unequivocally is subject to these requirements, the Project fails to align the contract extensions with the Delta Reform Act.

The DEIR is also deficient in its description of the future expenditures that will be enabled by the Project, failing to mention a single expenditure for which the money will be used. 9-3 Most significantly, the DEIR fails to include an analysis of California WaterFix, which is an enormous expenditure that will likely be funded, at least in part, by the funds generated as a result of the Project. Without an analysis of proposed future expenditures to the SWP—and in particular California WaterFix—it is impossible to evaluate the environmental impacts of the Project, and the DEIR fails in its role as an informational document. 9-4

II. THE CALIFORNIA ENVIRONMENTAL QUALITY ACT ("CEQA")

Under CEQA, a public agency must prepare an environmental impact report ("EIR") on any project the agency proposes to "carry out or approve" if the project may have significant environmental effects. (*Save Tara v. City of Hollywood* (2008) 45 Cal.4th 116, 121 [citing Pub. Resources Code, §§ 21100, subd. (a), 21151, subd. (a)].) An EIR is a "detailed statement … describing and analyzing the significant effects of a project and discussing ways to mitigate or avoid the effects." (Cal. Code Regs., tit. 14, § 15362 ("CEQA Guidelines").) The EIR is intended "to demonstrate to an apprehensive citizenry that the agency has, in fact, analyzed and considered the ecological implications of its action. (*County of Amador v. El Dorado Water Agency* (1999) 76 Cal.App.4th 931, 944.) Because the EIR must be certified or rejected by public officials, it is a document of accountability. (*Ibid.*) 9-5

A crucial component of the EIR "is to ensure that all reasonable alternatives to Projects are thoroughly assessed by the responsible official." (*Laurel Heights Improvement Assn. v. Regents of University of California* (1988) 47 Cal.3d 376, 400 [citing *Wildlife v. Chickering* (1976) 18 Cal.3d 190, 197].) An EIR must describe a reasonable range of alternatives to the project, or to the location of the project, that could feasibly attain most of the basic objectives of the project while avoiding or substantially lessening any of the significant effects of the project. (CEQA Guidelines, § 15126.6, subds. (a), (f).)

Another chief purpose of an EIR is the cumulative impact analysis. (*San Franciscans for Reasonable Growth v. City and County of San Francisco* (1984) 151 Cal.App.3d 61, 72-73.) The cumulative impacts from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. (*Id*. at 73 [citing CEQA Guidelines, § 15355, subd. (b) (formerly § 15023.5, subd. (b).)].) Lead agencies therefore must prepare a list of projects producing related or cumulative impacts. (*Ibid*.)

9-5 cont.

III. THE SACRAMENTO-SAN JOAQUIN DELTA REFORM ACT OF 2009 ("DELTA REFORM ACT")

In 2009, the California State Legislature determined that the Bay-Delta and California's water infrastructure were "in crisis and the existing Delta policies were not sustainable." (California Water Code, § 85001, subd. (a).) Accordingly, the State found that resolving the crisis required fundamental reorganization of the State's management of Bay-Delta watershed resources. (*Ibid*.) In an effort to resolve the crisis, a new policy was enacted to guide management decisions of the Bay-Delta, known as the Delta Policy.

Under the Delta Policy, the California Legislature declared that the basic goals for the Bay-Delta are the following:

(a) Achieve the two coequal goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Bay-Delta ecosystem. The coequal goals shall be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Bay-Delta as an evolving place;

(b) Protect, maintain, and, where possible, enhance and restore the overall quality of the Bay-Delta environment, including, but not limited to, agriculture, wildlife habitat, and recreational activities;

(c) Ensure orderly, balanced conservation and development of Bay-Delta land resources; and

(d) Improve flood protection by structural and nonstructural means to ensure an increased level of public health and safety.

9-6

(Pub. Resources Code, § 29702.) The California Water Code further elaborates that the State of California must reduce reliance on the Bay-Delta in meeting California's future water supply needs through a statewide strategy of investing in improved regional supplies, conservation, and water use efficiency. (California Water Code, § 85021.)

Under the Delta Reform Act, a state or local public agency that proposes to undertake a covered action shall prepare a written certification of consistency with detailed findings as to whether the covered action is consistent with the Delta Policy and shall submit that certification to the Delta Stewardship Council. (California Water Code, § 85225.) An action is covered if it is a plan, program, or project that occurs within the boundaries of the Bay-Delta, funded by a state or local public agency, is covered by at least one provision of the Delta Plan, and will have a significant impact on the coequal goals of the Delta Policy. (California Water Code, § 85057.5, subd. (a).) Regarding the SWP, an action is not covered only if it involves routine maintenance. (*Id*., subd. (b)(2).)

9-6 cont.

Since a proposal to implement the Water Supply Contract Extension Project is likely a covered action, and is more than just routine maintenance, DWR must draft a written certification of consistency with detailed findings indicating that it is consistent with the Delta Plan and will meet the coequal goals of the Delta Policy.

a. DWR Must Align the SWP Long-Term Contracts with the Delta Policy.

In proposing to implement the Water Supply Contract Extension Project, DWR has an opportunity and requirement to ensure that the SWP long-term contracts meet the coequal policy requirements of the Delta Reform Act. That is, in extending the SWP long-term contracts, DWR must provide a more reliable water supply for California as well as protect, restore, and enhance the Bay-Delta ecosystem. By amending only the financial terms of the contracts, yet extending the terms of the contracts to 2085, DWR is failing to meet the coequal goals of the Delta Policy, and failing to meet its obligations under the Delta Reform Act.

The SWP was enacted into law in the Burns-Porter Act (California Water Code, § 12930 et seq.), which was passed by the California Legislature in 1959 and approved by the voters in 1960. (DEIR at 2-1.) The SWP delivers water pursuant to contracts between DWR and twenty-nine contractors, including water agencies, throughout California. (*Ibid.*) The Burns-Porter Act authorized the State of California to issue bonds for construction of the SWP and enter into contracts for the sale, delivery, or use of water or power made available by the SWP. (*Id.* at 2-1 to 2-2.) In return for state financing, public water agencies contractually agreed to repay all SWP capital and operating costs allocable to water supply. (*Id.* at 2-2.)

9-7

The SWP diverts large volumes of water from the Bay-Delta, which flows down the California Aqueduct and is eventually delivered to the contractors. (*Id.* at 2-16.) Each year, by the first of October, the contractors submit monthly water requests to DWR for the subsequent calendar year to receive the water diverted from the Bay-Delta. (*Ibid.*) The amounts requested are the Table A amounts, which set the maximum annual amount of water that may be requested to be delivered. (*Id.* at 2-12.) The contracts require DWR to make all reasonable efforts to complete the water supply facilities necessary to deliver the full Table A amounts in the contracts, but when the supply of Table A water is less than the total of all contractors' requests, the available supply of Table A water is allocated among all contractors in proportions to each contractors' annual Table A amount. (*Ibid*.) Thus, the current contracts focus on supplying the maximum amount of water for human consumption, including agriculture and industry, with little to no regards to the ecology of the region.

Due to the long-term contracts' focus on DWR supplying the maximum amount of water to the contractors, and the SWP's reliance on the Bay-Delta, the SWP has played a large role in devastating the Bay-Delta ecosystem. According to DWR's 2011 SWP Delivery Reliability Report, SWP pumping is "not sustainable over the long term under current management practices and regulatory requirements." (Cal. Dept. of Water Resources, Final Delivery Reliability Report (2011) ("2011 DRR") p. 32 (Attached as Exhibit A).) That is partially why, in 2009, the California Legislature determined that the Bay-Delta was in crisis and passed the Delta Reform Act to restore the ecosystem and reduce the State's reliance on the Bay-Delta as a water supply. Thus, in extending the contracts that supply Bay-Delta water through the SWP for an additional fifty years, DWR cannot and should not maintain the same wasteful practices that led to the deterioration of the Bay-Delta's ecosystem in the first place. 9-7 cont.

b. Alternatives that Align the SWP Long-Term Contracts with the Delta Policy.

There are multiple ways DWR can align the Project with the Delta Policy, which DWR included but rejected in its alternatives analysis. As mentioned above, one of an EIR's major functions "is to ensure that all reasonable alternatives to proposed projects are thoroughly assessed by the responsible agency." (*Laurel Heights Improvement Assn. v. Regents of University of California*, *supra*, 47 Cal.3d at p. 400.) Public agencies "should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures available which would substantially lessen the significant environmental effects of such projects." (*Id.* [citing Pub. Resources Code, § 21002].) When an alternative is found to be infeasible on the ground that it is inconsistent with the project objectives, the finding must be supported by substantial evidence in the record. (*California Native Plant Soc. v. City of Santa Cruz* (2009) 177 Cal.App.4th 957, 604.)

DWR need only evaluate alternatives that meet the project objectives. DWR and the contractors agreed to the following project objectives: 9-8

(1) Ensure DWR can finance SWP expenditures beyond 2035 for a sufficiently extended period to provide for a reliable stream of revenue from the contractors and to facilitate ongoing financial planning for the SWP;

(2) Maintain an appropriate level of reserves and funds to meet ongoing financial SWP needs and purposes;

(3) Simplify the SWP billing process; and

(4) Increase coordination of financial matters between DWR and the contractors.

(DEIR at ES-3.) The alternatives that DWR considered meet the project objectives, but DWR erroneously rejected them.

i. Reduce Table A Deliveries.

During the scoping process, comments recommended that the DEIR should include an alternative with a reduction of the maximum Table A deliveries to contractors based on DWR reliability reports, climate change reports, and the Delta Reform Act, as well as associated reports on future water supplies. (DEIR at 7-3.) As the DEIR mentions, annual Table A amounts set forth the maximum annual amount of water that may be requested by contractors, and under the terms of the contracts DWR must make all reasonable efforts to perfect and protect those water rights. (*Ibid.*) A history of Table A deliveries indicates that DWR frequently attempts to give the maximum amount of Table A deliveries, which is not sustainable and degrades the Bay-Delta ecosystem. (DEIR at 2-14.) Thus, if Table A amounts were to be reduced to amounts that aligned with the amount of water the SWP can reliably and sustainably deliver each year, DWR would not be pressured to pump more water than the Bay-Delta is capable of providing. 9-9

In fact, there is no justification for including the original full Table A amounts in the new contracts. DWR cannot deliver these allocations because they simply do not exist. According to the 2011 DRR, there is a zero percent chance of delivering more than 3,365 acre feet in a given year, even though the maximum Table A amount is 4,133 acre feet. (2011 DRR at 46-49.) The Bay-Delta faces numerous challenges to its long-term sustainability, including continued subsidence of Bay-Delta Islands, many of which are below sea level, climate change, the threat of increased variability in floods and droughts, and potential levee failure. (*Id.* at S-1.) The Table A amounts must be changed in the new contracts to reflect these challenges. DWR should conduct a full analysis of actual water supply availability, taking into account climate change, impacts to threatened and endangered species, public trust doctrine issues, and other environmental regulations and statutes, to determine realistic Table A amounts that can actually be delivered. 9-10

Despite this information, DWR excuses the use of the inflated Table A amounts as merely representing the maximum annual water delivery a contractor can request, and thus not guaranteed amounts. (DEIR at 7-3.) DWR therefore concludes that reducing Table A amounts proportionately for all the contractors by amendment would not change the amount of water being delivered to the contractors. (*Ibid.*) However, that conclusion is logically inaccurate and not supported by substantial evidence: reducing the Table A amounts would lower the maximum amount of water contractors could request each year, which in turn would lower the total amount of water DWR was contractually obligated to attempt to deliver. Setting Table A amounts at sustainable levels would also reduce the political and economic pressure on DWR to continually deliver water in excess of what the SWP system and the Bay-Delta ecosystem can handle. 9-11

The DEIR reasons that reducing Table A amounts would not change the financial health of the SWP because it would not affect any of the contract financial provisions that address SWP billing provisions and reimbursements. (*Id.* at 7-3 to 7-4.) DWR then rejected a reduction in Table A deliveries because it does not address the Project's financial objectives. (*Id.* at 7-4.) However, as the DEIR admits, proportionally reducing the Table A amounts can be accomplished without reducing the annual amounts paid by each contractor, or the total amount 9-12

9-12 cont. paid by all the contractors together (these figures are calculated proportionally, as a percentage of the total, not as fixed amounts per contractor). 9-13 Thus, a reduction in Table A amounts is a clearly feasible and environmentally superior alternative. Not only can DWR meet all the objectives set forth above, it can also align the Project with the Delta Reform Act by ensuring a reliable and sustainable water supply to contractors and protecting, restoring, and enhancing the Bay-Delta ecosystem.

ii. Implement New Water Conservation Provisions in the Contracts.

9-14 Comments during the scoping also recommended that the EIR include an alternative that requires new agriculture and urban water conservation measures in the contract amendments, but DWR again rejected the alternative. (DEIR at 7-4.)

DWR reasoned that it does not have to evaluate the alternative because existing regulatory and legal requirements independent from the Project require agriculture and urban water efficiency, conservation, and management measures. (DEIR at 7-4.) According to the DEIR, federal, state, and local regulatory requirements are in place, and the contractors' water uses are governed by the Reasonable and Beneficial Use Doctrine. (*Ibid.*) The DEIR also states that Governor Brown issued Executive Order B-29-15, which requires stated mandatory water reductions from urban use. (*Ibid.*) Taking this into account, DWR concluded that additional water conservation measures would not address the financial challenges, nor would they make needed improvement to the current contract financial provisions, and therefore contract amendments with agriculture and urban water conservations measures were rejected for not meeting the basic project objectives. (*Ibid.*)

9-15 However, DWR fails to understand that the current federal, state, and local regulatory requirements are insufficient to protect and restore the Bay-Delta, which is exactly why the State Legislature determined that the Bay-Delta was in crisis and passed the Delta Reform Act. In fact, the Delta Plan promulgated pursuant to the Delta Reform Act specifically recommends DWR to include provisions "in all State Water Project contracts, contract amendments, contract renewals, and water transfer agreements that requires the implementation of all State water efficiency and water management laws, goals, and regulations, including compliance with Water Code § 85021," which requires California to reduce reliance on the Bay-Delta as a water supply. (Delta Stewardship Council, The Delta Plan (2013) ("Delta Plan") pp. ES-19, 103 (Attached as Exhibit B).) The impacts of water diversion and exports have environmental consequences beyond the Delta, impacting other hydrologically connected waters including the San Francisco Bay watershed. (See The Bay Institute, San Francisco Bay: the Freshwater-Starved Estuary (September 2016) p. 7 (Attached as Exhibit C).) The SWP's Banks Pumping Plant is one of the single largest extractors of the San Francisco Bay watershed's freshwater. (*Id.* at 9.) As a result of intensive water diversion and exports, on top of permanent drought conditions, the estuary and its unique and valuable fish and wildlife species have experienced extremely dry conditions throughout the past four decades. (*Id.* at 12.) The massive transformation of the Bay's watershed, including SWP pumping, has changed the patterns of flow resulting in a sharp decline of native fish. (*Id.* at 37.) Six native fish species—Delta smelt, longfin smelt, steelhead, green sturgeon, and the winter and spring runs of chinook salmon—used to be among the most common in the estuary but are now listed as in danger of extinction. (*Ibid.*)

By failing to include urban and agriculture conservation measures into the contracts, DWR is failing to comply with the Delta Plan and maintaining the same wasteful practices that caused the deterioration of the Bay-Delta. The conservation measures would not impact the financial provisions of the contract, meaning that DWR can meet all the projective objectives while also complying with the Delta Plan. 9-15 cont.

IV. CUMULATIVE IMPACTS

a. Failure to Disclose Reasonably Foreseeable Probable Future Projects.

9-16

A chief purpose of CEQA is providing public agencies and the general public with detailed information about the effects of a project on the environment. (*Bakersfield Citizens for Local Control v. City of Bakersfield* (2004) 124 Cal.App.4th 1184, 227.) Part of this vital informational function is performed by a cumulative impact analysis, which refers to when two or more individual effects which, when considered together, are considerable. (*Ibid.*) The cumulative impact is "the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects." (*Ibid.*) An EIR must analyze all probable future projects, which includes any projects that are undergoing environmental review. (*Gray v. County of Madera* (2008) 167 Cal.App.4th 1099, 1127.) Moreover, agencies have a duty to "use its best efforts to find out and disclose all that it reasonably can." (S*an Franciscans for Reasonable Growth v. City of County of San Francisco*, *supra*, 151 Cal.App.3d at p. 74 [citing CEQA Guidelines, § 15140, subd. (g).].)

The DEIR concludes that the Water Supply Contract Extension Project will not result in physical environmental impacts, and therefore would not contribute to any cumulative effect, but DWR failed to analyze any reasonably foreseeable probable future projects. (DEIR at 6-4.) DWR proposed the Water Supply Contract Extension Project to affordably finance capital expenditures for the SWP because it is apparently difficult for DWR to sell revenue bonds used to finance the expenditures with maturity dates that extend beyond the year 2035. (DEIR at 4-1.) However, DWR has not described a single expenditure on the SWP that requires funding. Because DWR believes it needs more reliable funds to finance capital expenditures to the SWP, DWR must be aware of probable future expenditures, but has not disclosed what those expenditures are. DWR has a duty to disclose all that it reasonably can, and it is impossible to properly evaluate the environmental impacts of the Project without information regarding probable future projects that will use the funding enabled by this Project. DWR has therefore failed to conduct a proper cumulative impact analysis.

b. California WaterFix is a Reasonably Foreseeable Probable Future Project.

9-17

Despite its likely-insurmountable political and economic obstacles, and its dubious legality, California WaterFix qualifies as a reasonably foreseeable probable future project that will use SWP funding, and thus must be included in the DEIR's cumulative impacts analysis. (*Gray v. County of Madera*, *supra*, 167 Cal.App.4th at pp. 1127-1128 ["[A]ny future project where the applicant has devoted significant time and resources to prepare for any regulatory review should be considered a probable future project for the purposes of the cumulative impact].) DWR has prepared a Recirculated Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement ("RDEIR/SDEIS") that purports to address the impacts of California WaterFix, making it a probable future project, yet information about this project is not sufficiently included in the DEIR. (DEIR at 7-5.) The DEIR concludes that since California WaterFix is separate and independent, and the contract extension would need to occur regardless of California WaterFix, it need not be included in the EIR. (*Ibid.*) Yet CEQA requires that the DEIR analyze all future probable projects.

Moreover, since the purpose of the Project is to enable DWR to finance SWP expenditures beyond 2035, and California WaterFix is an SWP expenditure, the funds will likely be used to pay for California WaterFix. (DEIR at 7-5.) Even in the unlikely event that California WaterFix obtains final approval, the Water Supply Contract Extension Project appears to exist for the purpose of funding California Waterfix, and DWR must therefore include California WaterFix in its cumulative impact analysis. In fact, California WaterFix, due to its extremely large capital cost, likely could not move forward without the completion of this contract extension. This is even more apparent when considering the removal of Article hh, which required that SWP revenue bonds be used to finance repairs to facilities that existed prior to January 1, 1987 and only be used to repair listed capital projects. (DEIR at 4-5.) The Water Supply Contract Extension Project proposes to delete the only clause that limits the extent of Delta Transfer Facilities that DWR could pursue after 1987. By removing Article hh, DWR would pave the way to finance California WaterFix with revenue bonds, which is prohibited in the current contracts. 9-17 cont.

V. CONCLUSION

DWR should not certify the DEIR or approve the Water Supply Contract Extension Project without conforming the Project to the Delta Policy, properly analyzing environmentally superior alternatives, and evaluating reasonably foreseeable probable future projects, including California WaterFix. 9-18

Thank you for the opportunity to comment on this matter. We look forward to your consideration and response to these comments.

Sincerely,

Ryan Berghoff
Center for Food Safety

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Response to Comment 9-1

The comment summarizes information about the SWP and the project as presented in the DEIR Executive Summary. See Chapter 2, State Water Project and Chapter 3, State Water Project Financing and Water Supply Contract Financial Provisions for descriptions of the physical and financial aspects of the SWP. See also Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives.

Response to Comment 9-2

As described on page 4-1 of the DEIR, the proposed project would not change water allocation provisions of the Contract. See Response to Comment 5-32 for discussion of consistency with the Delta Reform Act.

Response to Comment 9-3

See Chapter 3, State Water Project Financing and Water Supply Contract Financial Provisions for detailed descriptions of the current financial provisions for operation and maintenance of the SWP. See Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives. See also Master Response 2 for more on DWR's ability to define the project.

See also Response to Comment 4-2. As to projects other than California WaterFix, the responsibility for determining whether to undertake any other project continues to vest in DWR. It is important to reiterate that any project or activity proposed for repair, construction, or acquisition beyond 2035, just like any project or activity undertaken before 2035, would require a review and determination in compliance with the CEQA whether or not to proceed.

DWR's practice is to inform and consult, as appropriate, with the Contractors before undertaking new projects.

Response to Comment 9-4

The proposed project is an independent project that would occur with or without California WaterFix (see Response to Comment 5-75). A separate EIR/EIS was prepared to address the impacts of California WaterFix. Chapter 5 of the DEIR identified and analyzed potential direct and indirect environmental impacts associated with the proposed changes to the term length and financing terms of the Contract reflected in the negotiated AIP (the proposed project). See Response to Comment 5-11 for additional discussion of the definition of the proposed project and development of project objectives.

Furthermore, as described in Response to Comment 4-1, Contractor participation in California WaterFix will be addressed through a separate public negotiation and environmental review process to develop appropriate Contract amendments. See Master Response 3 for discussion of the relationship of the proposed project to California WaterFix and the separate Contract amendment process.

Response to Comment 9-5

See Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives. A total of 7 alternatives were evaluated in the DEIR. See Master Response 2 for discussion of the range of alternatives evaluated in the DEIR. Cumulative impacts were evaluated in the DEIR and the rationale for including the cumulative projects presented. See Chapter 6 pages 6-1 through 6-4.

Response to Comment 9-6

See Response to Comment 5-32 for discussion of consistency with the Delta Reform Act.

Response to Comment 9-7

As described on page 4-1 of the DEIR, the proposed project would not change water allocation provisions of the Contract. See Response to Comment 5-32 for discussion of consistency with the Delta Reform Act.

See Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives. As stated in the DEIR on page 4-2, the proposed project consists of amendments to the financial provisions of the Contracts. The proposed project would not create new water management measures, alter the existing authority of DWR to build new or modify existing facilities, or change water allocation provisions of the contract. As noted in Response to Comment 5-27, the proposed project would not result in amendments that would change existing operation and maintenance of the SWP, or result in changes to DWR's existing or future regulatory permits or permitting requirements. The attachments to the comment is included in Exhibit B to this FEIR.

Response to Comment 9-8

See Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives. See Response to Comment 5-28 which notes that because the proposed project would not make changes to SWP water allocations, reduced water allocations are not analyzed as part of the proposed project or as one of the alternatives. See Response to Comment 5-32 for discussion of proposed project consistency with the Delta Reform Act.

Response to Comment 9-9

See Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives. See also Response to Comment 5-53. An alternative that considers reduced Table A deliveries was included in the DEIR but, as described on pages 7-3 and 7-4, reducing Table A amounts proportionality for all the Contractors by amendment would not change the amount of water being delivered to the Contractors nor would it change the financial health of the SWP as it would not affect any of the other Contract financial provisions that address SWP billing provisions and reimbursements. Therefore, reducing Table A deliveries was rejected because it does not address project objectives. See also Responses to Comment 5-21 and 5-7 for more information on the baseline use in the DEIR analysis. See Master Response 6 for more information on reducing Table A amounts.

Response to Comment 9-10

See Master Response 2 for discussion of the range of alternatives evaluated in the DEIR. See Master Response 6 for a discussion on reducing Table A deliveries. See also Responses to Comment 5-21 and 5-7 for more information on the baseline use in the DEIR analysis.

Specifically, as it relates to climate change and its effects on SWP deliveries, as described on page 5-6 of the DEIR and discussed in Response to Comment 5-88, because SWP water supply would not change under the proposed project and would continue to be delivered to the Contractors consistent with current Contracts, the proposed project does not change hydrology, regulations, or climate change, all factors that could affect water supply delivery by the SWP. DWR would continue to maintain and operate the SWP and deliver available supplies to the Contractors consistent with the Contract terms, including Table A deliveries, Article 21 deliveries, and all regulatory requirements. Therefore, no changes in the conditions of resources associated with the SWP would be expected.

Response to Comment 9-11

See Response to Comment 9-9 for discussion of the alternative to reduce Table A deliveries that was included in the DEIR. See also Master Response 6 for more information on reducing Table A amounts.

Response to Comment 9-12

See Response to Comment 9-9 for discussion of the alternative to reduce Table A deliveries that was included in the DEIR. As noted, an alternative reducing Table A deliveries was rejected because it does not address project objectives. Therefore, this alternative was not included in the environmentally superior alternative analysis. See Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives. See also Master Response 2 for more on DWR's ability to define the project and Master Response 6 for more information on reducing Table A amounts.

Response to Comment 9-13

See Responses to Comments 9-9 and 9-12. See also Response to Comment 5-32 for discussion of consistency with the Delta Reform Act

Response to Comment 9-14

Section 5.2.18, Water Supply in the DEIR on pages 5-140 through 5-147 describes water planning efforts at the state and local level, including information on the Contractors' planning efforts through urban water management plans and integrated regional water management plans, regulatory requirements, and impact analysis. By law, these plans must include conservation and demand management measures. See Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives. See Master Response 2 for discussion of the range of alternatives evaluated in the DEIR.

Response to Comment 9-15

As stated in the DEIR on page 4-2, the proposed project consists of amendments to the financial provisions of the Contracts. The proposed project would not create new water management measures, alter the existing authority of DWR to build new or modify existing facilities, or change water allocation provisions of the contract. See Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives.

See also Responses to Comment 5-21 and 5-7 for more information on the baseline use in the DEIR analysis. As noted in Response to Comment 5-27, the proposed project would not result in amendments that would change existing operation and maintenance of the SWP, or result in changes to DWR's existing or future regulatory permits or permitting requirements. DWR's operation of the SWP complies with all relevant regulations. This compliance will be on-going with or without the proposed project.

See Response to Comment 5-32 for discussion of consistency with the Delta Reform Act and Master Response 2 for discussion of the range of alternatives evaluated in the DEIR. The attachments to the comment is included in Exhibit B to this FEIR.

Response to Comment 9-16

As described on page 5-7 of the DEIR several capital project could be financed in part or whole by the sale of longer term bonds should the proposed project be approved. However, the projects listed on page 5-7 would still be funded by other means should the proposed project not occur (e.g., Oroville hydroelectric license project). Further, an EIR or other environmental documentation for each of these projects has been or will be prepared. For future projects, DWR will continue its practice of providing separate CEQA compliance at the time that each such project is proposed. See Chapter 6, Other CEQA Considerations pages 6-2 through 6-4 for a description of the two projects identified for the cumulative analysis and the reasons why these two were the only projects that met the criteria for consideration as cumulative projects.

Response to Comment 9-17

Cumulative impacts were considered in Chapter 6, Other CEQA Consideration. As stated in that chapter on page 6-2, California WaterFix was considered in the cumulative impact analysis. See Chapter 6, Other CEQA Considerations pages 6-2 through 6-4 for a description of the two projects identified for the cumulative analysis and the reasons why these two were the only projects that met the criteria for consideration as cumulative projects.

As discussed in Response to Comment 8-4, the proposed project is an independent project that would occur with or without California WaterFix (see Response to Comment 5-75). A separate EIR/EIS was prepared to address the impacts of California WaterFix. Furthermore, as described in Response to Comment 4-1, Contractor participation in California WaterFix will be addressed through a separate public negotiation and environmental review process to develop appropriate Contract amendments. See Master Response 3 for discussion of the relationship of the proposed project to California WaterFix and separate Contract amendment process.

In addition, Article 1(hh) is not proposed for removal although there are proposed modifications see response to comment 6-2.

Response to Comment 9-18

The comment is a conclusion to the letter referencing the main points of the letter. Please see Responses to Comments 9-2 through 9-17.

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Letter 10

PLANNING AND CONSERVATION LEAGUE
PCFFA
STEWARDS OF THE FISHERIES
Environmental
Water
Caucus

October 17, 2016

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VIA EMAIL AND U.S. MAIL

Subject: Comments on Draft EIR for the Water Supply Contract Extension Project

Dear Mr. Alvarez:

On behalf of the Planning and Conservation League, Pacific Coast Federation of Fishermen's Associations and the Environmental Water Caucus representing hundreds of thousands of members and groups in California, we are writing to provide input on the Draft Environmental Impact Report for the Department of Water Resources' ("DWR") Water Supply Contract Extension Project ("DEIR"). The proposed project and DEIR fail to satisfy the requirements of CEQA and DWR's obligations under state law. As we explained in our scoping comments submitted on October 10, 2014, DWR's proposal to extend the term of existing State Water Project ("SWP") contracts for an additional 50 years necessarily implicates the urgent need to modernize other contract terms to reflect the current realities of climate change, restricted surface water supplies, declining water quality and environmental health of the Bay-Delta estuary, existing statutory requirements, and other current and anticipated changes that have occurred since these contracts were originally executed. DWR's failure to address these important issues while proposing to extend the contracts to 2085 is inexcusable and irreconcilable with Governor Brown's recognition in the 2016 California Water Action Plan of the "broad agreement that the state's water management system is currently unable to satisfactorily meet both ecological and human needs, too exposed to wet and dry climate cycles and natural disasters, and inadequate to handle the additional pressures of future population growth and climate change."[1] 10-1

Moreover, DWR's proposal and the analysis on which it is based are legally flawed. First, DWR 10-2 concludes that extending SWP contracts and water deliveries for another 50 years would result in no impact on the environment. But this conclusion is based on at least two faulty assertions that fatally taint the entire analysis. The first faulty assumption is that the SWP contracts would be extended to 2085 in any case, with or without this proposed project, "upon receipt of Article 4 letters from the Contractors," without any other changes to the contracts. DEIR at ES-6. The second faulty assumption is that SWP operations and facilities will not change based on the more affordable financing and broader construction authority that the 50-year extension would provide. Second, DWR incorrectly asserts that the "proposed project is separate and independent from the California WaterFix project," DEIR at 6-3, which causes DWR to impermissibly piecemeal the impacts of extending the contracts from the impacts of California WaterFix ("WaterFix"). Third, DWR and the SWP Contractors have recognized that multiple additional modifications to the SWP contracts will be necessary in order to implement WaterFix, whose modifications have been impermissibly excluded from this project and its impact analysis. 10-2 cont. 10-3 10-4 10-5

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[1] http://resources.ca.gov/docs/california_water_action_plan/Final_California_Water_Action_Plan.pdf, at 1. All cited documents are incorporated herein by reference.

DWR should reject the proposed project and prepare a new project and California Environmental Quality Act ("CEQA") analysis that considers the full suite of contract modifications and related impacts that are necessary to modernize the State Water Project and keep it functional beyond 2035. 10-6

I. The DEIR's Conclusion that the Proposed Project Would Cause No Environmental Impacts Is Flawed

A. DWR Improperly Conflates the "No Project" Alternative with the Proposed Project

The premise of the DEIR's no impacts conclusion is that the SWP contracts would be extended to 2085 with or without the proposed project because of Article 4 of the contracts. Thus, DWR defines the "no project" alternative as extension of the contracts from 2035 to 2085 with no changes to any existing contract terms or operations. DEIR at 7-6. But DWR inexplicably selects a 2085 contract extension date under this alternative, thus rendering it essentially identical to the proposed project. This selection, which is not supported by any analysis or reasoning, undermines the impact analysis. 10-7

Article 4 allows for extension of the contracts on terms that are mutually agreed to. *See, e.g.,* DEIR at 7-9. The Contractors may not simply demand that the contracts be extended indefinitely, or for 50 years as DWR assumes in the DEIR, nor does DWR have to acquiesce to such demands under Article 4. Indeed, the DEIR recognizes that "it is uncertain how far beyond 2035 the Contracts would be extended under this alternative." DEIR at 7-11.[2] But the DEIR randomly selects 2085 as the expiration date, noting that this "is the same as the proposed 10-8 project." This unjustified assumption impermissibly skews the impact analysis. If a shorter date were selected, then DWR would continue to face constraints on its ability to finance and construct additions and improvements to the SWP, leading to impacts very different from those anticipated under the proposed project, which would facilitate such construction. The DEIR acknowledges that DWR would continue to face constraints on its ability to sell bonds under this scenario, thus limiting the ability to finance significant upgrades to SWP facilities, but fails to recognize that reality in its impact analysis. *Id.* at 7-4 to 7-6. 10-8 cont.

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[2] The DEIR also recognizes that "DWR and the Contractors have made many amendments to the Contracts to address matters that have arisen over the past 55 years." DEIR at 2-12. Implementation and extension of the contracts over the next 69 years – to 2085 – should be no different, but the "no project" alternative unreasonably assumes it will be.

The Ninth Circuit Court of Appeals recently held that even where a statute mandates renewal, which is not the case here, the federal equivalent of CEQA, the National Environmental Policy Act ("NEPA"), "imposes obligations on agencies considering major federal actions that may affect the environment … [and] [a]n Agency may not evade these obligations by contracting around them." *Pac. Coast Fed'n of Fishermen's Ass'ns v. U.S. Dep't of the Interior*, 2016 WL 3974183 at *2 (9th Cir. July 25, 2016). As the Ninth Circuit noted, "a 'no action' alternative is 'meaningless' if it assumes the existence of the very plan being proposed." *Id.* at *1. The court held that the United States Bureau of Reclamation ("Reclamation") violated NEPA by failing to consider an alternative that would reduce water deliveries in a renewed contract. *Id.* at *3.[3] 10-9

A reduced delivery scenario under the "no action" alternative is more likely than the one that DWR has put forward. In fact, DWR itself has recently published and commissioned documents that assert that SWP deliveries will be far less in a "no action" future, under which new facilities are not constructed and upgraded. For example, the draft Bay Delta Conservation Plan prepared by DWR in 2013 projects that by 2025, Delta exports will fall to a range of 3.4-3.9 million acre-feet ("MAF") per year on average, a reduction of about 1 MAF or more on average from today's levels. *See, e.g.,* DWR, public draft Bay Delta Conservation Plan, at Table 9.A-2 (Nov. 2013) (available at http://baydeltaconservationplan.com/Libraries/Dynamic_Document_Library/Public_Draft_BDCP_Appendix_9A_-_Economic_Benefits_of_the_BDCP_and_Take_Alternatives.sflb.ashx). DWR's economic consultant for the WaterFix project recently reiterated this level of exports under a "no action" alternative, finding that Delta exports from existing SWP and Central Valley Project ("CVP") facilities are likely to decline to 3.9 MAF by 2020, "a reduction of 0.8 maf from current levels." The Brattle Group, Draft California WaterFix Economic Analysis, at 6 (Nov. 15, 2015) (available at http://www.restorethedelta.org/wp-content/uploads/2016/09/CA-WaterFix-Economic-Analysis-Sunding.pdf). DWR has presented similar reduced SWP delivery scenarios as likely in its most recent SWP delivery capability report. DWR, 2015 SWP Delivery Capability Report, at Appendices (https://msb.water.ca.gov/documents/86800/c97c3baa-0189-4154-bf19-aa88392026ac). Indeed, DWR's largest contractor, the Metropolitan Water District of Southern California, relied on the reduced "ECLO" SWP delivery projections in its 2015 10-10

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[3] As discussed *infra* at note 5, DWR incorrectly rejected the "reduced deliveries" alternative here.

Urban Water Management Plan. MWD, 2015 Urban Water Management Plan, at 2-13 ("Under the 2015 SWP Delivery Capability Report with existing conveyance and low outflow requirements scenario, the delivery estimates for the SWP for 2020 conditions … [are] equivalent to 976 TAF for Metropolitan, under long-term average condition.") (available at http://www.mwdh2o.com/PDF_About_Your_Water/2.4.2_Regional_Urban_Water_Management_Plan.pdf).

Because DWR anticipates that, without the addition of significant new SWP facilities, SWP deliveries are likely to decline significantly in the near future, the "no action" alternative should be revised to reflect a shorter contract extension and reduced delivery estimates over the life of this project. That assumption, which better matches DWR's, and its contractors' projections elsewhere, would lead to a different impact analysis than the one presented in the DEIR, with a greater disparity of future deliveries between the "no action" and "proposed project" alternatives. The DEIR should be revised to reflect those differences. 10-10 cont.

B. The DEIR Admits that the Proposed Project Will Allow DWR to Implement Projects with Potentially Significant Environmental Impacts

The DEIR states that a core purpose of the project is to "[e]nsure DWR can finance SWP expenditures beyond 2035." DEIR at ES-3. As DWR explains: "In order for DWR to sell bonds for 30 years or more, which would provide more affordable financing to the Contractors for the SWP costs associated with constructing and repairing the SWP facilities allocated to water supply, it is necessary to extend the expiration dates of the Contracts." DEIR at 1-2; *see also id.* at 4-1 (recognizing that DWR could not "as a practical matter" issue bonds with a maturity date beyond 2035 without extending the contract terms as proposed); *id.* at 5-4 ("the current Contracts require existing capital obligations to be repaid by 2035, causing a sharp increase in capital charges to contractors toward the end of the 2035 repayment period"). While the DEIR admits that this more affordable financing will increase the likelihood of modifications to the SWP that will have significant environmental impacts, it fails to analyze the impact of those reasonably foreseeable projects. Further, the proposed project would explicitly authorize DWR to extend the physical components of the SWP beyond current facilities, and thereby increase the likelihood of projects with significant environmental impacts. 10-11 We adopt by reference previous comments submitted by PCL et. al. during the contract extension public comments on the SWP contract extension negotiation sessions and referenced in our scoping comments. 10-12

CEQA requires that an EIR identify and describe the significant indirect environmental impacts that will result from the project, including actions that are a foreseeable consequence of the project, such as the construction and modification of SWP facilities here that the contract extension would make possible. 14 Cal. Code of Regs. § 15126.2(a); *City of Hayward v. Board* 10-13 *of Trustees of Cal. State Univ.*, 242 Cal. App. 4th 833, 859 (2015) (EIR on plan to expand campus deficient for not analyzing increased student use of parks). For example, the DEIR notes that "[c]apital projects that could be financed in whole or in part by the sale of longer term bonds (if available as the result of contract extension) include: (1) reinforcing Perris Dam at Lake Perris against seismic failure … ; (2) reconstructing the Ronald B. Robie Thermalito pump-generating plant … ; (3) implementing the Oroville hydroelectric license project; and (4) obtaining a renewed Federal Energy Regulatory Commission (FERC) license for the SWP's southern hydroelectric plants." DEIR at 5-7. Each of these anticipated projects would likely have significant environmental impacts. Similarly, the DEIR notes that:

> Because of physical and water quality limitations, the diversion at Barker Slough cannot deliver the maximum Table A water requested. In order to address these facility limitations and meet projected future water delivery needs of the North Bay Contractors, DWR is considering constructing a new intake and pumping plant facility in the Sacramento River and a new segment of NBA Conveyance pipeline that would be operated in conjunction with the existing Barker Slough Pumping Plant…[T]he NBA Alternate Intake Project (NBA AIP) would enable the NBA to deliver the total water supply allocation (Table A amounts) to the North Bay Contractors.

10-13 cont.

DEIR at 2-5 to 2-6; *see also* http://www.water.ca.gov/engineering/Projects/Current/NBA/. Given the current stresses on and over-allocation of the Delta ecosystem, there can be no question that increasing SWP diversions from the Delta would cause potentially significant environmental impacts.[4] Yet, that is what DWR proposes to do with the NBA AIP, which project would be more likely to occur with the more affordable financing available under the proposed extended contract term. *See, e.g.,* http://www.scwa2.com/home/showdocument?id=918 at 5 (Solano County Water Agency discussing the challenges of funding the project, which "capital costs are estimated at about $550 million" and "is expected to be financed by the State Water Project with revenue bonds," and explaining that "[f]ull payment by SCWA and Napa County would be a significant financial burden to our rate payers").

10-14

The DEIR anticipates that other SWP modifications will be made more likely with the contract extension and which are also likely to have potentially significant environmental impacts. In fact, the DEIR notes that the contracts themselves "require DWR to make all reasonable efforts to complete the water supply facilities necessary to deliver the Table A amounts in the Contracts." DEIR at 2-12.[5] DWR's pursuit of such facilities "necessary to deliver the Table A

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[4] *See, e.g.,* DWR's 2015 SWP Capability Report at 1-2 (available at https://msb.water.ca.gov/documents/86800/144575dd-0be1-4d2d-aeff-8d7a2a7b21e4).

[5] The proposed project's extension of this contract provision for another 50 years also undermines DWR's asserted basis for rejecting an alternative that would reduce Table A deliveries. The DEIR states that "Reducing Table A amounts proportionately for all the Contractors by amendment would not change the amount of water being

10-14 cont. amounts in the Contracts," including WaterFix with its stated purpose of enabling full contract deliveries, would significantly increase diversions and exports within and upstream of the Delta, causing significant environmental impacts. *See, e.g.,* DWR Application to USACE to Implement WaterFix, at 8 (Aug. 24, 2015) (available at https://s3.amazonaws.com/californiawater/pdfs/5n2mg_Complete_Final_CA_Water_Fix_USACE_404_Permit_Application.pdf) (the "purposes of the proposed actions are to … restore and protect the ability of the SWP and CVP to deliver up to full contract amounts … consistent with the terms and conditions of water delivery contracts held by SWP contractors."). As DWR's most recent SWP Capability Report admits, "[u]nder existing conditions, the average annual delivery of Table A water … is 2,550 taf/year," far less than the nearly 4.2 MAF of annual Table A amounts in the contracts,[6] and the "future inability of the SWP to deliver water to meet demands of certain [south-of-delta] contractors is a very real concern." *Id.* at 10.

10-15 Finally, the proposed project includes new authorization for "SWP revenue bonds to be issued to: (1) finance repairs, additions, and betterments to most facilities of the SWP without regard to whether the facilities were in existence prior to January 1, 1987, which is the current Contract requirement in Article 1(hh)(8); and (2) finance other capital projects (not already in the list in Article 1(hh) for which revenue bonds could be sold) when mutually agreed to by DWR and at least 80 percent of the affected Contractors." DEIR at 4-5 (emphasis added). This new authorization to finance and build new SWP facilities that were not in existence prior to January 1, 1987, is likely to cause significant impacts beyond those contained in the current contracts, including, but not limited to, increasing the likelihood of the new SWP diversion and conveyance facilities envisioned by WaterFix, which DWR has already acknowledged will cause significant environmental impacts. *See, e.g,* Letter from Jake Campos, STIFEL, to Mary Lou Cotton, SWPCA at 4 (March 19, 2014) (Exhibit A) (without contract amendments, "DWR's legal counsel has concluded that BDCP is not on the list of approved projects that are eligible for funding, including through bond financing"). The DEIR's failure to identify and analyze those impacts fails to comply with CEQA.

10-16 Thus, DWR's conclusions in the DEIR that the proposed project would not "alter the existing authority to build new or modify existing facilities" or "result in construction or modification of SWP facilities," DEIR at 5-96, and that "SWP water supply would not change under the proposed project" are contradicted by the facts. *See* DEIR at 5-6. The proposed project makes increased SWP water supply more likely by explicitly authorizing new facilities that are not

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delivered to the Contractors…." DEIR at 7-3. This assertion is not true if DWR is simultaneously obligating itself through 2085, as the proposed project would do, "to make all reasonable efforts to complete the water supply facilities necessary to deliver the Table A amounts in the Contracts." Nor is it true if the proposed project increases the ability of DWR to expand SWP facilities to increase deliveries, as it would do. Thus, the DEIR also suffers from failing to analyze a reasonable range of alternatives, including a reduced contract amount alternative, as well as modifications to other contract terms.

[6] *Id.* at 2.

authorized under the current contract, extending DWR's obligation to build out the SWP to achieve full Table A amounts, and making SWP expansion and extension projects more affordable. DWR's failure to analyze the impacts of these and related SWP modifications is impermissible piecemealing under CEQA. A far better solution would be to adjust Table A amounts to reflect more realistic delivery terms, now and in the future, and to omit the SWP contract term that "require[s] DWR to make all reasonable efforts to complete the water supply facilities necessary to deliver the Table A amounts." 10-16 cont.

II. The DEIR Improperly Piecemeals Reasonably Foreseeable SWP Changes and Contract Modifications with Potentially Significant Environmental Impacts

The DEIR asserts that the "proposed project is separate and independent from the WaterFix project," DEIR at 6-3, and excludes numerous other SWP contract modifications that are reasonably foreseeable.

CEQA defines a "project" as the whole of an action that has a potential for resulting in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment. The entire project being proposed must be described in the EIR, and the project description must not be artificially truncated so as to minimize project impacts. *City of Santee v. County of San Diego* (1989) 214 Cal. App. 3d 1438, 1450. A project description must include all relevant aspects of a project, including reasonably foreseeable future activities that are part of the project. *Laurel Heights Improvement Assn. v. Regents of the University of California* (1988) 47 Cal.3d 376. Responsibility for a project cannot be avoided by limiting the title or description of the project. *Rural Land Owners Association v. Lodi City Council* (3d Dist. 1983) 143 Cal. App.3d 1013, 1025. 10-17

The DEIR fails to meet these requirements of CEQA because, among other things, it fails to analyze the impacts of the proposed WaterFix project, even though several Contractors have admitted that the proposed SWP contract extension is a necessary condition for financing WaterFix. In addition, the DEIR excludes consideration of other contract changes that are being anticipated to enable implementation of the proposed California WaterFix project.

The SWP Contractors have recognized that the proposed project is necessary to enable financing and implementation of WaterFix. For example, in September, 2014, staff at the Metropolitan Water District of Southern California acknowledged that the proposed SWP contract amendments are a necessary step in financing what was then called the Bay Delta Conservation Plan, now known as WaterFix. *See* MWD, Special Committee on Bay-Delta Presentation Re. Review Status of BDCP Cost Allocation Discussions (September 23, 2014) (available at http://edmsidm.mwdh2o.com/idmweb/cache/MWD%20EDMS/003735248-1.pdf) (Exhibit B). Similarly, Kern County Water Agency staff explained in September 2013 that "DWR and SWP Contractors need to come to agreement on a contract extension that matches the term of the 10-18

BDCP and provides the SWP Contractors with a more appropriate role in managing SWP expenses." Kern County Water Agency, "Resolution of Issues Necessary to Inform a Development of a Business Case to Support a Decision on Continued Funding for the Bay Delta Conservation Plan and the Delta Habitat Conservation and Conveyance Program," at 1 (Sept. 23, 2013) (Exhibit C). 10-18 cont.

Several financing agencies similarly reiterated the need to extend the contracts to enable WaterFix. In response to a State Water Project Contractors Authority's request for proposal regarding financing the BDCP in March 2014, Morgan Stanley stated,

> "***Water Supply Contracts***. We understand that DWR's water supply contracts are in the process of being extended, likely to 2085, or 50 years from 2035 when most expire. Clearly, in order to finance the substantial costs associated with CM1 in the BDCP, the extension of these contracts is essential to allow for the amortization of financing payments over a long period of time."[7] 10-19

Raymond James echoed that the "current contracts between DWR and the water contractors … will have to be renegotiated in order to fund the tunnels…. Investors will be concerned about the extension of those terms through the life of the bonds." Raymond James and Associates, Inc., Response to Request for Qualifications and Proposals for Underwriting Services, at 9 (March 19, 2014) (Exhibit E).

In addition, the Contractors have identified a number of other contract amendments that are likely when and if the proposed WaterFix is approved, but which are excluded from the proposed project and DEIR. For example, in a November 2013 presentation, the State Water Contractors identified a number of recommended alternatives for financing WaterFix, all of which require SWP contract amendments. State Water Contractors Management Briefing to DHCCP SWP Cost Allocation Working Group, at 9 (November 8, 2013) (Exhibit F) ("Contract Amendment Likely Needed to Reflect Different Cost Allocations and Different Water Supply Deliveries, and Allowance for Annual Sales"); *see also id.* at 13 ("SWP Contract Amendment Needed" for Alternative 2C); *id.* at 17 (Alternative 4A "Would Require Contract Amendment"). On April 1, 2014, the State Water Contractors considered another set of financing options for WaterFix, all of which, again, would require amendments to existing SWP contracts. State Water Contractors Presentation to SWP Cost Allocation Workgroup, April 1, 2014 (Exhibit G). 10-20

DWR and the Contractors have indicated that they will make financing decisions on WaterFix by the end of this year. Those pending, near-term decisions are likely to have a significant impact on the scope of amendments needed to SWP contracts, but also the range of impacts associated with those impacts. *See, e.g.,* Email from Stephen Arakawa Re. Kern County Proposal on

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[7] Morgan Stanley, "State Water Project Contractors Authority: Response to Request for Qualifications and Proposals for Underwriting Services," at 8 (March 19, 2014).

BDCO [*sic*] Cost Allocation, January 30, 2014 (Exhibit H) (Kern County Water Agency propose financing strategies for a smaller, "urban-only" 6,000 cubic feet per second ("cfs") WaterFix facility because Kern is not supportive of the current 9,000 cfs approach). DWR should suspend the current SWP contract amendment proposal until these discussions are final and the full suite of amendments and impacts can be considered in a comprehensive fashion, as CEQA requires.

The attempt by the DEIR to separate the WaterFix financing and related issues to some future analysis runs afoul of CEQA's requirements to define the project to encompass the whole of the action. It must be revised in a recirculated CEQA analysis.

10-20
cont.

We appreciate the opportunity to provide our input and urge DWR to address these issues in a revised project and EIR.

Sincerely,

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Letter 10

PLANNING AND CONSERVATION LEAGUE
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Environmental Water Caucus
SOUTHERN CALIFORNIA WATERSHED ALLIANCE
RESTORE THE DELTA
AQUALLIANCE
DEFENDING NORTHERN CALIFORNIA WATERS
CA Save Our Streams Council

March 4, 2013

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Via email: watercontractextension@water.ca.gov

Below is our letter to DWR Director Mark Cowin. Please accept this letter as a public comment for the water contract extension process.

March 3, 2014

Mark Cowin, Director
Department of Water Resources
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Re: The Proposed 3D-Billing Authorization Amendment to the Existing State Water Project [SWP] Water Supply Contracts would likely shift Fish and Wildlife Costs Incurred by the SWP to the General Fund for 40-75 Years, Limiting Legislative Authority, Changes and Oversight 10-21

Dear Director Cowin:

At the last Water Supply Contractor Extension negotiation session, the SWP contractors urged the adoption of the existing Davis-Dolwig Act language[1] into 40 to 75 year water supply contracts. Furthermore, SWP contractors requested no water supply contract charges for required regulatory permit costs along with operation and maintenance charges for these required fish and wildlife facilities and recreation facilities be charged to the contractors.

State Negotiators should be Directed to Deny the SWP Contractor Request that would Thwart Legislative Power and Shift Unknown Costs to the General Fund—These are Project Costs not General Fund Costs.

We urge you to direct your negotiators to deny the proposed changes in the Objective 3D: Billing Authorization. The goal of such a contract change is likely to thwart Legislative oversight. Absent Legislative appropriations, this action would lock up in 40 to 75 year contracts this language, thereby shifting costs for fish and wildlife and recreation to the General Fund. Locking this language into such long term contracts would likely protect the SWP contractors at the expense of other General Fund appropriations. Given limited budgets, it is not clear how these required fish, wildlife and recreation measures would be paid. There has been discussion of interest baring accounts generating the revenue, but these costs are likely to be substantial and are a required permit for the SWP facilities. If adopted by DWR, the only remedy for the Legislature, if there is one, would be fraught with legal challenges under contract law.

State Negotiators should be directed to deny the Adoption of existing Davis-Dolwig Act language into these 40 to 75 Year Contracts.

The California State Legislative Analyst Office (LAO) has issued a series of reports indicating the approximately 10% costs of the SWP are allocated to fish, wildlife and recreation. [2] Many times, there are no such benefits. These costs are substantial. In addition, under the Governor's proposed peripheral water tunnels, such fish and wildlife costs along with operation and maintenance are likely to cost billions. Adopting contract language that would shift these types of costs from the water supply contract charges to the taxpayers or General Fund would have serious consequences. The LAO has indicated, "This allocation of costs without Legislative approval conflicts with the Legislature's exclusive constitutional authority to set its expenditure priorities by making appropriations."[3] Originally only "enhancements" to

10-21 cont.

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[1] California Water Code § 11900-11925

[2] ***LAO Policy Concerns and Recommendations Made in Past Years.*** We have raised concerns in the past (again, see "Funding Recreation at the State Water Project," as well as our analyses of the 2009-10 and 2010-2011 Governor's budgets) over DWR's practice of using SCRB to calculate the state's share of SWP costs. Most importantly, the practical implication of the use of this methodology (as implemented by DWR) is that DWR assigns cost responsibility to the state for aspects of SWP that lack any direct recreational component. Seehttp://www.lao.ca.gov/laoapp/budgetlist/PublicSearch.aspx?Yr=2011&KeyCol=401

[3] See http://www.lao.ca.gov/laoapp/budgetlist/PublicSearch.aspx?Yr=2011&KeyCol=401

10-21 cont.

fish and wildlife were to be funded by the taxpayer and the General Fund.[4] Governor Ronald Reagan's DWR Director Gianelli explained the cost allocation this way, "*The mitigation of damages to fish and wildlife resources should be mentioned because it differs greatly from recreation and fish and wildlife enhancement. Requirements for preserving existing, or pre-project fish and wildlife resources, or for mitigation of damages to them, produce no new benefits.* …. *Water project funds are used for fish and wildlife mitigation facilities and operations. These costs are project costs and are reimbursable" [emphasis added]*[5]

10-22

Deny Contract Amendment Objective 3D: Billing Authorization.

The proposed SWP Contractor language is broad and, under questioning, includes both capital costs and operation and maintenance costs. Specifically the Contractors want, "*Costs incurred to develop, construct, support or maintain fish and wildlife enhancement or public recreation….including Costs incurred to secure or comply with a permit, license or other approval issued by any federal, state, or local agency, shall not be included in the prices, rates and charges imposed for water and power and* ***shall not be reimbursable by the contractors pursuant to the Contract****.*" (emphasis added)

The General Fund has already been tapped for excessive unjustified costs that are necessary mitigation costs of the SWP and its beneficiaries. The Legislative Analyst has brought this to the Legislature's attention on numerous occasions: "*Given the "off-budget" nature of SWP (the Legislature only approves SWP positions, not expenditures), the DWR has been able to pursue development of SWP projects without expressed legislative consent, later retroactively billing the Legislature and the state's purse for its estimate of the state's share of the costs of those projects. This runs up against, and potentially conflicts with, the Legislature's exclusive constitutional authority to set its expenditure priorities by making appropriations.*"[6] Such a contract amendment would tie the hands of the Legislature and its constitutional power. Existing and future permit costs such as those envisioned by the proposed peripheral water tunnels conveyance and BDCP permits would be a necessary project cost and should be borne by the water supply contractor beneficiaries. Compliance with Water Code Section 85089(a) requires such mitigation along with operation and maintenance costs for this mitigation to be borne by the state and federal water project contractors.

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[4] http://www.c-win.org/webfm_send/13. *Originally, the General Fund paid the costs assigned to recreation, and fish and wildlife purposes. Since 1989, those costs not reimbursed by the General Fund offset an equal amount the SWP owes the California Water Fund. Recreation and fish and wildlife enhancement costs are non-reimbursable by SWP contractors. (However, contractors are responsible for reimbursing mitigation costs related to recreation, fish and wildlife.)*

[5] *DWR Bulletin 117 pg 8*

[6] http://www.lao.ca.gov/analysis_2009/resources/res_anl09004003.aspx Points include: *Over–Allocation of Total SWP Costs to Recreation; Operational Costs at Recreation Incurred Without Legislative Review; Regulatory Compliance Costs Are Being Allocated by DWR to Davis–Dolwig: The DWR has allocated a portion of the added costs of these facilities to Davis–Dolwig and the state, rather than including them in charges to SWP contractors, even though these costs are the result of regulatory requirements that must be met to operate the hydroelectric plant. Currently, these regulatory–related costs for providing recreation at Lake Oroville amount to approximately $1.5 million annually. However, DWR has estimated that these regulatory–related costs could increase to $11.5 million per year, for a period of 50 years.*

10-22 cont.

The Contract Amendment Objective 4: Affording the Opt Out Provision of the Exorbitant BDCP-DHCCP Costs Should Be Allowed.

10-23

Finally, it is unclear why after 21 months of negotiations, Objective 4, the opt-out of payment for the BDCP-DHCCP peripheral tunnels project was dropped. As Deputy DWR Director Laura King-Moon testified at the BDCP Oversight hearings[7] when Mr. Frazier, Chair of the Assembly Committee on Accountability and Administrative Review, asked about the ability for contractors to opt out of the BDCP, and what would the effect of that be, she stated:

> "*If some contractors did not want to participate, other contractor's costs potentially would go up and their water supplies associated with the project would go up, so it would balance itself out in that regard.*" replied Ms. King Moon.
>
> "*So opting out undermines the ability to finance the project. Has the administration made it clear to the contractors that opting-out is not an option for them?*" asked Mr. Frazier.
>
> "*We have not made anything like that clear,*" replied Ms. King Moon.

It is clear meetings are taking place and decisions have been proffered, however, the public and the Legislature have not been privy to these meetings and decisions. The SWP Contractors wrote to you on January 28, "*…there is general agreement on an assumption that North of the Delta SWP contractors will be largely excluded from repayment obligations for the costs of BDCP CM1, although they would continue to be responsible for past obligation for existing facilities and Endangered Species Act compliance that are existing obligation of SWP contractors….providing enhanced management tools, individual SWP contractors would be able to sell or exchange their supply as needed to other SWP contractors on a willing partner basis.*" We have requested a copy of the "December 2013 Deal Points", however, as yet we have not received them.

Also SWP Contractors and DWR representatives have conducted 'secret' Executive DHCCP Committee meetings to develop the Delta Habitat Conservation and Conveyance Program (DHCCP), which provides the engineering and environmental analysis used by DWR and state and federal contractors to promote the BDCP and obtain the necessary federal and state permits to export more water supplies. Again, required minutes of these meetings of public agencies have been requested, but not been made available.

We remain concerned that these proposed contract amendments will in fact socialize more of the costs while privatizing the benefits of a project that has already received substantial taxpayer funds. Such a lack of transparency in the corporate world might be referred to as collusion. Relying on access to the debt market through DWR with the implied back stop of the General Fund, more disclosure of reduced debt reserves and sources of revenue—water sales and property taxes—need the public spotlight. Hopefully, both the public and the Legislature will be fully informed before billions of dollars of "permit" costs associated with water supply projects are transferred for decades—40 to 75years--to the taxpayers and General Fund. Again we urge you to direct DWR negotiators to deny Objective 3D: Billing Authorization.

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[7] http://mavensnotebook.com/2014/02/19/assembly-oversight-hearing-on-the-funding-structure-and-economic-impacts-of-the-bay-delta-conservation-plan-part-1/

10-23 cont.

We look forward to your response. Thank you for consideration of these views from groups representing hundreds of thousands of ratepayers and taxpayers throughout the State of California.

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Letter 10

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Letter 10

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July 3, 2013

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Via email: watercontractextension@water.ca.gov

Re: Comments on State Water Project (SWP) WATER SUPPLY CONTRACT EXTENSION Negotiation Project

10-24

The undersigned respectfully submit the following comments regarding the SWP water supply contract extension negotiation project, which proposes to extend existing water supply contracts for 40 to 75 years. These extended contracts would rely on water sales to meet as yet undisclosed costs, while extending ratepayer debt to repay the increased interest and unknown costs for two to three future generations of Californians.

As noted in background documents, the original contract with the people of the State of California assumed a cost of $1.75 billion in general obligation bonds to fund the construction of the State Water Project. Additional debt to fund full construction, maintenance and operation costs has been required, however. Revenue bonds of $7 billion have been sold, with $2.3 billion still outstanding.[1] All of this debt is backed by ratepayers and water sales, if water is available.

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[1] http://www.water.ca.gov/swpao/watercontractextension/

For decades urban ratepayers invested millions of dollars to ensure an urban preference during times of shortages. This preference was an insurance policy whereby these municipal water users would receive water on a priority basis during times of water shortages. In closed door SWP contractor sessions, without ratepayer or public participation, this preference was removed. Given droughts, climate extremes, and uncertainty of State Water Project water supplies, any contract extension must include an objective to reinstate this preference and these contract provisions that were removed without ratepayer notice or participation. This urban preference requirement would ensure that decades of promises, contract obligations, and ratepayer investments by these users, who pay the bulk of the project costs, would not be abrogated. 10-24 cont.

Under the terms of the Monterey Settlement Agreement and good business practices, any extension or refinancing of SWP project debt needs to clearly disclose total costs, total interest payments, amounts of water projected to be available for delivery, and needed capital reserves for replacement of this aging infrastructure. Additionally, public disclosure of all costs associated with these contract extensions must be honestly and completely displayed in intelligible language. For example, if this contract extension project proposes to "indirectly" or "directly" finance any "new" as yet unapproved capital expenditures, such as the Governor's proposed approximately $25 billion twin tunnels construction costs with estimated debt, operations, and other costs totaling $51.4 billion[2]—these costs also need to be disclosed to the public and ratepayers before obligating them to this multi-generational contract extension. 10-25

The proposed contract extensions and repayment period will saddle generations with debt and massive interest payments. Prior to any adoption of these proposals, contracting agencies must, under current law, seek approvals from ratepayers disclosing the full costs (including interest and debt payments) and need prior to adopting these obligations that use their property taxes or rate dollars as collateral.

As announced, DWR proposes to disclose at the next negotiating session the costs of the SWP contract extension to state taxpayers under the Davis-Dolwig Act. Hopefully this disclosure will address legislative criticism of how these allocations have over allocated costs to the public for recreation and fish and wildlife enhancements that should be paid by SWP contractors. 10-26

By over–allocating SWP project costs to recreation, DWR and the SWP contractors over charge the public for SWP costs and exaggerate recreation benefits or fish and wildlife enhancements of the SWP project. For example the public is charged for "recreation" at the Edmonston Pumping Plant—a facility closed to the public, and yet 3.1 percent of the annual SWP operational costs are allocated to the general fund and thus, the taxpayers.[3] These inflated recreation costs, along with regulatory permit condition costs under

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[2] See Chapter 8 Administrative Draft BDCP documents (p. 8-86 & p. 8-88) & http://mavensnotebook.com/the-bdcp-road-map/project-costs-and-financing/ & http://www.mercurynews.com/science/ci_22791436/next-big-step-jerry-browns-23-billion-delta & http://www.latimes.com/news/local/la-me-delta-cost-20130530,0,3249093.story

[3] http://www.lao.ca.gov/analysis_2009/resources/res_anl09004003.aspx Also see Legislative Analyst Report that raised concerns about DWR's methodology for calculating Davis-Dolwig costs documented in the 2009 report, *Funding Recreation at the State Water Project.*

FERC relicensing, must be paid by the State Water Project Contractors and should not be allocated to the general taxpayer.[4] As documented by the Legislature, allocating regulatory compliance costs of SWP operations to Davis–Dolwig and thus, the general fund, rather than including them in charges to SWP contractors (users of the water system), shifts these costs that should be considered costs of doing business by the SWP as typically public utilities are required to do.[5] DWR does not have the power to continue to obligate the general fund for these inflated SWP costs without Legislative approval.

In summary, the State Water Supply Project contract extension project should accurately reflect all costs, including interest, anticipated under any "refinancing" or debt reauthorization. We do not believe that past court rulings meant to provide DWR with a blank check of debt authorization in Warne v. Harkness, 60 Cal.2d 579. Critical to this accurate reflection of the costs should be an honest appraisal of replacement costs and emergency provisions for pump failures or repair costs. Just one example is the miles of the California Aqueduct impacted by subsidence. Further, this debt refinancing also must include accurate data regarding the amount of water that may or may not be available for sale over any given repayment period, especially given climate change. Finally this debt refinancing necessarily needs to include "op out" provisions for those contractors who either will not benefit or do not want to participate, or whose ratepayers do not want the added expense of proposed "new conveyance tunnels" that are likely to be exorbitantly expensive and will not provide benefits sufficient to warrant the additional construction, operating and debt costs.

Any changes to current debt loads and contract costs demand DWR and the SWP Contractors understand ratepayers and taxpayers are at a breaking point. Water rates are projected to more than double over the next ten years under existing operating costs, replacement and power costs. Full disclosure of debt costs and new construction proposals need to seriously consider the ability to rely on ratepayers to foot the bill and whether water supply projections are accurate to support such increased debt loads. 10-26 cont.

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[4] http://www.lao.ca.gov/2009/rsrc/reforming_davis-dolwig/davis-dolwig_030909.pdf *"There a number of facilities in the SWP that are regulated under FERC, including Lake Oroville—a site in the final stages of renewing a license for a further 50 years of operation. As part of the relicensing process, DWR has agreed to provide recreation facilities that will cost an estimated $500 million over the 50 years of the license. The Department of Water Resources (DWR) plans to allocate these costs to Davis-Dolwig and hence to the state….. Currently, these regulatory-related costs for providing recreation at Lake Oroville amount to approximately $1.5 million annually. However, DWR has estimated that these regulatory-related costs could increase to $11.5 million per year, for a period of 50 years."*

[5] http://www.lao.ca.gov/2009/rsrc/reforming_davis-dolwig/davis-dolwig_030909.pdf pg 9

Thank you for consideration of these views from groups representing hundreds of thousands of ratepayers and taxpayers throughout the State of California.

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Letter 10

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July 10, 2013

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Via email: watercontractextension@water.ca.gov

Re: Comments on State Water Project (SWP) WATER SUPPLY CONTRACT EXTENSION Negotiation Project

The undersigned respectfully submit the following comments regarding the SWP water supply contract extension negotiation project, which proposes to extend existing water supply contracts for 40 to 75 years. These extended contracts, if adopted, would rely on water sales to meet as yet undisclosed costs and the resulting long-term debt will saddle ratepayers with increased interest and unknown costs for two to three future generations of Californians.

10-27

We agree with both agency groups—SWP contractors and the Department of Water Resources representatives—that each is accountable to elected officials, ratepayers and taxpayers. As such the electorate deserves greater transparency and full disclosure of the costs of this SWP water diversion system including emergencies, maintenance, replacement and reserve projects, and the full cost of any new capital projects, such as the peripheral tunnels project or BDCP—and the total revenues needed to cover these costs.

Central to the water supply contract extension negotiations is a determination of the safe yield of the State Water Project. Federal scientists estimate the snowpack of the Sierra Nevada range could lose 80% of its winter snowpack by the end of the century [87 years].[1] Relying on paper water as collateral for revenue bonds is an unwise folly.[2] 10-28

It is understandable DWR would desire an "emergency" fund to assist with variable costs associated with running such a large state water supply system. But "emergency" by definition means unexpected or unforeseen. The SWP replacement costs, along with the seismic retrofit of the California Aqueduct, dams and bridges are known and expected costs. It is expected that the SWP will coexist with water shortages and droughts. Climate change is not unexpected and will bring variable hydrology, and increased need for flows and cold water to ensure survival of salmon runs and other beneficial uses.[3] Power costs due to aging infrastructure and expiring power contracts are increasing costs. As a result, any contract extension must provide for an equitable process to govern the distribution of shortages and address reduced revenues due to the lack of water sales and increased power costs. 10-29

As noted in the latest negotiation session [July 10, 2013], the SWP water rights and supply system are owned by the taxpayers of the State of California with attendant public trust and legal duties to ensure operation of the system does not harm these beneficial uses and run afoul of federal and state water quality laws. 10-30

The water supply contract extension amendments and refinancing relies on revenue from the sale of water as collateral for repayment of the debt. Thus any water contract extension beyond the existing term of 2035 needs to disclose: 10-31

1. The baseline capital debt and interest remaining on the existing SWP project;
2. The capital replacement costs for the SWP water supply system that is more than 50 years old;
3. The seismic retrofit costs of existing dams, bridges and aqueducts at the existing SWP system;

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[1] USGS scientist Tom Suchanek http://www.usgs.gov/newsroom/article.asp?ID=3148 & http://www.almanacnews.com/news/show_story.php?id=10886

[2] http://www.moodys.com/research/Moodys-assigns-Aa1-rating-to-California-DWRs-Central-Valley-Project--PR_273014 *"The rating primarily reflects the strong take-or-pay nature of the water supply contracts from which debt service payments are derived, and the critical, long run importance of the Department's water supply to its contractors. Also key to the rating are the largest contractors' strong credit standings, and the Department's ability to withstand a large amount of delinquencies by contractors with the help of the 1.25x rate covenant and step-up provisions. These considerations largely offset the risk that would otherwise be posed by the tightening legal and regulatory environment for water exports from the Sacramento-San Joaquin Bay Delta, and the volatile annual precipitation levels."*

[3] Sacramento River Chinook salmon spawning this year [2013] are threatened by the relaxation of water temperature standards on the upper Sacramento River combined with the violations of water quality standards in the Delta that are the result of the over-allocation of scarce water supplies and diverting too much water in a dry year. http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/decision_1641/conserve/docs/05292013swrcb.pdf http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/decision_1641/conserve/docs/05242013swrcb.pdf

4. Increased power costs from expiring contracts and lower output.[4]
5. Total capital costs for any "new" projects;
6. Clear provisions to allocate water shortages; and
7. Clear provisions as to how cost over runs will be allocated to the contractors and ratepayers. 10-31 cont.

Prior to extending the existing water supply contracts and debt obligation, DWR should complete a financial disclosure analysis with independent review to ensure taxpayers are not being asked to subsidize costs that should be paid for by the SWP contractors. And further, such independent analysis needs to ensure that the water supply contracts do not put undue risks or commitments on the state's general fund and the taxpayer. 10-32

Thank you for consideration of these views from groups representing hundreds of thousands of ratepayers and taxpayers throughout the State of California.

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[4] Hoover and SCE supplemental power contracts expire in 2017. Damage to existing project power plants has increased operating costs. "*Recently, maintenance issues at the Hyatt Power Plant interrupted hydropower generation, and a fire last November destroyed the Thermalito Power Plant. This has not resulted in loss of water supplies, but does increase the costs of running the project as hydropower not generated by the project must be purchased from elsewhere.*" http://mavensnotebook.com/2013/04/17/dwr-announces-state-water-project-negotations-to-start-in-may/

Letter 10

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cc: Interested Parties

Letter 10

PLANNING AND CONSERVATION LEAGUE
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Environmental Water Caucus
PCFFA
STEWARDS OF THE FISHERIES
CALIFORNIA SPORTFISHING PROTECTION ALLIANCE
CSPA
Since 1983
california water impact network
SOUTHERN CALIFORNIA WATERSHED ALLIANCE

CA Save Our Streams Council

January 29, 2014

Carl Torgersen
Deputy Director of the State Water Project
California Department of Water Resources Contract Extension
1416 9th Street, Room 1640-H4
Sacramento, CA 95814

Via email: watercontractextension@water.ca.gov

Subject: State Water Project Water Supply Contract Extension Project—Project scope & financial risk to retail ratepayers and taxpayers needs to be disclosed, expansion of scope needs to be clearly prohibited, contracts in default should return water to the public and the urban preference reinstated.

Dear Mr. Torgersen:

The undersigned respectfully submit the following comments regarding the SWP water supply contract extension negotiation project.

As you reported at the last negotiation session, failure to be transparent "makes the hair on the back of State DWR Director Cowin's neck stand up." This alarm expressed by Director Cowin is shared by ratepayers and taxpayers who will be the ones on the hook for the unspecified scope of allowable costs, unspecified legislative changes, and the increased risk to bondholders and the public from excessive debt needed to fund this blank check of unspecified costs. We have carefully monitored the negotiations and herein argue for both improved transparency AND improved protection of public interests. 10-33

A. Ratepayer and Taxpayers Threatened by Unspecified SWP Capital Costs.

10-33 cont.

The retail SWP customer—ratepayers and taxpayers—are on the hook to pay sufficient revenues to the Contractors to fund the operations, maintenance, replacement reserve, and emergency costs of the State Water Project. If one contractor cannot pay under contract provisions, the remaining contractors must pick up that financial burden, even if it means increasing both property taxes and water rates. As mentioned in previous comments, the original cost promise of $1.75 Billion has more than quadrupled under the present 75—year contracts, which are set to expire around 2035 for most contractors.

B. Scope of Allowable Capital Costs must be clearly defined: If the Peripheral Tunnels (BDCP-DHCCP) are excluded, as has been claimed during negotiations, then the contract should clearly prohibit such financing under the Water Supply Contract Extension.

10-34

It remains unclear what will be financed under the water supply contract renewals for another 40 to 75 years. Mr. Torgersen and Metropolitan Water District chief negotiator, Deven Upadhyay, have said the financing of the peripheral tunnels—the Bay Delta Conservation Plan (BDCP) and Delta Habitat Conservation and Conveyance Program (DHCCP)—are "not part of this negotiation." [1] To back up these public statements, any extension of the water supply contracts should clearly state that any new Delta conveyance or Peripheral Tunnels planning, construction, and associated mitigation costs are not allowable charges under the contract extension. This water supply contract extension needs to be transparent on this and other potential expansions of scope—and should not hide financing of the Peripheral Tunnels or any other new conveyance project in the Delta Estuary. A clear cut statement is needed that the various new funding pots, supplemental billings, emergencies, expenditures, and the "new" chartered financing committee (led by DWR and Contractors) is not intended to fund, without public review, expensive new capital projects or any planning for such projects. As we have stated before, the public has a right to know what their ratepayer charges and property taxes will fund.[2] They took on debt and paid increased property taxes believing the project would be paid for by 2035. Now, some 65 years later, we are told more debt must be issued that they need to spread out payments for another 75 years.

C. As a "Package" Deal, all Elements of the Package Needs to be disclosed for Public Comment and Review Pursuant the Monterey Settlement Agreement.

10-35

At the last negotiation session, final touches on the charter for the Finance Policy Committee were set for review by department and water contractor lawyers. Ratepayers and California State Legislative representatives are absent from this high level "finance policy" committee, which has uniquely influential "direct" access to the DWR Director to 'assist' in financial decision making with regard to funding for the SWP.

Negotiations have clearly stated that the term of the contract extension, the formation of various funding pots—supplemental billings, cash reserves and 'emergency' funding—and this new Finance

Committee are a "package deal." The claim is that this "Finance Policy Committee" can be formed by charter and implemented outside of the contract extension approval process. [3] By definition, however, it is part of the State and inseparable from the contractors' actions and the water supply contract extension. Thus, there is a need for full environmental and fiscal review by the public through disclosure in CEQA documents prior to implementation and approvals of such a major State and water contractor action.

MWD's chief negotiator, at the last negotiation session, referenced the need for some legislative changes that would be outside of the contract extension negotiations. Any such contemplated changes need to be disclosed for public review and comment. The State Water Project, pursuant to the Burns Porter Act, authorized $1.75 million in general obligation bonds to fund capital costs of the State Water Project.[4] "*An additional $510 million for Project construction came from the California Water Fund which was created using Tidelands Oil revenues. Since the Tidelands funds were an interest free loan, taxpayers have had to make up for the money that the state declined to charge in interest.*"[5] Pursuant to the State of California Central Valley Project Act, additional capital costs of some $7 billion have been funded with the issuance of revenue bonds.[6] One of the main rationales given for this contract extension beyond the existing repayment term is that the Department of Water Resources cannot sell revenue bonds whose maturity dates extend past the contract end date of 2035—and that all project costs have a revenue source including recreation costs and mitigation costs. Thus, the proposed strategy contends that issuing more debt to finance the necessary capital expenditures would be more affordable if bonds with longer terms could be sold. But, there is no specific plan provided of the amounts of money needed and "necessary" capital expenditures. Ratepayers, taxpayers and the public at large, all of whom thought the debt already issued would fund the capital expenditures and be paid off in 2035, have a right to know why more debt is needed, how much is needed, when it will be needed, and for what it will be spent.

Federal and state water contractors are also seeking additional SWP financing authority to fund the $51 to $67 billion peripheral tunnels delta conveyance that proposes to divert water directly from the Sacramento River bypassing the Delta Estuary.[7] Water Code §85089 requires the beneficiaries to enter contracts to pay these costs.[8] Under current law authorizing the State Water Project, there is no clear DWR authority to accept and spend state and federal contractor moneys for pre-construction activities and, in the case of state water contractors, collect revenues and repay debt service on the statement of charges.[9] Perhaps this is the change referenced in the negotiations. The public has no way of knowing because, thus far, there has been only passing reference without disclosure. Any such "package deal" of anticipated legislative or contract changes to allow such activities should be publicly disclosed.

10-35 cont.

D. Increased Risks to Ratepayers, Taxpayers and Bondholders Need Greater Transparency.

1. Debt Reserves Reduced By 50% & Riskier Investments Authorized.

10-36

The lower reserve requirement and reliance on reserve investments outside of cash can be viewed as risky or a *negative* credit event for the bond holders. The counterclaim contends that relying on MWD's property taxpayers and ratepayers is sufficient to avoid this risk and provides an opportunity to return more cash to the contractors and to 'reimburse' costs needed to fund the planning and engineering costs of the new water tunnels under the delta conveyance strategy.[10] These would be exceptional and unreasonable burdens on MWD ratepayers, and is highly unlikely to be simple to implement. The reduced reserve cash is substantial and most likely being used to pay off contractors and other expenses, but the amounts are not disclosed in one location. This concentrated reliance on MWD ratepayers and taxpayers is also a risk to other smaller or less 'wealthy' SWP contractors, who may lose their water in the process. Contractors who have paid into the project for years may not be able to afford these massive increased costs. Requests for an "opt out" option have thus far been ignored.[11] 10-36 cont.

2. Any Payment Defaults Require the Rest of the SWP Contractors to Step Up and Pay More, Therefore Increasing Costs to Retail Customers.

In 2000, DWR and the SWC started a process to reduce the maximum annual debt service (MADS) level by 50% and authorize riskier investments for reserve funds.[12] This below average reserve is brushed aside by those who proposed it and benefit, but over the next 75 years, given climate changes, droughts and increased energy pumping costs, ratepayers and taxpayers in Southern California (who now provide the bulk of the SWP revenue that services the debt), could balk at ever increasing water rate and property tax rates.[13] Some MWD customers, such as San Diego Water Authority, have filed suit over the rate increases and property tax charges.[14] Additionally, default provisions in the existing water contracts require the other SWP contractors to pick up these defaulting contractors and to pay regardless of whether they receive water.[15] And, in the event of a contractor's operating revenues being less than required to make its fixed contract payment, the contractor has an obligation to levy a property tax assessment in an amount to make up the shortfall (this supplemental levy falls outside of the Proposition 13's 1% property tax limit). 10-37

3. The Risk of Partnering with Federal Contractors Needs to Be Disclosed.

Westlands Water District (WWD) is likely to issue debt to pay up to 90% of the federal half-share of the DHCCP-BDCP additional planning costs of $1.2 billion due this year. State Water Project contractors need to raise the other $600 million.[16] Retail irrigators, like Mark Borba of WWD, recently rang the alarm bell because of rising costs of water and the fear of losing his land. Mark Borba stated, "*With regard to the $1.2 billion, and I guess our share is just about half—that's roughly $1,100 an acre debt on every acre in the Westlands Water District just to prepare the documents, get the engineering done, and we haven't turned a teaspoon of dirt… If the District goes broke, will the bondholders not come back [and go after the Westlands landowners]?*[17] In reply, Westlands' General Manager Tom 10-38

Birmingham reassured Borba that Westlands landowners are not at risk. Birmingham, reported WWD would just declare bankruptcy in the event of the inability to meet its debt obligations:

> *"The security on the bonds is the [Westlands] District's revenue, not the landowner's land. In a worst case, we file for bankruptcy. That's what the District could do. The landowners' land is not security."*[18]

In 2009, at the time WWD became the obligator for the federal share of debt for the Delta Conveyance facility planning and engineering costs, bond rating agencies, based on WWD documents, assured bondholders that it could sell water to Southern California or the Bay Area, even though the water rights are held by the federal taxpayers and WWD does not have long term contracts for the water.[19] Note that the United States holds the water right, that this water is supplemental and available only when there is water that is surplus to other higher priority water right holders. This raises a fundamental question for state contractors and their retail customers—will the new contract being negotiated require them to pay the costs of any as yet undisclosed additional SWP capital facilities if a federal contracting partner defaults? Again, if the SWP contract extension does not anticipate how the costs of new capital facilities will be charged under the proposed contract extension, then a strict prohibition against such charges needs to be included. A clear-cut statement is needed to protect retail customers, ratepayers and taxpayers from potential "liar loans" based on paper water. 10-38 cont.

4. Water from Any Defaulting Contractor Should Be Used to Reduce "Paper Water" Promises.

As stated under existing state water supply contracts, any default requires the other contractors who have not defaulted to pay the bills; the allocation of water supplies is then adjusted among the remaining contractors. It is likely that only the large irrigators under federal water contracts or mammoth urban contractors under the state contracts are favored under such a reallocation. It is likely that small retailers will be priced out of the market. Most important, however, nothing is done to reduce the unrealistically large quantity of "Paper Water"—it's just reallocated! Instead, since the public has paid a substantial portion of the State Water Project (about $2 billion), any failure to pay should be viewed as an opportunity to reduce the paper water promises and dedicate this "freed-up" water to public trust values. Rather than allow a contractor to remarket and sell these precious, over-allocated water supplies, the inflated yield of the project needs to be reduced. 10-39

E. In Times of Drought and Shortages the Urban Preference—Drinking Water Over Irrigation—Needs to be Reinstated.

10-40

The present drought reminds us that the urban ratepayer who has paid a disproportionate amount of the costs for the SWP needs the reliability that, during times of shortage, drinking water will receive priority over irrigation of crops. Many have criticized the export of so much water for supplemental irrigators. University of California Professor Emeritus, Dr. Richard Walker recently remarked, "*I have a better solution. Instead of building the Delta Drains, use the money to buy out Westlands, about $9 billion at current land prices. This would be cheaper and have the added benefit of saving 1 million acre-feet a year (average) now going to Westlands, leaving that water for other farmers and urban users.*"[20] It bears repeating for decades, urban ratepayers invested millions of dollars to ensure an urban preference during times of shortages.[21] Others note that drinking water, domestic supplies and irreplaceable public trust values threatened with extinction should have priority over irrigators. "*I understand that almonds garner high prices worldwide and are profitable for Californian farmers. But maybe in an extreme drought, the governor could decide that he wants to spend our limited water on preserving our native species, and not providing Chinese people with pleasant snacks.*"[22]

10-40
cont.

The urban preference was an insurance policy whereby these municipal water users would receive water on a priority basis during times of water shortages. In closed door SWP contractor sessions, without ratepayer or public participation, this preference was removed in 1995. Given droughts, climate extremes, and uncertainty of State Water Project water supplies, any contract extension must include this preference and reinstate these contract provisions that were removed without ratepayer notice or participation. This urban preference requirement would ensure that decades of promises, contract obligations, and ratepayer investments by these users, who pay the bulk of the project costs, would not be abrogated. "*It is one of the many ironies of the SWP that those who get the most water pay the least, while those who get the least pay the bulk of the costs.*"[23]

Thank you for consideration of these views from groups representing hundreds of thousands of ratepayers and taxpayers throughout the State of California.

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Attachments:
A: Gary Lasky, Transcription of Westlands Water District Board Meeting 1-15-2014, Harris Ranch, Ca.

B: 26th Supplemental May 1, 2002 No DWR-WS-49 Amending1986 DWR Bond Resolution Central Valley Project Water System Revenue Bonds General Bond Resolution No DWR-WS-1

C: 25th Supplemental May 1, 2002 No DWR-WS-48 Amending1986 DWR Bond Resolution Central Valley Project Water System Revenue Bonds General Bond Resolution No DWR-WS-1 10-41

ENDNOTES

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[1] See http://www.water.ca.gov/swpao/watercontractextension/2013_contract_negotiations.cfm & Department of Water Resources Objectives also see http://mavensnotebook.com/2013/09/04/contract-length-cash-reserves-and-more-input-from-contractors-at-issue-in-state-water-project-negotiations/

[2] This includes seismic retrofit costs of existing facilities, FERC relicensing costs and required mitigation measures, along with changes to debt financing resolutions that would use debt to amortize and fund operations and maintenance, and the added debt costs of "capitalizing" interest costs if included in the financing proposals.

[3] SWRDS Finance Committee Charter - Draft 01.08.14 v.3
http://www.water.ca.gov/swpao/watercontractextension/contract_negotiations.cfm

[4] Under State statute issuance of Revenue Bonds by the Department of Water Resources [DWR] to fund the SWP automatically requires or places a lien on property taxes from the contracting water districts to repay for the revenue bond debt obligations. To date water districts have utilized a combination of water rate increases and property tax assessments to cover the costs of the SWP. In adopting a bond funding resolution DWR typically relies on the Central Valley Project Act (Water Code, § 11100 et seq.), enacted in 1933 as amended. Under the act the department is empowered to construct and operate various water facilities, among which are those authorized by section 11260 of the Water Code. The act further empowers the department to issue revenue bonds to carry out the objects of the act and provides that the bonds shall not be obligations of the state but shall constitute a first lien on revenues. (Water Code, §§ 11700, 11705, 11720-11722.)
Some mistakenly believe that DWRs authority to issue the revenue bonds was superseded by the California Water Resources Development Bond Act [the Burns-Porter Act Water. Code, § 12930 et seq.]. This was passed by the Legislature in 1959 & approved by the voters in 1960. The Burns-Porter Act authorizes the department to construct and operate the State Water Resources Development System, and provides for the issuance, in an aggregate amount not to exceed $1,750,000,000 of general obligation bonds. (Water Code, §§ 12931, 12935, 12938.)
The courts have ruled otherwise. see http://scocal.stanford.edu/opinion/warne-v-harkness-32852
There is wide discretion for DWR to issue revenue bonds for the construction, operation and maintenance of the Central Valley Project and State Water Project as defined under state law. Once issued water districts have the authority, without a vote of property taxpayers, to raise property taxes to pay for the principal and interest. In a general provision the Burns-Porter Act declares that the facilities authorized as part of the Central Valley Project "or facilities which are acquired or constructed ... with funds made available hereunder" shall be "acquired, constructed, operated, and maintained pursuant to the provisions of the code governing the Central Valley Project." (Water Code, § 12931.)

[5] http://www.citizen.org/documents/SWPreport05.pdf Mismanaging the California State Water Project 2005 @ pg 2

[6] **Ibid**. pg 2

[7] See Bay_Delta_Westlands_BDCP_DWR_Workshop_11-20-13_Powerpoint Also See the 2011 LAO Report: http://www.lao.ca.gov/handouts/resources/2011/BDCP_Planning_process_10_19_11.pdf @ pg 5 *Implications for BDCP Implementation Funding. The voluntary aspect of planning phase funding also has implications for future funding of BDCP implementation, namely the construction and operation of an alternative system of conveyance that is being evaluated under the planning process. Costs of such conveyance have been estimated at $12 billion or*

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higher. Funding BDCP implementation therefore cannot rely on voluntary contributions and will require amendment of long-term water supply contracts between DWR, the Bureau of Reclamation, and the contractors in order to provide the funding mechanism.

[8] Water Code §85089. *Construction of a new Delta conveyance facility shall not be initiated until the persons or entities that contract to receive water from the State Water Project and the federal Central Valley Project or a joint powers authority representing those entities have made arrangements or entered into contracts to pay for both of the following: (a) The costs of the environmental review, planning, design, construction, and mitigation, including mitigation required pursuant to Division 13 (commencing with Section 21000 of the Public Resources Code), required for the construction, operation, and maintenance of any new Delta water conveyance facility. (b) Full mitigation of property tax or assessments levied by local governments or special districts for land used in the construction, location, mitigation, or operation of new Delta conveyance facilities.*

[9] **Ibid.** @ Footnote 4 See LAO report http://www.lao.ca.gov/handouts/resources/2011/BDCP_Planning_process_10_19_11.pdf

[10] http://www.water.ca.gov/publications/financials/docs/dwr12fn.pdf State Water Resources Development System *Management's Discussion and Analysis (Unaudited)For the years ended June 30, 2012 and 2011. Pgs 16, 18 & 28.*

Also See State Water Project Contractors Authority letter Subject: BDCP Environmental Analysis and Preliminary Engineering Funding, October 30, 2008. "*Funding of the DHCCP will be by advance payments by Participating Contractors. SWP contractors may become Participating Contractors by signing a DHCCP Funding Agreement with DWR. Funding for 2008 will be accomplished through a DWR rebill and a credit equal to the DHCCP funding amount on the rebill from the bond funds released by the Springing Amendment. Funding for 2009 and 2010 will be on the DWR bills and collected in the same manner as the Transportation Minimum Component. Attached is a draft DHCCP Funding Agreement. Also attached is a breakdown of SWP Participating contractors cost share assuming three different participation levels.*"
http://cf.valleywater.org/About_Us/Board_of_directors/Board_meetings/_2009_Published_Meetings/MG37438/AS37448/AI37602/DO37898/DO_37898.pdf Santa Clara Water District 10-13-09 Workshop: "The District along with other CVP contractors provided ... amount on the rebill from the bond funds released by the Springing. Amendment Funding for 2009 and 2010 will be on the DWR bills and ... the Delta Habitat Conservation and Conveyance Program (DHCCP). See also- San Gorgonio Pass Water Agency Nov 10, 2008 - become Participating Contractors by signing a DHCCP Funding ... rebill from the bond funds released by the Springing Amendment.
http://sgpwa.com/pdfs/Agenda-2008-Nov-10-900.pdf

[11] http://www.water.ca.gov/swpao/watercontractextension/2013_contract_negotiations.cfm & Plumas County Objective

[12] The reserve account provides for the purchase of riskier investments including purchase letters of credit, surety bonds, or other higher rated (AA) or better credit facilities - these are cheaper for the issuer to fund the reserve account. The 1986 Bond Resolution and Attachments B&C: Amendments 25 & 26 to the1986 Resolution dated May 1, 2002 and April 1, 2002. Common debt service reserve fund levels are 1x MADS. Moody's made the following comment in their review of the 50% reduction under the amendment, "*The debt service reserve requirement is also weaker than for the typical municipal water enterprise at only 50% of maximum annual debt service. Given the Department's other credit strengths, however, this below average reserve is not heavily weighted in our analysis.*"

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[13] On June 11, 2013 a majority of the MWD Board of Directors voted to suspend these limits on property tax rate increases despite protests from the Southeast Water Coalition representing various cities, San Diego Water Authority and some 20 different community leaders and groups. [http://www.citywatchla.com/lead-stories-hidden/5221-will-angelinos-be-submerged-in-a-new-water-tunnel-tax "*Despite efforts by business groups, community activists, mayors and several Southern California water agencies to stop unnecessary rate hikes and increased property tax collection by the Los Angeles-based Metropolitan Water District of Southern California, the board voted to increase spending by $75 million instead of returning the money or rolling back rate increases.*"http://www.mwdfacts.com/momentum-builds-to-halt-mwds-over-collection/Proposition 218, known as the Right to Vote on Taxes Act, added Article XIII D. Metropolitan Water District and other wholesalers of water argue that Article XIIIC and XIIID do not apply to MWD's rates because they are not "imposed"; they are voluntary charges for property owned by MWD; and in any event the rates and property tax increases are approved by a 2/3s vote of the "electorate"—in this case the "electorate" is the MWD Board.

[14] http://www.sdcwa.org/mwdrate-challenge Limits on tax rate increases for the reasonable cost of service and debt are routinely suspended by the MWD Board. Section 124.5 of the MWD Act places limits on property tax rate increases. Section 124.5 permits Metropolitan to suspend the restriction if, following a public hearing, the Board finds that such revenue is essential to the fiscal integrity of the District. http://ronkayela.com/wordpress/wp-content/uploads/2013/06/06112013-BOD-8-2-B-L-1.pdf

[15] Metropolitan Water District of Southern CA (who makes up 46% of water entitlements) and more than three quarters of the combined contract revenue pledged to the water revenue bonds are rated Aa3 or better. Under existing contracts with DWR the contracts are take or pay contracts, this means certain payments are due regardless of the actual water delivery levels. The Department has a rate covenant of "1.25x" that they charge the contractors and there is a step up provision in the contracts (non-defaulting contractors are generally required to make an additional step up payment of up to 25% of their own contract payment if needed to cure defaults by other contractors). In the event of contractors operating revenues being less than required to make its fixed contract payment, the contractor has an obligation to levy a property tax assessment in an amount to make up the shortfall (this levy falls outside of the state's 1% property tax limit).

[16] http://www.sacbee.com/2013/12/07/5978184/delta-water-tunnel-project-needs.html **Delta water tunnel project needs $1.2 billion more for planning** By Matt Weiser Dec. 7, 2013, "*The giant Delta water-diversion tunnels proposed by Gov. Jerry Brown need $1.2 billion more spent on planning and design before construction starts or is even assured.*"

[17] See Attachment A: Transcript and Notes from WWD November 2013 Board Meeting @ pg 7.

[18] See Attachment A: Transcript and Notes from WWD November 2013 Board Meeting @ pg 7.

[19] See Fitch Bond Rating *2009, San Luis and Delta-Mendota Water Authority, California Delta Habitat Conservation and Conveyance Program Development Project. "There is concentration amongst WWD water purchasers. But offsetting this risk somewhat is the value of the cash crops farmed in the district (about $1.3 billion in fiscal 2008) and the absence of alternative/equivalent supplies or infrastructure to deliver water. In addition, WWD potentially has the ability to sell and transfer water rights outside the district should agriculture cease to be economic, as the*

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demand for water in southern California and the San Francisco Bay area by users with connectivity to the CVP is very high."

[20] http://www.sfgate.com/opinion/article/Away-go-our-dollars-down-the-delta-drains-5132228.php
"Away go our dollars down the delta drains" Richard Walker, SF Chronicle Friday, January 10, 2014.

In all this, Westlands is the tail wagging the water dog. The district has the lowest priority water rights and can't get enough water in dry years. The district wants more water diverted from the Sacramento and the North Coast, not less. They don't give a fig for the fish, having sued to stop water releases for salmon in the San Joaquin and Trinity rivers. I have a better solution. Instead of building the Delta Drains, use the money to buy out Westlands, about $9 billion at current land prices. This would be cheaper and have the added benefit of saving 1 million acre-feet a year (average) now going to Westlands, leaving that water for other farmers and urban users."

[21] http://www.citizen.org/documents/SWPreport05.pdf "*To date, the North of Delta and Delta regions have born the near entirety of the direct negative environmental and economic impacts of the project and reaped scant amounts of the economic benefits. Kern County agribusiness, other the other hand, has secured the lion's share of the economic benefits, and has distributed those benefits in a highly inequitable manner. Since the State Water Project began pumping subsidized water to Kern County agribusinesses, the concentration of landownership has steadily increased, numbers of farms have decreased and rural poverty indicators have increased….. The Kern water agency contracts for 24 percent of the State Water Project's water. The Agency has actually received, however, 42 percent of the water and paid for only 13 percent of the costs of the project …. The Metropolitan Water District of Southern California contracts for 48 percent of the water, but has received only 31 percent while paying for 62 percent.*" Pg 4

[22] Also see http://onthepublicrecord.org/2014/01/16/manage-what-exactly/
http://onthepublicrecord.org/2014/01/page/2/ "*Nut crop growers put a whole lot of capital into their orchards, then point to their orchards as hostages in drought time. "But we must get water, or our trees will die!" I've never understood why the public at large should be the backstop for the bad choice to plant crops with a constant water demand in a variable climate. If there is a state interest in growing nuts and grapes in particular, it hasn't been explained… I understand the grower's interest in growing a valuable crop, but since the profits from that aren't returned to the state, I don't see why the risk should be.*"

[23] https://www.callawyer.com/clstory.cfm?eid=919370 A Run on the Water Bank --A determined investigator pursues a Los Angeles billionaire for allegedly seizing control of the state's water supply. It's Chinatown again, Jake. by Bill Blum | December 2011
Also see: http://www.citizen.org/documents/Water_Heist_lo-res.pdf "*Don Villarejo writes that from the first SWP water deliveries in 1968 through to 1980, San Joaquin Valley contractors received 63% of the water delivered—almost entirely for agricultural irrigation—while mostly residential Southern California water users paid 70% of the costs of the project. "It is one of the many ironies of the SWP that those who get the most water pay the least, while those who get the least pay the bulk of the costs.*" Pg 28

Response to Comment 10-1

See Response to Comment 8-1.

Response to Comment 10-2

See Response to Comment 8-2.

Response to Comment 10-3

See Response to Comment 8-3.

Response to Comment 10-4

See Response to Comment 8-4.

Response to Comment 10-5

See Response to Comment 8-5.

Response to Comment 10-6

See Response to Comment 8-6.

Response to Comment 10-7

See Response to Comment 8-7.

Response to Comment 10-8

See Response to Comment 8-8.

Response to Comment 10-9

See Response to Comment 8-9.

Response to Comment 10-10

See Response to Comment 8-10.

Response to Comment 10-11

See Response to Comment 8-11.

Response to Comment 10-12

Comments submitted to DWR during the public negotiations provided suggestions for consideration in forming the AIP and, ultimately, the proposed amendments to the Contracts. Those comments were not made on the environmental analysis contained within the DEIR. Comments made during the scoping period for the DEIR were reviewed and considered by DWR prior to preparing and publishing the DEIR. Responses to those comments are provided separately to Comment Letter 13.

Response to Comment 10-13

See Responses to 8-11 and 8-12.

Response to Comment 10-14

See Response to Comment 8-13.

Response to Comment 10-15

See Response to Comment 8-14.

Response to Comment 10-16

See Response to Comment 8-15.

Response to Comment 10-17

See Response to Comment 8-16.

Response to Comment 10-18

See Response to Comment 8-17.

Response to Comment 10-19

See Response to Comment 8-18.

Response to Comment 10-20

See Response to Comment 8-19.

Response to Comment 10-21

The comment was made on the negotiation sessions that were held from May 2013 through June 2014 and does not address the environmental analysis in the DEIR. See Response to Comment 5-64 for more information on the Davis-Dolwig Act.

Response to Comment 10-22

The comment was made on the negotiation sessions that were held from May 2013 through June 2014 and does not address the environmental analysis in the DEIR. However, see Response to Comment 5-64 for more information on the Davis-Dolwig Act and see Master Response 3 for discussion of the relationship of the proposed project to California WaterFix.

Response to Comment 10-23

The comment was made on the negotiation sessions that were held from May 2013 through June 2014 and does not address the environmental analysis in the DEIR. However, see Responses to Comments 5-11 and 10-22. See Response to Comment 3-2 for discussion of Alternative 7 in DEIR which evaluates an alternative of not all Contractors sign the amendment. See also Response to Comment 4-1. DWR notified and invited the public to participate in each of the 23 public negotiation meetings held. Included in the meeting notices was the location of the meetings, mailing address for written comment, and access to a conference line for attending meetings remotely.

Response to Comment 10-24

The comment was made on the negotiation sessions that were held from May 2013 through June 2014 and does not address the environmental analysis in the DEIR. However, see Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives.

Response to Comment 10-25

The comment was made on the negotiation sessions that were held from May 2013 through June 2014 and does not address the environmental analysis in the DEIR. However, please see Chapter 3 of the DEIR for a description of the financial status of bonds under the Burns-Porter Act and the CVP Act. Chapter 4, Project Description of the DEIR outlines the various financial provisions in the proposed Contract amendments, including amounts set aside for reserves (see page 4-3) and rate reductions (see page 4-5 and 4-6).

Response to Comment 10-26

The comment was made on the negotiation sessions that were held from May 2013 through June 2014 and does not address the environmental analysis in the DEIR. However, see Response to Comment 5-64 regarding the Davis-Dolwig Act and Response to Comment 10-25 regarding financial costs of the proposed project.

Response to Comment 10-27

The comment was made on the negotiation sessions that were held from May 2013 through June 2014 and does not address the environmental analysis in the DEIR. However, see Response to Comment 5-64 regarding the Davis-Dolwig Act and Response to Comment 10-25 regarding financial costs of the proposed project. See Master Response 3 for information on relationship to California WaterFix.

Response to Comment 10-28

The comment was made on the negotiation sessions that were held from May 2013 through June 2014 and does not address the environmental analysis in the DEIR. However, see Master Response 2 for more information on the definition of the proposed project and Response to Comment 9-14 for more information on water supply planning.

Response to Comment 10-29

The comment was made on the negotiation sessions that were held from May 2013 through June 2014 and does not address the environmental analysis in the DEIR. However, see Chapter 3, State Water Project Financing and Water Supply Contract Financial Provisions pages 3-3 through 3-6 for an explanation of the water supply Contract cost recovery from the Contractors. This explanation includes details on the charges for the construction, operation, maintenance and water supply delivered to the Contractors. The Contracts provide for changes to water supply allocations and costs in the event of water shortages.

Response to Comment 10-30

The comment was made on the negotiation sessions that were held from May 2013 through June 2014 and does not address the environmental analysis in the DEIR. However, see Response to Comment 10-25.

Response to Comment 10-31

The comment was made on the negotiation sessions that were held from May 2013 through June 2014 and does not address the environmental analysis in the DEIR. However, see Response to Comment 10-25 regarding the proposed Contract revisions and financial information. Further, the issue raised by the commenter addresses the financial effects of the proposed project and does not raise issues with the environmental analysis provided in the DEIR. The commenter does not offer any evidence on how this financial effect would result in a significant impact. Therefore, no further response can be provided.

Response to Comment 10-32

The comment was made on the negotiation sessions that were held from May 2013 through June 2014 and does not address the environmental analysis in the DEIR. However, see Response to Comment 10-31 regarding the proposed Contract revisions and financial information. A financial disclosure analysis is not required for the analysis of environmental impacts of the proposed project.

Response to Comment 10-33

The comment was made on the negotiation sessions that were held from May 2013 through June 2014 and does not address the environmental analysis in the DEIR. However, see Responses to Comments 10-23 and 10-24. See Response to Comment 10-31 regarding the proposed Contract revisions and financial information.

Response to Comment 10-34

The comment was made on the negotiation sessions that were held from May 2013 through June 2014 and does not address the environmental analysis in the DEIR. However, see Master Response 3 for information on relationship to California WaterFix and the separate Contract amendment process.

Response to Comment 10-35

The comment was made on the negotiation sessions that were held from May 2013 through June 2014 and does not address the environmental analysis in the DEIR. However, see Response to Comment 10-31.

Response to Comment 10-36

The comment was made on the negotiation sessions that were held from May 2013 through June 2014 and does not address the environmental analysis in the DEIR. However, see Response to Comment 10-29 regarding the proposed Contract revisions and financial information. See Master Response 3 for information on relationship to California WaterFix and the separate Contract amendment process.

Response to Comment 10-37

The comment was made on the negotiation sessions that were held from May 2013 through June 2014 and does not address the environmental analysis in the DEIR. However, see Response to Comment 10-31 regarding the proposed Contract revisions and financial information.

Response to Comment 10-38

The comment was made on the negotiation sessions that were held from May 2013 through June 2014 and does not address the environmental analysis in the DEIR. However, see Response to Comment 10-31 regarding the proposed Contract revisions and financial information. See Master Response 3 for information on relationship to California WaterFix and the separate Contract amendment process.

Response to Comment 10-39

The comment was made on the negotiation sessions that were held from May 2013 through June 2014 and does not address the environmental analysis in the DEIR. However, see Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives.

Response to Comment 10-40

The comment was made on the negotiation sessions that were held from May 2013 through June 2014 and does not address the environmental analysis in the DEIR. However, see Response to Comment 5-11 for discussion of the definition of the proposed project and development of project objectives.

Response to Comment 10-41

The comment was made on the negotiation sessions that were held from May 2013 through June 2014 and does not address the environmental analysis in the DEIR. The attachments noted are cited in Comments 10-33 through 10-40. Please see the responses to those comments. The attachments to the comment is included in Exhibit B to this FEIR.

Letter 11

AQUALLIANCE
DEFENDING NORTHERN CALIFORNIA WATERS

CSPA

california
water impact
network

October 17, 2016

Ted Alvarez
State Water Department Analysis Office
Department of Water Resources
PO Box 942836
Sacramento, CA 94236-0001
watercontractextension@water.ca.gov

Subject: Comments on the Draft Environmental Impact Report for the *Water Supply Contract Extension Project*

Dear Mr. Alvarez:

AquAlliance, the California Sportfishing Protection Alliance, and the California Water Impact Network submit additional comments and questions for the Draft Environmental Impact Report (DEIR) for the *Water Supply Contract Extension Project* (Project).

I. Items of Omission That Must be Corrected

The percent of use by sector must be added to the regions discussed in Section 5.2.18.2 that do not have it, such as: "Water use in the Sacramento River and San Joaquin River hydrologic regions is mostly for agricultural production, including a variety of crops as well as livestock management, followed by environmental and urban use. Irrigation using both groundwater and surface water dominates water use volume, but municipal water use has grown along with the rising population." (pp. 5-140 - 5-141) Without this information the public is unable to adequately understand the existing conditions. 11-1

The percent of water used by state contractors for all sectors and water transfer sales must also be quantified. Just one of the many examples that need additional disclosure is found in the paragraph on Castaic Lake WA that provided no numeric data at all.[1] There are also omissions of 11-2 water transfers purchases altogether, let alone quantification of how much transferred water is part of a portfolio for districts such as Palmdale WD.[2] All contractors that participate in water transfer sales or purchases must be identified, the range of water amounts sold or purchased must be quantified, and the portfolio percentage by district must be disclosed. Without this information the public is unable to adequately understand the existing conditions therefore the DEIR must be revised and recirculated for public comment. 11-2 cont.

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[1] DWR 2016. Draft Environmental Impact Report for the Water Supply Contract Extension Project. "In addition to SWP supplies, Castaic Lake WA receives supplies from two other water districts in Kern County, and has access to groundwater and recycled water. The agency is a wholesaler to four retail purveyors, who deliver supplies to primarily M&I users (Castaic Lake Water Agency 2011)." p. 5-143

II. Cumulative Impact Analysis is Inadequate

CEQA states that assessment of the project's incremental effects must be "viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects." (CEQA Guidelines § 15065(a)(3).) "[A] cumulative impact consists of an impact which is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts." (CEQA Guidelines § 15065(a)(3).)

An EIR must discuss significant cumulative impacts. CEQA Guidelines §15130(a). Cumulative impacts are defined as two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts. CEQA Guidelines § 15355(a). "[I]ndividual effects may be changes resulting from a single project or a number of separate projects. CEQA Guidelines § 15355(a). A legally adequate cumulative impacts analysis views a particular project over time and in conjunction with other related past, present, and reasonably foreseeable future projects whose impacts might compound or interrelate with those of the project at hand. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time. CEQA Guidelines § 15355(b). The cumulative impacts concept recognizes that "[t]he full environmental impact of a proposed . . . action cannot be gauged in a vacuum." *Whitman v. Board of Supervisors* (1979) 88 Cal. App. 3d 397, 408 (internal quotation omitted). 11-3

A. The DEIR failed to include significant projects

The DEIR's failure to include significant projects includes, but is not limited to:

- The Delta Stewardship Council's Plan
- The Long-Term Water Transfer Program (aka 10-Year Water Transfer Program)

The failure to consider and analyze major projects in preparing the DEIR signifies that it must be revised and recirculated for public comment.

B. The DEIR Fails to Demonstrate the Project Will not Create Physical Environmental Impacts

Among many statements in the DEIR, one makes it quite obvious that the Project has the extremely high potential for serious environmental impacts: "Extending the Contracts' expiration dates to 2085 will enable DWR to finance SWP expenditures beyond 2035 and continue to receive a reliable stream of revenues from Contractors for the ***construction, operation, and maintenance of the SWP***." (p. 6-3) (emphasis added) This is followed by the lead agency's conclusory statements that fall flat without any supporting disclosure or analysis:

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[2] *Id.* p. 5-144.

"[i]mplementation of the proposed project would not result in physical environmental impacts; therefore, it would not contribute to any cumulative effect and would not compound or increase an environmental impact of these other projects. As a result, the proposed project would have no cumulative impacts." (p. 6-4) How is it remotely possible that over the next 69 years (from the present to 2085) the "[c]onstruction, operation, and maintenance of the SWP" will *not* result in an impact to the environment? The DEIR's failure to disclose, consider, and analyze what construction, operations, and maintenance will occur in conjunction with cumulative projects in the DEIR signifies that it must be revised and recirculated for public comment. 11-3 cont.

C. The DEIR Obfuscates the Projects Timing with the WaterFix

The DEIR seeks to isolate the Project from the WaterFix. "The proposed project is separate and independent from the California WaterFix project. The proposed project would need to occur regardless of the outcome of California WaterFix." (p. 6-4) While SWP contracts would inevitably need to be renewed starting in 2035, the timing of the Project's contract renewals is directly tied to the WaterFix and the DEIR reveals it later in the same paragraph: "It has become more challenging in recent years to affordably finance capital expenditures for the SWP since revenue bonds used to finance these expenditures are not sold with maturity dates that extend beyond the year 2035, the year the first Contract would expire. Not extending the Contracts would continue to exacerbate the revenue bond compression problem that DWR and the Contractors are currently facing." Revenue bonds are the primary way for the State to fund the WaterFix, therefore marrying the Contract Renewal Project with the WaterFix. The DEIR must be revised with a candid discussion of the symbiotic connection between the Project and the WaterFix and recirculated for public comment. 11-4

Our groups respectfully request notification of any meetings or actions that address this Project. 11-5

Sincerely,

B. Vlamis

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Response to Comment 11-1

The information provided in the environmental setting for Section 5.2.18 Water Supply is sufficient to provide the context for the impact analysis included in the DEIR. The level of specificity requested in the comment is not necessary because it would not change the results or conclusions of the impact analysis. As stated in the DEIR on page 4-2, the proposed project consists of amendments to the financial provisions of the Contracts. The proposed project would not create new water management measures, alter the existing authority of DWR to build new or modify existing facilities, or change water allocation provisions of the contract. More information is available in the California Water Plan at http://www.water.ca.gov/waterplan/ and Bulletin 132 - Management of the California State Water Project available at http://www.water.ca.gov/swpao/bulletin_home.cfm.

Response to Comment 11-2

See Response to Comment 11-1.

Response to Comment 11-3

As explained in DEIR Chapter 6, Other CEQA Considerations on pages 6-1 and 6-2, section 15355 of the CEQA Guidelines defines cumulative effects as "two or more individual effects that, when considered together, are considerable or which compound or increase other environmental impacts." According to CEQA Guidelines Section 15130(b), the cumulative impacts discussion shall reflect "the severity of the impacts and their likelihood of occurrence" and shall "be guided by the standards of practicality and reasonableness." The CEQA Guidelines further indicate that the discussion of cumulative impacts should include a discussion of the geographic scope of the affected area by the cumulative effect, and a summary of expected environmental effects to be produced by the list of past, present, and probable future projects producing related cumulative impacts. Further, the DEIR goes on to explain the criteria to identify those similar projects that could combine with effects of the proposed Contract amendment for the analysis of cumulative impacts. The DEIR identified only two projects (California WaterFix and the Monterey Agreement/Amendment) that would or did result in amendments to the Contracts. The projects mentioned in the comment do not meet the criteria used to identify and analyze cumulative impacts.

Therefore, because the proposed amendments to the Contracts do not alter baseline operations and maintenance and do not authorize future construction projects, there are no physical impacts. Because there are no physical impacts, no other projects including the Delta Stewardship Council's Plan and the Bureau of Reclamation's Long-Term Water Transfer Program, were identified for the cumulative impact analysis, and the proposed project would not contribute to the cumulative impacts of the two projects.

See also Response to Comment 5-32 for discussion of the Delta Reform Act.

Response to Comment 11-4

See Responses to Comments 4-1 and 4-2. The responsibility for determining whether to undertake any other project continues to vest in DWR as under the current contract provisions. DWR's practice is to inform and consult, as appropriate, with the Contractors before undertaking new projects. As it relates specifically to California WaterFix, a separate EIR/EIS was prepared to address the impacts of California WaterFix. The proposed project is an independent project that would occur with or without California WaterFix (see Response to Comment 5-75). Furthermore, as described in Response to Comment 4-1, Contractor participation in California WaterFix will be addressed through a separate public negotiation and environmental review process to develop appropriate Contract amendments. See Master Response 3 for discussion of the relationship of the proposed project to California WaterFix and the separate Contract amendment process.

Response to Comment 11-5

The request for notification of any meetings or actions on the proposed project has been noted and all email addresses have been added to the project notification database managed by DWR.

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October 17, 2016

Ted Alvarez
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Department of Water Resources
P.O. Box 942836
Sacramento, CA 94236-0001
Email: watercontractextension@water.ca.gov

Via Email

Re: Comments on Draft EIR for the Water Supply Contract Extension Project

Dear Mr. Alvarez:

12-1 Friends of the River objects to approval of the above proposed project to extend the term of existing State Water Project (SWP) contracts for an additional 50 years. The Draft Environmental Impact Report (DEIR) and proposed project fail to comply with the California Environmental Quality Act (CEQA) and other provisions of state law including the Delta Reform Act. If the Department of Water Resources (DWR) wishes to continue considering the contract extension, in order to proceed in the manner required by law including CEQA it will be necessary for DWR to prepare and circulate for public review and comment a new, revised DEIR.

12-2 To avoid unnecessary repetition and to conserve resources Friends of the River hereby adopts and incorporates herein by reference as though fully set forth herein all of the comments made this same date, October 17, 2016, in the joint comment letter to you from the Natural Resources Defense Council (NRDC), Defenders of Wildlife, and The Bay Institute. Because of the importance of the issues and magnitude of the CEQA violations we do add the following comments to amplify or add to as the case may be, the joint comments made by NRDC et al.

FAILURE TO PROPERLY DEVELOP AND ANALYZE ALTERNATIVES REDUCING EXPORTS

12-3 Development of alternatives increasing flows through the Delta by reducing exports has always been a direct and obvious first step to complying with NEPA and CEQA in the course of accomplishing the co-equal goals established by the Delta Reform Act, California Water Code § 85054:

> ‘Coequal goals’ means the two goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem. The coequal goals shall be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place.

The alternative of increasing flows through the imperiled Delta by reducing exports is so obvious that the Ninth Circuit recently reversed in part a district court decision denying environmental plaintiffs summary judgment because the challenged environmental document issued by Reclamation under NEPA "did not give full and meaningful consideration to the alternative of a reduction in maximum water quantities." *Pacific Coast Federation of Fishermen's Assn's v. U.S. Dept. of the Interior,* __Fed.Appx.__, 2016 WL 3974183 *3 (9th Cir., No. 14-15514, July 25, 2016)(Not selected for publication). "Reclamation's decision not to give full and meaningful consideration to the alternative of a reduction in maximum interim contract water quantities was an abuse of discretion, and the agency did not adequately explain why it eliminated this alternative from detailed study." *Id.* at *2. Reclamation's "reasoning in large part reflects a policy decision to promote the economic security of agricultural users, rather than an explanation of why reducing maximum contract quantities was so infeasible as to preclude study of its environmental impacts." *Id.* at *3.

The requirement under NEPA for Reclamation to consider the obvious alternative of reducing exports to increase flows through the Delta is so obvious that the Ninth Circuit's decision was not selected for publication because no new legal analysis was required to reach the decision.[1] The decision pertained to ***interim two-year contract renewals***. If the alternative of reducing exports must be considered during renewal of two-year interim contracts it most assuredly must be considered during the course of deciding whether to ***extend contracts 50 years***.

12-3 cont.

We presented *A Sustainable Water Plan for California* (Environmental Water Caucus, May 2015) as a reasonable alternative to the California Water Fix Delta Water Tunnels over a year ago. The plan is at: http://ewccalifornia.org/reports/ewcwaterplan9-1-2015.pdf. The actions called for by this alternative include: reducing exports to no more than 3,000,000 acre-feet in all years in keeping with State Water Board Delta flow criteria (for inflow as well as outflow); water

12-4

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[1] In *California v. Block,* 690 F.2 753, 765-769 (9th Cir. 1982), the project at issue involved allocating to wilderness, non-wilderness or future planning, remaining roadless areas in national forests throughout the United States. The court held that the EIS failed to pass muster under NEPA because of failure to consider the alternative of increasing timber production on federally owned lands currently open to development; and also because of failure to allocate to wilderness a share of the subject acreage "at an intermediate percentage between 34% and 100%." 690 F.2d at 766. Like the situation here where the Water Fix agencies claim a trade-off involved between water exports and Delta restoration (RDEIR/SDEIS ES 4-6), the Forest Service program involved "a trade-off between wilderness use and development. This trade-off however, cannot be intelligently made without examining whether it can be softened or eliminated by increasing resource extraction and use from already developed areas." 690 F.2d at 767. Here, likewise, trade-offs cannot be intelligently analyzed without examining whether the impacts of alternatives reducing exports can be softened or eliminated by increasing water conservation, recycling, and eventually retiring drainage-impaired agricultural lands in the areas of the exporters from production. *Accord, Oregon Natural Desert Assn. v. Bureau of Land Management*, 625 F.3d 1092, 1122-1124 (9th Cir. 2010) (EIS uncritical alternatives analysis privileging of one form of use over another violated NEPA). Here, the BDCP alternatives analysis has unlawfully privileged water exports over protection of Delta water quality, water quantity, public trust values, and ESA values.

efficiency and demand reduction programs including urban and agricultural water conservation, recycling, storm water recapture and reuse; reinforced levees above PL 84-99 standards; installation of improved fish screens at existing Delta pumps; elimination of irrigation water applied on up to 1.3 million acres of drainage-impaired farmlands south of the Bay-Delta; return the Kern Water Bank to State control; restore Article 18 urban preference; restore the original intent of Article 21 surplus water in SWP contracts; conduct feasibility study for Tulare Basin water storage; provide fish passage above and below Central Valley rim dams for species of concern; and retain cold water for fish in reservoirs. We also requested that the range of reasonable alternatives include reducing exports both more and less than the 3,000,000 acre feet limit called for by this alternative.

A Sustainable Water Plan for California is a carefully conceived modern, 21st-century Plan alternative. It is an example of the kinds of alternatives to extending the contracts 50 years that DWR must consider in order to proceed in the manner required by law.

12-4 cont.

There is more. On August 1, 2016, the Council on Environmental Quality (CEQ) issued a Memorandum for Heads of Federal Departments and Agencies: *Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews.* The *Final Guidance* fits this situation perfectly:

> The analysis of climate change impacts should focus on those aspects of the human environment that are impacted by both the proposed action and climate change. Climate change can make a resource, ecosystem, human community, or structure more susceptible to many types of impacts and lessen its resilience to other environmental impacts apart from climate change. This increase in vulnerability can exacerbate the effects of the proposed action. *For example, a proposed action may require water from a stream that has diminishing quantities of available water because of decreased snow pack in the mountains, or add heat to a water body that is already warming due to increasing atmospheric temperatures.* Such considerations are squarely within the scope of NEPA and can inform decisions on whether to proceed with, and how to design, the proposed action to eliminate or mitigate impacts exacerbated by climate change. (*Final Guidance,* p. 21)(Emphasis added).

Logically, the Final Guidance issued by CEQ is as pertinent to CEQA review as it is to NEPA review of proposed projects.

Here, climate change will be reducing, in the long-term, mountain snowpack and mountain stream runoff thereby reducing freshwater flows in the San Francisco Bay-Delta watershed and in the Delta itself. Among other things, reduction in flows will add heat to the water exacerbating impacts to fish, fish habitat, and human health. At the same time, climate change induced rising sea levels will exacerbate the salinity intrusion in the Delta.

12-5

The *Final Guidance* states that:

> Agencies should consider applying this guidance to projects in the EIS or EA preparation stage *if this would inform the consideration of differences between alternatives* or address comments raised through the public comment process with sufficient scientific basis that *suggest the environmental analysis would be incomplete* without application of the guidance, and the additional time and resources needed would be proportionate to the value of the information included. (*Final Guidance*, p. 34)(Emphasis added). 12-5 cont.

The projections of long-term reduced San Francisco Bay Delta watershed runoff and rising sea levels inducing greater salinity intrusion continue to worsen. This will be reducing available water supply making existing delivery levels all the more infeasible as well as exacerbating the adverse environmental impacts if nevertheless contracts are extended. This makes the absence of proper development and consideration of alternatives increasing freshwater flows through the Delta by reducing exports all the more prejudicial to any kind of meaningful, informed public review. The failure to properly assess climate change impacts here is extremely serious. 12-6

The failure to properly evaluate a range of reasonable alternatives violates CEQA. An EIR must "describe a range of reasonable alternatives to the project . . . which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives." 14 Code Cal. Regs (CEQA Guidelines) § 15126.6(a). "[T]he discussion of alternatives shall focus on alternatives to the project or its location which are capable of avoiding or substantially lessening any significant effects of the project, even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly." § 15126.6(b). 12-7

Recirculation of a new Draft EIR/EIS will be required by CEQA Guidelines section 15088.5(a) for several reasons including the failure to properly develop and evaluate the required range of reasonable alternatives increasing Delta flows by reducing exports.

In short, the fundamental flaws in the treatment of alternatives and other deficiencies as set forth here and by the NRDC have led to a DEIR "so fundamentally and basically inadequate and conclusory in nature that meaningful public review and comment were precluded." These deficiencies are so serious that we include the text of CEQA guideline section 15088.5(a).[2] Again, recirculation of a new, revised DEIR is required by CEQA. 12-8

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[2] § 15088(a) provides:
A lead agency is required to recirculate an EIR when significant new information is added to the EIR after public notice is given of the availability of the draft EIR for public review under Section 15087 but before certification. As used in this section, the term "information" can include changes in the project or environmental setting as well as additional data or other information. New information added to an EIR is not "significant" unless the EIR is changed

DWR IS ALSO VIOLATING THE DELTA REFORM ACT

On May 18, 2016, the Superior Court, County of Sacramento, issued its 73 page ruling in the *Delta Stewardship Council Cases* (Judicial Council Coordination Proceeding No. 4758) that invalidated the Delta Plan adopted by the Delta Stewardship Council pursuant to the Delta Reform Act. The court found the adopted Plan violated the Delta Reform Act because it failed to include quantified or otherwise measurable targets associated with achieving reduced Delta reliance (Ruling p. 12), failed to include quantified or otherwise measurable targets associated with restoring more natural flows (Ruling p. 36), and failed to promote options for water conveyance and storage systems. (Ruling pp. 38, 72).[3]

The Delta Reform Act declared in Water Code § 85086(b):

> It is the intent of the Legislature to establish an accelerated process to determine instream flow needs of the Delta for the purposes of facilitating the planning decisions that are required to achieve the objectives of the Delta Plan.

12-9

The Water Quality Control Plan for the San Francisco Bay/San Joaquin -Sacramento Delta Estuary (WQCP) (Water Rights Decision 1641, D-1641) was adopted in 1995, and amended without substantive changes in 2006. The State Water Board is in the process of a periodic update of the WQCP, which is occurring in phases

The Bay-Delta Plan was 15 years out of date when the Delta Reform Act was enacted. The Plan is now 20 years out of date. The Act is being ignored by DWR in its refusal to await updating the Bay-Delta Plan and compliance with the Delta Reform Act before deciding whether to extend the contracts. For DWR, it as if the Delta Reform Act of 2009 was not enacted into law.

The Delta Reform Act (Water Code § 85021) provides that:

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in a way that deprives the public of a meaningful opportunity to comment upon a substantial adverse environmental effect of the project or a feasible way to mitigate or avoid such an effect (including a feasible project alternative) that the project's proponents have declined to implement. “Significant new information” requiring recirculation include, for example, a disclosure showing that:
(1) A new significant environmental impact would result from the project or from a new mitigation measure proposed to be implemented.
(2) A substantial increase in the severity of an environmental impact would result unless mitigation measures are adopted that reduce the impact to a level of insignificance.
(3) A feasible project alternative or mitigation measure considerably different from others previously analyzed would clearly lessen the significant environmental impacts of the project, but the project's proponents decline to adopt it.
(4) The draft EIR was so fundamentally and basically inadequate and conclusory in nature that meaningful public review and comment were precluded.

[3] On June 24, 2016 the court issued its Ruling clarifying its earlier Ruling, by determining: “To be clear, the Delta Plan is invalid and must be set aside until proper revisions are completed."

> The policy of the State of California is to reduce reliance on the Delta in meeting California's future water supply needs through a statewide strategy of investing in improved regional supplies, conservation, and water use efficiency. . . . 12-9 cont.

Delta Reform Act policies also include (Water Code § 85020 (c):

> Restore the Delta ecosystem, including its fisheries and wildlife, as the heart of a healthy estuary and wetland ecosystem.

CONCLUSION

A new, revised DEIR must be prepared and recirculated for public review and comment 12-10
correcting the deficiencies identified by the NRDC. Among the necessary revisions is the proper
development and consideration of the CEQA required range of reasonable alternatives reducing
exports and evaluation of the reduced freshwater runoff and exacerbated adverse impacts of 12-11
exporting water from the Delta as a result of worsening climate change.

A new, revised DEIR must be prepared and recirculated for public review and comment requiring compliance with the Delta Reform Act and measuring extension of the contracts and those impacts against the requirements of the Delta Reform Act. Instead, DWR is proceeding as if the Delta Reform Act has not become a key part of the law of the State of California applicable to Delta flows and exports from the Delta. This failure also constitutes failure to proceed in the manner required by law. 12-12

Sincerely,

E. Robert Wright

E. Robert Wright
Senior Counsel, Friends of the River

Response to Comment 12-1

The comment does not provide specific reference to deficiencies within the DEIR. See Responses to Comments 12-3 through 12-12.

Response to Comment 12-2

The comment references and incorporates all the comments made in comment Letter 8 (NRDC, Defenders of Wildlife, and Bay Institute). Please see the responses to Letter 8.

Response to Comment 12-3

As discussed in Response to Comment 5-53, an alternative that considers reduced Table A deliveries was included in the DEIR but, as described on pages 7-3 and 7-4, reducing Table A amounts proportionality for all the Contractors by amendment would not change the amount of water being delivered to the Contractors nor would it change the financial health of the SWP as it would not affect any of the other Contract financial provisions that address SWP billing provisions and reimbursements. Therefore, reducing Table A deliveries was rejected because it does not address project objectives. See Master Response 6 for more information on reducing Table A amounts. Please also see Response to Comment 5-11 for discussion of the definition of the proposed project and Master Response 2 for discussion of the range of alternatives evaluated in the DEIR.

See Response to Comment 5-32 for discussion of consistency with the Delta Reform Act.

Response to Comment 12-4

Please see Response to Comment 5-11 for discussion of the definition of the proposed project and Master Response 2 for discussion of the range of alternatives evaluated in the DEIR. See Response to Comment 8-1 for discussion of why, as part of this proposed project, DWR is not proposing terms to reflect changes in circumstances since the Contracts were originally executed.

Response to Comment 12-5

Only the CEQA Guidelines, and not the NEPA Council on Environmental Quality (CEQ) Guidelines, are applicable to the project analysis because there is no federal nexus and no federal lead agency. Further, greenhouse gas emissions were analyzed in Chapter 5, Environmental Analysis on pages 5-62 through 5-72.

Specifically, as it relates to climate change and its effects on SWP deliveries, as described on page 5-6 of the DEIR and discussed in Response to Comment 5-88, because SWP water supply would not change under the proposed project and would continue to be delivered to the Contractors consistent with current Contracts, the proposed project does not change hydrology, regulations, or climate change, all factors that could affect water supply delivery by the SWP. DWR would continue to maintain and operate the SWP and deliver available supplies to the Contractors consistent with the Contract terms, including Table A deliveries, Article 21 deliveries, and all regulatory requirements. Therefore, no changes in the conditions of resources associated with the SWP would be expected.

Response to Comment 12-6

See Response to Comment 5-11 for discussion of the definition of the proposed project and Master Response 2 for discussion of the range of alternatives evaluated in the DEIR. See Response to Comment 12-5 for discussion of climate change.

Response to Comment 12-7

See Master Response 2 for discussion of the range of alternatives evaluated in the DEIR. See also Master Response 4 for discussion of compliance with current environmental regulations BiOps and Master Response 5 on recirculation.

Response to Comment 12-8

The comment references and incorporates all the comments made in Letter 8 (NRDC, Defenders of Wildlife, and Bay Institute). Please see the responses to Letter 8. See Master Response 2 for discussion of the range of alternatives evaluated in the DEIR. See also Master Response 5 on recirculation.

Response to Comment 12-9

See Response to Comment 5-32 for discussion of consistency with the Delta Reform Act.

Response to Comment 12-10

The comment references and incorporates all the comments made in Letter 8 (NRDC, Defenders of Wildlife, and Bay Institute). Please see the responses to Letter 8. See also Master Response 5 on recirculation.

Response to Comment 12-11

See Response to Comment 5-11 for discussion of the definition of the proposed project and Master Response 2 for discussion of the range of alternatives evaluated in the DEIR. See Response to Comment 12-5 for discussion of climate change.

Response to Comment 12-12

See Master Response 5 on recirculation and Response to Comment 5-32 for discussion of consistency with the Delta Reform Act.

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Exhibit A

Proposed Contract Extension Amendment

EXHIBIT A

GENERAL GUIDE

AIP PRINCIPLES INCORPORATED INTO EXTENSION AMENDMENT LANGUAGE

AIP Objective	Title in AIP / General Description of Key Terms	Amendment Article Number
1	Term of Contract Term Extension: Extends the term of the SWP water supply contracts to December 31, 2085.	2
2A	Reserves – General Operating Account: Increases the maximum cap in the General Operating Account, and specifies other actions and limitations.	61 (a)
2B	Accounts -- SWRDS Reinvestment Account (SRA), SWRDS Support Account (SSA), and Facilities Capital Account (FCA): Establishes the SRA and SSA and provides for each account's purposes and operation. Establishes process for closing the FCA.	51(b)(FCA) 61(b) (SRA) 61(c) (SSA)
2C	Flow of Funds – Adjusts the Monterey Amendment's flow and uses of funds, which will no longer apply after December 31, 2035.	51(e)
2D	Financial Management – Establishes a joint DWR and SWP Contractor finance committee, with the primary purpose to make recommendations to the DWR Director concerning the financial policies of the SWRDS.	61(e)
2E	Supplemental Billing – Adjustments are made to the supplemental billing provisions related to system cash balances.	51(c)(4)
2F	Cost Recovery – Addresses cost recovery principles and procedures.	61(f)
2G	SWRDS Reporting Principles – Establishes principles for financial reporting.	Appendix B
2H	Article 51(e) Revenue Reporting Requirements – Establishes reports to be prepared by DWR.	51(e)(3)&(4) 61(d)
3A	Simplification of Billing – Establishes pre- and post- amendment cost repayment provisions, with post- repayment costs on a primarily a "Pay-As-You-Go" basis, including billing for actual debt service	5, 22, 23, 24, 25, 26, 27, 28, 29, 50
3B	Replacement Accounting System (RAS) – Provides for the elimination of the RAS.	Willl implement with existing provisions
3C	Article 1(h)(h) – Expands one category and adds another category of projects which when authorized may be financed with water system revenue bonds.	1(ap)(8) 1(ap)(11)
3D	Billing Authorization – sets out current excerpts from recreation and fish and wildlife enhancement statute (Davis-Dolwig Act).	22(c)(1)(C) 23(d)(2)
Other	Effective Date, Billing Estimates, Waiver and Release, Other Provisions Remain in Effect	Implementing and Admin Provisions

STATE OF CALIFORNIA
CALIFORNIA NATURAL RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
____

AMENDMENT NO. _____(THE CONTRACT EXTENSION AMENDMENT) TO WATER SUPPLY CONTRACT BETWEEN THE STATE OF CALIFORNIA DEPARTMENT OF WATER RESOURCES AND THE ___________________________ FOR CONTINUED SERVICE AND THE TERMS AND CONDITIONS THEREOF

THIS AMENDMENT to the Water Supply Contract is made this _________ day of ___________________, 201_, pursuant to the provisions of the California Water Resources Development Bond Act, the Central Valley Project Act, and other applicable laws of the State of California, between the State of California, acting by and through its Department of Water Resources, herein referred to as the “State,” and _____________ ___________, herein referred to as the “[District].”

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RECITALS

A. The State and the [District] entered into and subsequently amended a water supply contract (the “contract”), dated November 4, 1960, providing that the State shall supply certain quantities of water to the [District] and providing that the [District] shall make certain payments to the State, and setting forth the terms and conditions of such supply and such payments; and

B. Article 2 of the contract provides that the contract shall remain in effect for the longest of the following: (1) the project repayment period, which, as defined in the contract, is to end on December 31, 2035; (2) 75 years from the original date of the contract; and (3) the period ending with the latest maturity date of any bond issue used to finance the construction costs of project facilities; and

C. The longest of the above referenced periods in Article 2 would have ended in this contract on [DATE]; and

D. Article 4 of the contract provides that the [District], by written notice to the State at least six (6) months prior to the expiration of the term of the contract (as specified in Article 2), may elect to receive continued service under the contract under certain conditions specified therein and under other terms and conditions that are reasonable and mutually agreed upon by the State and the [District]; and

E. The State, the [District] and representatives of certain other State Water Project Contractors have negotiated and executed a document (Execution Version dated June 18, 2014), the subject of which is “Agreement in Principle Concerning Extension of the State Water Project Water Supply Contracts” (the “Agreement in Principle”); and

F. The Agreement in Principle describes the terms and conditions of the continued service upon which the State and the [District] mutually proposed to develop contractual amendments consistent with the Agreement In Principle; and

G. The State, the [District] and those Contractors intending to be subject to the contract amendments contemplated by the Agreement in Principle subsequently prepared an amendment to their respective contracts to implement the provisions of the Agreement in Principle, and such amendment was named the “Amendment for Continued Service and the Terms and Conditions Thereof”; and

H. The State and the [District] desire to implement continued service under the contract under the terms and conditions of this Amendment for Continued Service and the Terms and Conditions Thereof to the water supply contract; and

I. The [District]’s execution of this Amendment for Continued Service and the Terms and Conditions Thereof is the equivalent of the [District]’s election under Article 4 to receive continued service under the contract under the conditions provided in Article 4, and the mutually agreed terms and conditions herein are the other reasonable and equitable terms and conditions of continued service referred to in Article 4.

NOW, THEREFORE, IT IS MUTUALLY AGREED that the following changes and additions are hereby made to the [District]'s water supply contract with the State:

AMENDED CONTRACT TEXT

I. ARTICLES 1, 2, 5, 22 THROUGH 29, 50 AND 51 ARE DELETED IN THEIR ENTIRETY AND REPLACED WITH THE FOLLOWING TEXT:

1. DEFINITIONS.

When used in this contract, the following terms shall have the meanings hereinafter set forth:

(a) **"Additional Project Conservation Facilities"** shall mean the following facilities and programs, which will serve the purpose of preventing any reduction in the Minimum Project Yield as hereinafter defined:

(1) Those Project Facilities specified in Section 12938 of the Water Code;

(2) Those facilities and programs described in (A), (B), (C), (D), and (E) below which, in the State's determination, are engineeringly feasible and capable of producing Project Water which is economically competitive with alternative new water supply sources, *provided* that in the State's determination, the construction and operation of such facilities and programs will not interfere with the requested deliveries of Annual Table A Amount to any Contractor other than the sponsoring Contractor, and will not result in any greater annual charges to any Contractor other than the sponsoring Contractor than would have occurred with the construction at the same time of alternative new water supply sources which are either reservoirs located north of the Delta or off-Aqueduct storage reservoirs located south or west of the Delta designed to supply water to the California Aqueduct.

The following facilities and programs shall hereinafter be referred to as "Local Projects":

(A) On-stream and off-stream surface storage reservoirs not provided for in Section 12938 of the Water Code, that will produce Project Water for the System for a period of time agreed to by the sponsoring Contractor;

(B) Groundwater storage facilities that will produce Project Water for the System for a period of time agreed to by the sponsoring Contractor;

(C) Waste water reclamation facilities that will produce Project Water for the System for a period of time agreed to by the sponsoring Contractor;

(D) Water and facilities for delivering water purchased by the State for the System for a period of time agreed to by the sponsoring Contractor; *provided* that the economic test specified herein shall be applied to the cost of these facilities together with the cost of the purchased water; and

(E) Future water conservation programs and facilities that will reduce demands by the sponsoring Contractor for Project Water from the System for a period of time agreed to by the sponsoring Contractor and will thereby have the effect of increasing Project Water available in the Delta for distribution.

(3) Whether a Local Project described in (2) above shall be considered economically competitive shall be determined by the State by comparing, in an engineering and economic analysis, such Local Project with alternative new water supply sources which are either reservoirs located north of the Delta or off-Aqueduct storage reservoirs located south or west of the Delta designed to supply water to the California Aqueduct. The analysis for such alternative new water supply sources shall use the average cost per acre-foot of yield in the latest studies made for such sources by the State and shall compare those facilities with the proposed Local Project using commonly accepted engineering economics. In the case of a Local Project to be funded in part by the State as part of the System and in part from other sources, the economic analysis specified herein shall be applied only to the portion to be funded by the State as part of the System.

(4) The Local Projects in (2) above shall not be constructed or implemented unless or until:

(A) The sponsoring Contractor signs a written agreement with the State which:

(i) Contains the sponsoring Contractor's approval of such facility or program;

(ii) Specifies the yield and the period of time during which the water from the Local Project shall constitute Project Water; and
(iii) Specifies the disposition of such Local Project or of the yield from such Local Project upon the expiration of such period of time.

(B) All Contractors within whose boundaries any portion of such Local Project is located, and who are not sponsoring Contractors for such Local Project give their written approval of such Local Project.

(5) “Sponsoring Contractor” as used in this Article 1(a) shall mean the Contractor or Contractors who either will receive the yield from facilities described in 2(A), (B), (C), or (D) above, or agree to reduce demands for Project Water from the System pursuant to 2(E) above.

(6) In the event of a shortage in water supply within the meaning of Article 18(a), the determination of whether to count, in whole or in part, the yield from facilities described in 2(A), (B), (C), or (D) above, or the reduced demand from future conservation programs described in 2(E) above in the allocation of deficiencies among Contractors will be based on a project-by-project evaluation taking into consideration such factors as any limitation on the use of the water from such facilities and whether the sponsoring Contractor has access to Project Water from the Delta as an alternate to such facilities.

(b) **“Agricultural Use”** shall mean any use of water primarily in the production of plant crops or livestock for market, including any use incidental thereto for domestic or stock-watering purposes.

(c) **“Annual Table A Amount”** shall mean the amount of Project Water set forth in Table A of this Contract that the State, pursuant to the obligations of this contract and applicable law, makes available for delivery to the [District] at the delivery structures provided for the [District]. The term Annual Table A Amount shall not be interpreted to mean that in each year the State will be able to make that quantity of Project Water available to the [District]. The Annual Table A Amounts and the terms of this contract reflect an expectation that under certain conditions only a lesser amount, allocated in accordance with this contract, may be made available to the [District]. This recognition that full Annual Table A Amounts will not be deliverable under all conditions does not change the obligations of the State under this contract, including but not limited to, the obligations to make all reasonable efforts to complete the Project Facilities, to perfect and protect water rights, and to allocate among Contractors the supply available in any year, as set forth in Articles 6(b), 6(c), 16(b) and 18, in the manner and subject to the terms and conditions of those articles and this contract. Where the term “annual entitlement” appears elsewhere in this contract, it shall mean “Annual Table A Amount.” The State agrees that in future amendments to this and other Contractor’s contracts, in lieu of the term “annual entitlement,” the term “Annual Table A

Amount" will be used and will have the same meaning as "annual entitlement" wherever that term is used.

(d) **"Area of Origin Statutes"** shall mean Sections 10505 and 11460 through 11463 of the Water Code as now existing or hereafter amended.

(e) **"Article 51(e) Amounts"** shall mean the annual amounts determined pursuant to Article 51(e)(1).

(f) **"Billing Transition Date"** shall mean January 1 of the first calendar year starting at least six (6) months after the Contract Extension Amendment Effective Date.

(g) **"Burns-Porter Bond Act"** shall mean the California Water Resources Development Bond Act, comprising Chapter 8, commencing at Section 12930, of Part 6 of Division 6 of the Water Code, as enacted in Chapter 1762 of the Statutes of 1959.

(h) **"Capital Costs"** shall mean all costs Incurred subsequent to authorization of a facility for construction by the Legislature or by administrative action pursuant to Section 11290 of the Water Code and to the Burns-Porter Bond Act, including those so Incurred prior to the beginning of the Project Repayment Period as herein defined and any accrued unpaid interest charges thereon at the rates specified herein, which are properly chargeable to the construction of and the furnishing of equipment for the facilities of the System, including the costs of surveys, engineering studies, exploratory work, designs, preparation of construction plans and specifications, acquisition of lands, easements and rights-of-way, and relocation work, all as shown upon the official records of the Department of Water Resources.

(i) **"Carry-over Table A Water"** shall mean water from a Contractor's Annual Table A Amount for a respective year, which is made available for delivery by the State in the next year pursuant to Article 12(e).

(j) **"Central Valley Project Act"** shall mean the Central Valley Act comprising Part 3, commencing at Section 11100, of Division 6 of the Water Code**.**

(k) **"Contract Extension Amendment"** shall mean the substantially similar amendments to the Contractors' Water Supply Contracts that include, among other things, an extension of the term of the contract to December 31, 2085.

(l) **"Contract Extension Amendment Effective Date"** shall mean the date on which the Contract Extension Amendment becomes effective with regard to this contract. The State shall provide a written notice to the [District] specifying the Contract Extension Amendment Effective Date once the applicable conditions set out in the Contract Extension Amendment have been met.

(m) “**Contractor**” shall mean any entity that has executed, or is an assignee of, a contract of the type published in Department of Water Resources Bulletin No. 141, dated November 1965, with the State for a dependable supply of water made available by the System, except such water as is made available by the facilities specified in Section 12934(d)(6) of the Water Code, as such contracts have been amended from time to time.

(n) **“Delta”** shall mean the Sacramento-San Joaquin Delta as defined in Section 12220 of the Water Code on the date of approval of the Burns-Porter Bond Act by the voters of the State of California.

(o) **“East Branch Aqueduct”** shall mean that portion of the San Joaquin Valley-Southern California Aqueduct specified in Section 12934(d)(2) of the Water Code extending from the South Portal of the Tehachapi Tunnels to a terminus in the vicinity of Perris, Riverside County.

(p) **“Economic Useful Life”** shall mean the period during which the State expects to derive economic benefit from using an asset, as determined by the State.

(q) **“Financial Information System”** shall mean the system of record designated by the State as the authoritative source for the recording of all financial data values relating to the System.

(r) **“Financing Costs”** shall mean the following:

(1) principal of and interest on Revenue Bonds,

(2) debt service coverage required by the applicable bond resolution or indenture in relation to such principal and interest,

(3) deposits to reserves required by the bond resolution or indenture in relation to such Revenue Bonds, and

(4) premiums for insurance or other security obtained in relation to such Revenue Bonds.

(s) **“Incurred”** shall mean the following with respect to the timing of a cost:

(1) Capital Costs and operation, maintenance, and power costs allocated irrespective of the amount of Project Water delivered to the Contractors are “Incurred” when the expenditure for the good, service or other consideration is recorded in the State’s financial information system, regardless of the date the good, service or other consideration is provided; and

(2) operation, maintenance, and power costs allocated in an amount which is dependent upon and varies with the amount of Project Water delivered to the Contractors are "Incurred" when the good, service or other consideration is provided, regardless of when the expenditure for the good, service or other consideration is recorded in the financial information system.

(t) **"Initial Project Conservation Facilities"** shall mean the following Project Facilities specified in Section 12934(d) of the Water Code:

(1) All those facilities specified in subparagraph (1) thereof.

(2) Those facilities specified in subparagraph (3) thereof to the extent that they serve the purposes of water conservation in the Delta, water supply in the Delta, and transfer of water across the Delta.

(3) A reservoir near Los Banos in Merced County as specified in subparagraph (2) thereof.

(4) The reach of the San Joaquin Valley-Southern California Aqueduct extending from the Delta to a reservoir near Los Banos in Merced County, to the extent required for water conservation through conveyance of water diverted from the Delta to offstream storage in such reservoir as determined by the State.

(5) Those facilities specified in subparagraph (5) thereof which are incidental to the facilities included under (1), (2), (3), and (4) above.

(6) Those facilities specified in subparagraph (7) thereof which are necessary and appurtenant to the facilities included under (1), (2), (3), (4), and (5) above.

(u) **"Interruptible Water"** shall mean Project Water available as determined by the State that is not needed for fulfilling Contractors' Annual Table A Amount deliveries as set forth in their water delivery schedules furnished pursuant to Article 12 or for meeting project operational requirements, including storage goals for the current or following years.

(v) **"Manufacturing Use"** shall mean any use of water primarily in the production of finished goods for market.

(w) "**Maximum Annual Table A Amount"** shall mean the maximum annual amount set forth in Table A of this contract, and where the term "maximum annual entitlement" appears elsewhere in this contract it shall mean "Maximum Annual Table A Amount."

(x) **"Minimum Project Yield"** shall mean the dependable annual supply of project water to be made available assuming completion of the initial project conservation facilities and additional project conservation facilities. The project's capability of providing the Minimum Project Yield shall be determined by the State on the basis of coordinated operations studies of initial project conservation facilities and additional project conservation facilities, which studies shall be based upon factors including but not limited to:

(1) the estimated relative proportion of deliveries for agricultural use to deliveries for municipal use assuming Maximum Annual Table A Amounts for all Contractors and the characteristic distributions of demands for these two uses throughout the year; and

(2) agreements now in effect or as hereafter amended or supplemented between the State and the United States and others regarding the division of utilization of waters of the Delta or streams tributary thereto.

(y) **"Monterey Amendment"** shall mean the substantially similar amendments to Contractors' Water Supply Contracts that included, among other provisions, the addition of Articles 51 through 56.

(z) **"Municipal Use"** shall mean all those uses of water common to the municipal water supply of a city, town, or other similar population group, including uses for domestic purposes, uses for the purposes of commerce, trade or industry, and any other use incidental thereto for any beneficial purpose.

(aa) **"Nonproject Water"** shall mean water made available for delivery to Contractors that is not Project Water as defined in Article 1(ah).

(ab) **"Project Facilities"** shall mean those facilities of the System which will, in whole or in part, serve the purposes of this contract by conserving water and making it available for use in and above the Delta and for export from the Delta and from such additional facilities as are defined in Article 1(a)(2), and by conveying water to the [District]. Such Project Facilities shall consist specifically of "Project Conservation Facilities" and "Project Transportation Facilities", as hereinafter defined.

(ac) **"Project Conservation Facilities"** shall mean such Project Facilities as are presently included, or as may be added in the future, under 1(a) and 1(t).

(ad) **"Project Interest Rate"** shall mean the following:

(1) Prior to the Billing Transition Date, the weighted average interest rate on bonds, advances, or loans listed in this section to the extent the proceeds of any such bonds, advances, or loans are for construction of the State Water Facilities defined in Section 12934(d) of

the Water Code, the additional project conservation facilities, and the supplemental conservation facilities (except off-aqueduct power facilities; water system facilities; advances for delivery structures, measuring devices and excess capacity; and East Branch Enlargement Facilities). The Project Interest Rate shall be calculated as a decimal fraction to five places by dividing (i) the total interest cost required to be paid or credited by the State during the life of the indebtedness or advance by (ii) the total of the products of the various principal amounts and the respective terms in years of all such amounts. The bonds, advances, or loans used in calculating the project interest rate shall be:

(A) General obligation bonds issued by the State under the Bond Act, except that any premium received on the sale of these bonds shall not be included in the calculation of the project interest rate,

(B) Revenue Bonds issued after May 1, 1969,

(C) Bonds issued by the State under any other authority granted by the Legislature or the voters,

(D) Bonds issued by any agency, district, political subdivision, public corporation, or nonprofit corporation of this State,

(E) Funds advanced by any Contractor without the actual incurring of bonded debt therefore, for which the net interest cost and terms shall be those which would have resulted if the Contractor had sold bonds for the purpose of funding the advance, as determined by the State,

(F) Funds borrowed from the General Fund or other funds in the Treasury of the State of California, for which the total interest cost shall be computed at the interest rate earned over the period of such borrowing by moneys in the Surplus Money Investment Fund of such Treasury invested in securities, and

(G) Any other financing capability available in the Treasury of the State of California at whatever interest rate and other financing costs are provided in the law authorizing such borrowing. However, the use of other financing from the State Treasury is intended to involve only short term borrowing at interest rates and other financing costs no greater than those charged to other State agencies during the same period until such time as the Department can sell bonds and reimburse the source of the short term borrowing from the proceeds of the bond sale.

(2) On and after the Billing Transition Date, the Project Interest Rate shall be four and six hundred and ten thousandths percent (4.610%) per annum.

(ae) **"Project Repayment Period"** shall mean that period of years commencing on January 1, 1961, and extending until December 31, 2035.

(af) **"Project Revenues"** shall mean revenues derived from the service of Project Water to Contractors and others, and from the sale or other disposal of electrical energy generated in connection with operation of Project Facilities.

(ag) **"Project Transportation Facilities"** shall mean the following Project Facilities:

(1) All those facilities specified in subparagraph (2) of Section 12934(d) of the Water Code except: The reservoir near Los Banos in Merced County; the reach of the San Joaquin Valley-Southern California Aqueduct extending from the Delta to the reservoir near Los Banos in Merced County, to the extent required for water conservation as determined by the State; the North Bay Aqueduct extending to a terminal reservoir in Marin County; the South Bay Aqueduct extending to terminal reservoirs in the Counties of Alameda and Santa Clara; the Pacheco Pass Tunnel Aqueduct extending from a reservoir near Los Banos in Merced County to a terminus in Pacheco Creek in Santa Clara County; and the Coastal Aqueduct beginning on the San Joaquin Valley-Southern California Aqueduct in the vicinity of Avenal, Kings County, and extending to a terminus at the Santa Maria River.

(2) Facilities for the generation and transmission of electrical energy of the following types:

(A) Hydroelectric generating and transmission facilities, whose operation is dependent on the transportation of Project Water, or on releases to channels downstream of Project Facilities defined under (1) above. Such facilities shall be called "project aqueduct power recovery plants."

(B) All other generating and associated transmission facilities, except those dependent on water from Project Conservation Facilities, for the generation of power. These facilities shall be called "off-aqueduct power facilities" and shall consist of the State's interest in the Reid-Gardner and any other generating and associated transmission facilities, constructed or financed in whole or in part by the State, which are economically competitive with alternative power supply sources as determined by the State.

(3) Those facilities specified in subparagraph (7) of Section 12934(d) of the Water Code which are necessary and appurtenant to the facilities included under (1) and (2) above.

(ah) **"Project Water"** shall mean water made available for delivery to the Contractors by the Project Conservation Facilities and the Project Transportation Facilities included in the System.

(ai) **"Revenue Bonds"** shall mean the following types of instruments payable from the sources provided in the Central Valley Project Act: revenue bonds, notes, refunding bonds, refunding notes, bond anticipation notes, certificates of indebtedness, and other evidences of indebtedness.

(aj) **"Subject to Approval by the State"** shall mean subject to the determination and judgment of the State as to acceptability.

(ak) **"Supplemental Conservation Facilities"** shall mean those facilities provided for in Section 12938 of the Water Code which will serve the purpose of supplying water in addition to the Minimum Project Yield and for meeting local needs.

(al) **"Supplemental Water"** shall mean water made available by Supplemental Conservation Facilities, in excess of the Minimum Project Yield.

(am) **"System"** shall mean the State Water Resources Development System as defined in Section 12931 of the Water Code.

(an) **"System Revenue Account"** shall mean the special account created pursuant to Water Code Section 12937(b) into which are deposited all revenues derived from the sale, delivery or use of water or power and all other income or revenue, derived by the State, from the System, with the exception of revenue attributable to facilities financed with revenue bonds issued pursuant to the Central Valley Project Act (Water Code Section 11100 et seq.).

(ao) **"Water Supply Contract"** shall mean one of the contracts described in the definition of Contractor in Article 1(m).

(ap) **"Water System Facilities"** shall mean the following facilities to the extent that they are financed with Revenue Bonds or to the extent that other financing of such facilities is reimbursed with proceeds from Water System Facility Revenue Bonds:

(1) The North Bay Aqueduct,

(2) The Coastal Branch Aqueduct,

(3) Delta Facilities, including Suisun Marsh facilities, to serve the purposes of water conservation in the Delta, water supply in the Delta, transfer of water across the Delta, and mitigation of the environmental effects of Project Facilities, and to the extent presently authorized as project purposes, recreation and fish and wildlife enhancement,

(4) Local projects as defined in Article 1(a)(2) designed to develop no more than 25,000 acre-feet of project yield from each project,

(5) Land acquisition prior to December 31, 1995, for the Kern Fan Element of the Kern Water Bank,

(6) Additional pumps at the Banks Delta Pumping Plant,

(7) The transmission line from Midway to Wheeler Ridge Pumping Plant,

(8) Repairs, additions, and betterments to Project Facilities,

(9) A Project Facilities corporation yard,

(10) A Project Facilities operation center, and

(11) Capital projects which are approved in writing by the State and eighty (80) percent of the affected Contractors as “Water System Facilities”, *provided* that the approving Contractors’ Table A amounts exceed eighty (80) percent of the Table A amounts representing all affected Contractors and *provided further* that “affected Contractors” for purposes of this subdivision (11) shall mean those Contractors which would be obligated to pay a share of the debt service on Revenue Bonds issued to finance such project**.**

(aq) **“Water System Facility Revenue Bonds”** shall mean Revenue Bonds issued after January 1, 1987 for Water System Facilities identified in Article 1(ap).

(ar) **“West Branch Aqueduct”** shall mean that portion of the San Joaquin Valley-Southern California Aqueduct specified in Section 12934(d)(2) of the Water Code extending from the South Portal of the Tehachapi Tunnels to a terminus in the vicinity of Newhall, Los Angeles County.

(as) **“Year”** shall mean the 12-month period from January 1 through December 31, both dates inclusive.

(at) **“Year of Initial Water Delivery”** shall mean the year when Project Water will first be available for delivery to a Contractor pursuant to its contract with the State.

2. TERM OF CONTRACT.

This contract shall become effective on the date first above written and shall remain in effect for the longer of the following:

1. December 31, 2085, or

2. The period ending with the latest maturity date of any bond issue used to finance the construction costs of project facilities.

5. PLEDGE OF REVENUES.

This contract is entered into for the direct benefit of the holders and owners of all general obligation bonds issued under the Burns-Porter Bond Act and the holders and owners of Revenue Bonds issued under the Central Valley Project Act, and the income and revenues derived from this contract are pledged to the respective purposes and in the respective priorities set forth in these acts, as provided by law.

22. DELTA WATER CHARGE

The payments to be made by each Contractor shall include an annual charge designated as the Delta Water Charge, which shall be separately calculated and stated for costs Incurred prior to the Billing Transition Date and costs Incurred on or after the Billing Transition Date.

(a) **Delta Water Charge for Costs Incurred Prior to the Billing Transition Date**. The provisions of this subdivision (a) shall apply only to costs Incurred prior to the Billing Transition Date**.**

(1) *Recovery of Costs of Project Conservation Facilities*. The Delta Water Charge for costs Incurred prior to the Billing Transition Date, together with the total revenues derived prior to the Billing Transition Date from the sale or other disposal of electrical energy generated in connection with operation of Project Conservation Facilities, shall return to the State during the Project Repayment Period all costs of the Project Conservation Facilities Incurred prior to the Billing Transition Date**,** including capital, operation, maintenance, power, and replacement costs, which are allocated to the purpose of water conservation in, above, and below the Delta pursuant to subdivisions (c)(1) through (c)(3) of this article.

(2) *Components of Charge.* For each Contractor receiving Project Water in any year through December 31, 1969, the Delta Water Charge shall be the product of $3.50 and the Contractor's Annual Table A Amount for the respective year. For each Contractor receiving Project Water in the year 1970, the Delta Water Charge shall be the product of $6.65 and the Contractor's Annual Table A Amount for that year. The $6.65 rate for the year 1970 shall consist of a capital component of $5.04 and a minimum operation, maintenance, power and replacement component of $1.61. For each Contractor receiving Project Water in the year 1971, the Delta Water Charge shall be the product of $7.24 and the Contractor's Annual Table A Amount for that year. The $7.24 rate for the year 1971 shall consist of a capital component of $5.44 and a minimum operation, maintenance, power and replacement component of $1.80.

After December 31, 1971, the Delta Water Charge for costs Incurred prior to the Billing Transition Date shall consist and be the sum of the following components as these are computed in accordance with subdivisions (a)(3) and (a)(4) of this article: a capital component; a minimum operation, maintenance, power and replacement component; and a variable operation, maintenance, power and replacement component.

(3) *Charge Components Expressed as Rates*. The Capital Cost, the minimum operation, maintenance, power, and replacement, and the variable

operation, maintenance, power, and replacement components of the Delta Water Charge for costs Incurred prior to the Billing Transition Date, together with that portion of the revenues derived prior to the Billing Transition Date from the sale or other disposal of electrical energy generated in connection with operation of Project Conservation Facilities which is allocated by the State to repayment of the respective category of costs, shall return to the State during the Project Repayment Period, respectively, the following categories of the costs allocated to the purpose of water conservation in, above, and below the Delta pursuant to subdivisions (c)(1) through (c)(3) of this article:

(A) Capital Costs;

(B) operation, maintenance, power, and replacement costs Incurred irrespective of the amount of Project Water delivered to the Contractors; and

(C) operation, maintenance, power, and replacement costs Incurred in an amount which is dependent upon and varies with the amount of Project Water delivered to the Contractors;

provided that each of the above categories of costs shall be inclusive of the appropriate costs properly chargeable to the generation and transmission of electrical energy in connection with operation of Project Conservation Facilities. Each component of the Delta Water Charge for costs Incurred prior to the Billing Transition Date shall be computed on the basis of a rate which, when charged during the Project Repayment Period for each acre-foot of the sum of the yearly totals of Annual Table A Amounts of all Contractors, will be sufficient, together with that portion of the revenues derived prior to the Billing Transition Date from the sale or other disposal of electrical energy generated in connection with operation of Project Conservation Facilities which is allocated by the State to repayment of the respective category of costs, to return to the State during the Project Repayment Period all costs included in the respective category of costs covered by that component. Each such rate shall be computed in accordance with the following formula:

$$\frac{(c_1 - r_1)(1+i)^{-1} + (c_2 - r_2)(1+i)^{-2} + \cdots + (c_n - r_n)(1+i)^{-n}}{e_1(1+i)^{-1} + e_2(1+i)^{-2} + \cdots + e_n(1+i)^{-n}}$$

Where:

i = The Project Interest Rate.

c = The total costs included in the respective category of costs and Incurred during the respective year of the Project Repayment Period (prior to the Billing Transition Date).

r = That portion of the revenues derived from the sale or other disposal of electrical energy allocated by the State to repayment of the costs included in the respective category and Incurred during the respective year of the Project Repayment Period (prior to the Billing Transition Date).

1, 2, and n appearing below c and r = The respective year of the Project Repayment Period during which the costs included in the respective category are Incurred, n being the last year of the Project Repayment Period.

e = With respect to the Capital Cost and minimum operation, maintenance, power, and replacement components, the total of Annual Table A Amounts of all Contractors for the respective year of the Project Repayment Period.

e = With respect to the variable operation, maintenance, power, and replacement component, the total of the amounts of Project Water delivered to all Contractors for the respective year of the expired portion of the Project Repayment Period, together with the total of Annual Table A Amounts of all Contractors for the respective year of the unexpired portion of the Project Repayment Period.

1, 2, and n appearing below e = The respective year of the Project Repayment Period in which the Annual Table A Amounts or Project Water deliveries occur, n being the last year of the Project Repayment Period.

n used as an exponent = The number of years in the Project Repayment Period

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(4) *Determination of Charge Components.* The Capital Cost and minimum operation, maintenance, power, and replacement components of the Delta Water Charge for costs Incurred prior to the Billing Transition Date shall be the product of the appropriate rate computed under subdivision (a)(3) of this

article and the Contractor’s Annual Table A Amount for the respective year. The variable operation, maintenance, and power component of the charge shall be the product of the appropriate rate computed under subdivision (a)(3) of this article and the number of acre-feet of Project Water delivered to the Contractor during the respective year; *provided*, that when Project Water has been requested by a Contractor and delivery thereof has been commenced by the State, and, through no fault of the State, such water is wasted as a result of failure or refusal by the Contractor to accept delivery thereof, such variable component during such period shall be the product of such rate per acre-foot and the sum of the number of acre-feet of Project Water delivered to the Contractor and the number of acre-feet wasted.

(5) *Redetermination of Rates.* The rates to be used in determining the components of the Delta Water Charge pursuant to subdivision (a)(4) of this article and to become effective on January 1, 1970, shall be computed by the State in accordance with subdivision (a)(3) of this article prior to that date. Such computation shall include an adjustment which shall account for the difference, if any, between revenues received by the State under the Delta Water Charge prior to January 1, 1970, and revenues which would have been received under the charge prior to that date had it been computed and charged in accordance with subdivisions (a)(3) and (4) of this article. Upon such computation, a document establishing such rates shall be prepared by the State and attached to this contract as an amendment of this article. The State shall recompute such rates each year thereafter, and each such recomputation shall take account of and reflect increases or decreases from year to year in projected costs, outstanding reimbursable indebtedness of the State Incurred to construct the Project Conservation Facilities described in subdivisions (c)(1) through (c)(3) of this article, Annual Table A Amounts, deliveries of Project Water, Project Interest Rate, revenues from the sale or other disposal of electrical energy, and all other factors which are determinative of such rates. In addition, each such recomputation shall include an adjustment of the rates for succeeding years which shall account for the differences, if any, between projections of costs used by the State in determining such rates for all preceding years, and actual costs Incurred by the State during such years. Upon each such recomputation, an appropriately revised copy of the document establishing such rates shall be prepared by the State and attached to this contract as an amendment of this article.

(6) *Water System Facility Revenue Bond Charges.* Notwithstanding provisions of Article 22(a)(1) through (5), the capital and the minimum operation, maintenance, power and replacement component of the Delta Water Charge for costs Incurred prior to the Billing Transition Date shall include an annual charge to recover the [District]’s share of the portion of the Water System Facility Revenue Bond Financing Costs allocable to Project Conservation Facilities for Capital Costs Incurred prior to the Billing Transition Date. Charges to the [District]

for these costs shall be calculated in accordance with Article 50(a).

(b) **Delta Water Charge for Costs Incurred On or After the Billing Transition Date**. The provisions of this subdivision (b) of this article shall apply only to costs Incurred on or after the Billing Transition Date**.**

(1) *Components of the Delta Water Charge for Costs Incurred On or After the Billing Transition Date.* The Delta Water Charge for costs Incurred on or after the Billing Transition Date shall consist of the following components as these are computed in accordance with subdivisions (b)(2) through (b)(4) of this article:

(A) Capital component,

(B) Minimum operation, maintenance, power, and replacement component; and

(C) Variable operation, maintenance, and power component.

(2) *Determination of Charge Components.* These three components of the Delta Water Charge for each calendar year, together with that portion of the revenues derived during such calendar year from the sale or other disposal of electrical energy generated in connection with operation of Project Conservation Facilities which is allocated by the State to repayment of the respective category of costs, shall return to the State during such calendar year the following categories, respectively, of the costs allocated pursuant to subdivisions (c)(1) through (c)(3) of this article to the purpose of water conservation in, above, and below the Delta.

(A) the capital component consisting of Capital Costs of Project Conservation Facilities to be recovered during such calendar year as and to the extent provided in subdivision (b)(3) of this article;

(B) the minimum operation, maintenance, power, and replacement component consisting of operation, maintenance, power, replacement costs of Project Conservation Facilities Incurred during such calendar year irrespective of the amount of Project Water delivered to the Contractors; and

(C) the variable operation, maintenance, and power component consisting of operation, maintenance, and power costs of Project Conservation Facilities Incurred during such calendar year in an amount which is dependent upon and varies with the amount of Project Water delivered to the Contractors;

provided that each of the above categories of costs shall be inclusive of the appropriate costs properly chargeable to the generation and transmission of electrical energy in connection with operation of Project Conservation Facilities; and *provided further* that revenues generated in connection with the sale or other disposal of electrical energy generated in connection with operation of Project Conservation Facilities shall not reduce or be credited against charges pursuant to subdivision (b)(3)(D)(i) of this article (charges for Water System Facility Revenue Bond Financing Costs);

(3) *Categories of Capital Costs.*

(A) The amount of the capital component of the Delta Water Charge shall be determined in three steps as follows:

(i) first, an allocation to the [District] of Capital Costs of Project Conservation Facilities as provided in subdivisions (c)(1) through (c)(3) of this article,

(ii) second, a determination of the type and source of payment of each Capital Cost in accordance with subdivision (b)(3)(B) of this article, and

(iii) third, a computation of the annual payment to be made by the [District] as provided in subdivision (b)(3)(C) and (b)(3)(D) of this article.

(B) Annual Capital Costs of Project Conservation Facilities shall be divided into five categories of type and source of payment:

(i) Project Conservation Facility Capital Costs paid with the proceeds of Water System Facility Revenue Bonds,

(ii) Project Conservation Facility Capital Costs to be paid with the proceeds of Bonds issued under the Burns-Porter Bond Act,

(iii) Project Conservation Facility Capital Costs to be paid with amounts in the SWRDS Reinvestment Account,

(iv) Project Conservation Facility Capital Costs to be paid annually for assets that will have a short Economic Useful Life or the costs of which are not substantial, and

(v) Project Conservation Facility Capital Costs prepaid by the [District].

(C) The projected amounts of Project Conservation Facility Capital Costs in each such category to be allocated annually to the [District] shall be determined by the State in accordance with the cost allocation principles and procedures set forth in subdivision (c)(1) through (c)(3) and (b)(6) of this article, which principles and procedures shall be controlling as to allocations of Capital Costs to the [District]; *provided* that these amounts shall be subject to redetermination by the State in accordance with Article 28. Such projected amounts will be set forth in Table B by the State.

TABLE B
PROJECTED ALLOCATIONS TO [DISTRICT] OF PROJECT CONSERVATION FACILITY CAPITAL COSTS INCURRED ON OR AFTER THE BILLING TRANSITION DATE

Year	Projected Allocations in Thousands of Dollars				
	Costs to be Paid with Proceeds of Water System Facility Revenue Bonds	Costs to be Paid with the Proceeds of Bonds issued under the Burns-Porter Bond Act	Costs to be Paid with Amounts in the SWRDS Reinvestment Account	Costs to be Paid Annually for Assets That Will Have a Short Economic Useful Life or the Costs of which are Not Substantial	Costs Prepaid by the [District]
1*					
2					
3					

* Year commencing with the Billing Transition Date.

(D) The annual amount to be paid by the [District] under the capital component of the Delta Water Charge for each calendar year for costs Incurred on or after the Billing Transition Date shall consist of the following categories:

(i) Water System Facility Revenue Bonds: a charge determined in accordance with Article 50(b) to recover Water System Facility Revenue Bond Financing Costs Incurred during such calendar year that relate to the financing of Project Conservation Facilities,

(ii) Burns-Porter Act Bonds: a charge to recover the amount to be paid by the State of California during such calendar year in accordance with the Burns-Porter Bond Act for the principal of and interest on bonds issued under the Burns-Porter Bond Act on or after the Billing Transition Date for Project Conservation Facility Capital Costs,

(iii) SWRDS Reinvestment Account: a charge determined in accordance with subdivision (b)(5) of Article 61 to amortize Project Conservation Facility Capital Costs Incurred during prior calendar years (but not prior to the Billing Transition Date) that have been paid with amounts from the SWRDS Reinvestment Account,

(iv) Capital Assets with Short Economic Life or Costs of which are Not Substantial: a charge to recover the Capital Costs to be Incurred during such calendar year of Project Conservation Facility assets with a short Economic Useful Life or the costs of which are not substantial as determined by the State and any such Capital Costs Incurred but not charged in the prior two calendar years,

(E) The projected amounts of each category of charges to be paid annually by the [District] under this capital component shall be determined by the State in accordance with the cost allocation principles and procedures set forth in this subdivision (b), which principles and procedures shall be controlling as to allocations of types of capital component charges to the [District]; *provided* that these amounts shall be subject to redetermination by the State in accordance with Article 28. Such amounts are projected to be as set forth in Table C by the State.

TABLE C
PROJECTED CHARGES TO [DISTRICT] UNDER THE CAPITAL COMPONENT OF THE DELTA WATER CHARGE FOR COSTS INCURRED ON OR AFTER THE BILLING TRANSITION DATE

Year	Projected Charges in Thousands of Dollars			
	Costs to be Paid with Proceeds of Water System Facility Revenue Bonds	**Costs to be Paid with the Proceeds of Bonds issued under the Burns-Porter Bond Act**	**Costs to be Paid with Amounts in the SWRDS Reinvestment Account**	**Costs to be Paid Annually for Assets That Will Have a Short Economic Useful Life or the Costs of which are Not Substantial**
1				
2				
3				

* Year commencing with the Billing Transition Date.

(4) *Minimum Operation, Maintenance, Power and Replacement Charge – Determination; Repayment Table.*

The amount to be paid each year by the [District] under the minimum operation, maintenance, power, and replacement component of the Delta Water Charge shall be determined by the State in accordance with the cost allocation principles and procedures set forth in subdivision (b)(6)(A) of this article; *provided* that these amounts shall be subject to redetermination by the State in accordance with Article 28. Such amounts are projected to be as set forth in Table D by the State.

TABLE D
DELTA WATER CHARGE -- ESTIMATED MINIMUM OPERATION, MAINTENANCE, POWER AND REPLACEMENT COMPONENT FOR COSTS INCURRED ON OR AFTER THE BILLING TRANSITION DATE
[DISTRICT]

Year	Total Annual Payment by [District]
1*	
2	
3	
4	

* Year commencing with the Billing Transition Date.

(5) *Variable Operation, Maintenance and Power Charge–Determination; Repayment Table.*

The amount to be paid each year by the [District] under the variable operation, maintenance and power component of the Delta Water Charge shall be determined by the State in accordance with the cost allocation principles and procedures set forth in subdivision (b)(6)(B) of this article; *provided* that these amounts shall be subject to redetermination by the State in accordance with Article 28. Such amounts are projected to be as set forth in Table E by the State.

TABLE E
DELTA WATER CHARGE -- ESTIMATED VARIABLE OPERATION, MAINTENANCE AND POWER COMPONENT FOR COSTS INCURRED ON OR AFTER THE BILLING TRANSITION DATE
[DISTRICT]

Year	Total Annual Payment by [District]
1*	
2	
3	
4	

* Year commencing with the Billing Transition Date.

(6) *Allocation of Charges to the [District].*

(A) The capital and minimum operation, maintenance, and power components of the Delta Water Charge for each calendar year for costs Incurred on or after the Billing Transition Date shall be allocated to the [District] in proportion to the ratio of the [District]'s Annual Table A Amount for such calendar year to the total of the Annual Table A Amounts for all Contractors for such calendar year.

(B) The variable operation, maintenance, and power component of the Delta Water Charge for each calendar year for costs Incurred on or after the Billing Transition Date shall be allocated to the [District] in proportion to the ratio of the number of acre-feet of Project Water delivered to the [District] during such calendar year to the number of acre-feet of Project Water delivered to all Contractors during such calendar year; *provided* that when Project Water has been requested by a Contractor and delivery thereof has been commenced by the State, and, through no fault of the State, such water is wasted as a result of failure or refusal by the Contractor to accept delivery thereof, such variable component during such period shall be calculated as if the number of acre-feet wasted had been delivered.

(7) *Delta Water Charge -- Repayment Schedule.*

The amounts to be paid by the [District] for each year on or after the Billing Transition Date under the Capital Cost component, minimum operation, maintenance, power and replacement component and the variable operation, maintenance, and power component of the Delta Water Charge shall be set forth by the State in Table F, which Table F shall constitute a summation of Tables C, D, and E; *provided* that each of the amounts set forth in Table F shall be subject to redetermination by the State in accordance with Article 28;

provided further that the principles and procedures set forth in this Article 22 shall be controlling as to such amounts. Such amounts shall be paid by the [District] in accordance with the provisions of Article 29.

TABLE F
REPAYMENT SCHEDULE—DELTA WATER CHARGE FOR COSTS INCURRED ON OR AFTER THE BILLING TRANSITION DATE
[DISTRICT]

Year	Capital Cost Component	Minimum Component	Variable Component	Total
1*				
2				
3				
4				

* Year commencing with the Billing Transition Date.

(c) **Provisions Applicable to the Delta Water Charge for Costs Incurred Both Before and On or After the Billing Transition Date**. The provisions of this subdivision (c) shall be applicable to costs Incurred both prior to and on or after the Billing Transition Date.

(1) *Allocation of Costs to Project Purposes.*

(A) Prior to the time that Additional Project Conservation Facilities or Supplemental Conservation Facilities are constructed, the Delta Water Charge shall be determined on the basis of an allocation to project purposes, by the separable cost-remaining benefits method, of all actual and projected costs of all those Initial Project Conservation Facilities located in and above the Delta, and upon an allocation to the purposes of water conservation and water transportation, by the proportionate use of facilities method, of all actual and projected costs of the following Project Facilities located below the Delta: The aqueduct intake facilities at the Delta, Pumping Plant I (Delta Pumping Plant) <Harvey O. Banks Delta Pumping Plant>, the aqueduct from the Delta to San Luis Forebay (O'Neill Forebay), San Luis Forebay (O'Neill Forebay), and San Luis Reservoir: *provided,* that all of the actual and projected costs properly chargeable to the generation and transmission of electrical energy in connection with operation of Project Conservation Facilities shall be allocated to the purpose of water conservation in, above, and below the Delta; *provided further*, that allocations to purposes the cost of which are to be paid by the United States shall be as determined by the United

States.

(B) Wherever reference is made, in connection with the computation, determination, or payment of the Delta Water Charge, to the costs of any facility or facilities included in the System, such reference shall be only to those costs of such facility or facilities that are reimbursable by the Contractors as determined by the State.

(C) The State, in fixing and establishing prices, rates, and charges for water and power, shall include as a reimbursable cost of any state water project an amount sufficient to repay all costs incurred by the State, directly or by contract with other agencies, for the preservation of fish and wildlife and determined to be allocable to the costs of the project works constructed for the development of that water and power, or either. Costs incurred for the enhancement of fish and wildlife or for the development of public recreation shall not be included in the prices, rates, and charges for water and power, and shall be nonreimbursable costs. Such recreational purposes include, but are not limited to, those recreational pursuits generally associated with the out-of-doors, such as camping, picnicking, fishing, hunting, water contact sports, boating, and sightseeing, and the associated facilities of campgrounds, picnic areas, water and sanitary facilities, parking areas, viewpoints, boat launching ramps, and any others necessary to make project land and water areas available for use by the public. In administering this Contract "development of public recreation" shall include recreation capital and operation and maintenance.

(2) *Additional Conservation Facilities.* Commencing in the year in which the State first awards a major construction contract for construction of a major feature of Additional Project Conservation Facilities, or first commences payments under a contract with a federal agency in the event a major feature of Additional Project Conservation Facilities is constructed by such federal agency under an agreement requiring the State to pay all or part of the costs of such construction, the Delta Water Charge shall be determined on the basis of the foregoing allocations and upon an allocation to project purposes, by the separable costs-remaining benefits method and subject to the foregoing provisos, of all projected costs of such feature of the Additional Project Conservation Facilities; *provided,* that if the agreement with such federal agency allows repayment of costs of a portion of a facility to be deferred, the associated costs of such portion shall be excluded from the Delta Water Charge computations until repayment of such deferred costs or interest thereon is commenced by the State; *provided, further,* that all costs of Additional Project Conservation Facilities Incurred prior to the award of a major construction contract, shall be included in the Delta Water Charge computations in the year in

which they are Incurred.

(3) *Supplemental Conservation Facilities.* Upon the construction of the Supplemental Conservation Facilities, the Delta Water Charge shall be paid by all Contractors for Supplemental Water, as well as by Contractors for Project Water, and, together with revenues derived from the sale or other disposal of electrical energy generated in connection with operation of Project Conservation Facilities and Supplemental Conservation Facilities, shall return to the State, in addition to those costs of the Project Conservation Facilities allocated to the purpose of water conservation, in, above, and below the Delta pursuant to subdivision (c)(1) of this article, all costs of such Supplemental Conservation Facilities, including capital, operation, maintenance, power, and replacement costs which are allocated to the purpose of water conservation, in, above, and below the Delta pursuant hereto. Commencing in the year in which the State first awards a major construction contract for construction of a major feature of any Supplemental Conservation Facilities, or first commences payments under a contract with a federal agency in the event a major feature of Supplemental Conservation Facilities is constructed by such federal agency under an agreement requiring the State to pay all or part of the costs of such construction, the Delta Water Charge shall be determined on the basis of the allocations made pursuant to subdivision (c)(1) of this article, and upon an allocation to project purposes, by the separable costs-remaining benefits method and subject to provisos corresponding to those contained in such subdivision (c)(1), of all projected costs of such feature of the Supplemental Conservation Facilities. Commencing in the same year, the computation of the rates to be used in determining the components of the Delta Water Charge shall include the Annual Table A Amounts under all contracts for Supplemental Water. If the repayment period of any bonds sold to construct Supplemental Conservation Facilities or the repayment period under any agreement with a federal agency for repayment of the costs of Supplemental Conservation Facilities constructed by such federal agency extends beyond the repayment period of the contract, the Delta Water Charge shall be determined and redetermined on the basis of such extended repayment period as the State determines to be appropriate; *provided,* that if the agreement with such federal agency allows repayment of costs of a portion of a facility to be deferred, the associated costs of such portion shall be excluded from the Delta Water Charge computations until repayment of such deferred costs or interest thereon is commenced by the State.

(4) *Local Projects.* The determination of the Delta Water Charge shall be made by including the appropriate costs and quantities of water, calculated in accordance with subdivisions (a) and (b) above, for all Additional Project Conservation Facilities as defined in Article 1(a). In the event a Local Project as defined in Article 1(a)(2) will, pursuant to written agreement between the State and the sponsoring Contractor, be considered and treated as an Additional Project Conservation Facility for less than the estimated life of the facility, the

Delta Water Charge will be determined on the basis of that portion of the appropriate cost and water supply associated with such facility as the period of time during which such facility shall be considered as an Additional Project Conservation Facility bears to the estimated life of such facility. No costs for the construction or implementation of any Local Project are to be included in the Delta Water Charge unless and until the written agreement required by Article 1(a) has been entered into.

(5) *Water Purchased By the State.* In calculating the Delta Water Charge under subdivisions (a) and (b) of this article, the component for operation, maintenance, power and replacement costs shall include, but not be limited to, all costs to the State Incurred in purchasing water, which is competitive with alternative sources as determined by the State, for delivery as Project Water.

(6) *Replacement Cost Treatment*. Replacement costs of Project Conservation Facilities shall be treated as either Capital Costs or as minimum operation, maintenance, power, and replacement costs, as determined by the State considering the Economic Useful Life of the asset being replaced and other relevant factors.

23. TRANSPORTATION CHARGE.

The payments to be made by each Contractor shall include an annual charge designated as the Transportation Charge, which shall be separately stated and calculated for costs Incurred prior to the Billing Transition Date and costs Incurred on or after the Billing Transition Date.

(a) **Transportation Charge for Costs Incurred Prior to the Billing Transition Date**. The provisions of this subdivision (a) and Articles 24(a) and (c), 25 and 26 shall apply to costs Incurred prior to the Billing Transition Date.

(1) *Recovery of Costs of Project Transportation Facilities*. The Transportation Charge for costs Incurred prior to the Billing Transition Date shall return to the State during the Project Repayment Period such costs of all Project Transportation Facilities necessary to deliver Project Water to the Contractor and which are allocated to the Contractor in accordance with the cost allocation principles and procedures hereinafter set forth.

(2) *Components of Transportation Charge for Costs Incurred Prior to the Billing Transition Date*. The Transportation Charge for costs Incurred Prior to the Billing Transition Date shall consist of a capital component; a minimum operation, maintenance, power, and replacement component; and a variable operation, maintenance and power component, as these components are defined in and determined under Articles 24(a) and (c), 25, and 26, respectively.

(b) **Transportation Charge for Costs Incurred On or After the Billing Transition Date**. The provisions of this subdivision (b) and Articles 24(b) and (c), 25 and 26 shall apply to costs Incurred on or after the Billing Transition Date.

(1) *Recovery of Costs of Project Transportation Facilities*. The Transportation Charge for costs Incurred on or after the Billing Transition Date shall return to the State during each such calendar year all costs which are Incurred on or after the Billing Transition Date of all Project Transportation Facilities necessary to deliver Project Water to the [District] and which are allocated to the [District] in accordance with the cost allocation principles and procedures hereinafter set forth.

(2) *Components of Transportation Charge.* The Transportation Charge for costs Incurred on or after the Billing Transition Date shall consist of a capital component; a minimum operation, maintenance, and power component; and a variable operation, maintenance, and power component, as these components are defined in and determined under Articles 24(b) and (c), 25, and 26, respectively.

(c) **Segregation of Aqueduct Reaches for All Transportation Charge**

Purposes*.* For the purpose of allocations of costs among Contractors pursuant to subdivisions (a) and (b) of this article, and Articles 24, 25 and 26, the Project Transportation Facilities shall be segregated into such aqueduct reaches as are determined by the State to be necessary for such allocations of costs. Subject to such modifications as are determined by the State to be required by reason of any request furnished by the [District] to the State pursuant to Article 17(a) of this contract, or by reason of contracts entered into by the State with other Contractors, the aqueduct reaches of the Project Transportation Facilities, a portion of the costs of which may be allocated to the [District], are established as provided in Table G; *provided* that those costs of the aqueduct reaches from the Delta through the outlet of San Luis Reservoir which are allocated to the purpose of water conservation in, above, and below the Delta for the purpose of determining the Delta Water Charge, as hereinbefore set forth, shall not be included in the Transportation Charge.

TABLE G
PROJECT TRANSPORTATION FACILITIES NECESSARY TO DELIVER WATER TO [DISTRICT]

Aqueduct Reach	**Major Features of Reach**
Delta to Discharge Pumping Plant I:	Intake Canal, Fish Protective Facilities Pumping Plant I
Discharge Pumping Plant I to San Luis Forebay:	Aqueduct
San Luis Forebay to Outlet San Luis Reservoir:	San Luis Forebay and Dam, Pumping Plant II, San Luis Reservoir and Dam
Outlet San Luis Reservoir to Avenal Gap:	Aqueduct
Avenal Gap to Pumping III:	Aqueduct
Pumping Plant III to Pumping Plants IV-V:	Pumping Plant III, Aqueduct
Pumping Plant IV-V to Pumping Plant VI:	Pumping Plant IV, Pumping Plant V Aqueduct
Pumping Plant VI to South Portal Tehachapi Tunnels:	Pumping Plant VI Tehachapi Tunnels
East Branch Aqueduct	
South Portal Tehachapi Tunnels to Cottonwood Power Plant:	Aqueduct Cottonwood Power Plants 1 and 2
Cottonwood Power Plant to a point near Fairmont Reservoir:	Aqueduct
Near Fairmont Reservoir to Little Rock Creek:	Aqueduct
Little Rock Creek to West Fork Mojave River:	Pumping Plant VIII Aqueduct
West Fork Mojave River to Perris Reservoir	Cedar Springs Reservoir and Dam Devil Canyon Power Plants 1 and 2 Aqueduct Perris Reservoir and Dam

Aqueduct Reach (continued)	Major Features of Reach
West Branch Aqueduct	
South Portal Tehachapi Tunnels to West Branch Terminal Reservoir:	Aqueduct
West Branch Terminal Reservoir:	Dam, reservoir, and outlet facilities

(This table was labeled Table I in original contract provisions)

(d) **Provisions Applicable to the Transportation Charge for Costs Incurred Both Before and On or After the Billing Transition Date**.

(1) Wherever reference is made, in connection with the computation, determination, or payment of the Transportation Charge, to the allocation or payment of costs of any facility or facilities included in the System, such reference shall be only to those costs of such facility or facilities which are reimbursable by the Contractors as determined by the State.

(2) The State, in fixing and establishing prices, rates, and charges for water and power, shall include as a reimbursable cost of any state water project an amount sufficient to repay all costs incurred by the State, directly or by contract with other agencies, for the preservation of fish and wildlife and determined to be allocable to the costs of the project works constructed for the development of that water and power, or either. Costs incurred for the enhancement of fish and wildlife or for the development of public recreation shall not be included in the prices, rates, and charges for water and power, and shall be nonreimbursable costs. Such recreational purposes include, but are not limited to, those recreational pursuits generally associated with the out-of-doors, such as camping, picnicking, fishing, hunting, water contact sports, boating, and sightseeing, and the associated facilities of campgrounds, picnic areas, water and sanitary facilities, parking areas, viewpoints, boat launching ramps, and any others necessary to make project land and water areas available for use by the public. In administering this Contract “development of public recreation” shall include recreation capital and operation and maintenance.

24. TRANSPORTATION CHARGE -- CAPITAL COMPONENTS.

(a) **Transportation Charge Capital Component for Costs Incurred Prior to the Billing Transition Date**. The provisions of this subdivision (a) shall apply only to Capital Costs Incurred prior to the Billing Transition Date.

(1) *Recovery of Capital Costs of Project Transportation Facilities Incurred Prior to the Billing Transition Date.* The amount of the capital component of the Transportation Charge for Capital Costs Incurred prior to the Billing Transition Date shall be determined in two steps as follows:

(A) first, an allocation of such costs to the Contractor in accordance with subdivision (a)(2) of this article, and

(B) second, a computation of annual payments to be made by the Contractor of such allocated costs and interest thereon, computed at the Project Interest Rate in accordance with subdivision (a)(3) of this article.

(2) *Allocation of Capital Costs of Project Transportation Facilities Incurred Prior to the Billing Transition Date.* The total amount of Capital Costs Incurred prior to the Billing Transition Date of each aqueduct reach to be returned to the State shall be allocated among all Contractors entitled to delivery of Project Water from or through such reach by the proportionate use of facilities method of cost allocation and in accordance with Article 23(c) and subdivision (c)(1) of this article.

The projected amounts of Capital Costs to be allocated annually to the [District] under the capital component of the Transportation Charge shall be determined by the State in accordance with the cost allocation principles and procedures set forth in this subdivision (a) and subdivision (c)(1) of this article, which principles and procedures shall be controlling as to allocations of Capital Costs to the [District]. Such amounts will be set forth in Table H by the State as soon as designs and cost estimates are prepared by it subsequent to receipt of requests from the [District] as to the maximum monthly delivery capability to be provided in each aqueduct reach for transport and delivery of Project Water to the [District], pursuant to Article 17(a), *provided* that these amounts shall be subject to redetermination by the State in accordance with Article 28.

TABLE H
PROJECTED ALLOCATIONS OF CAPITAL COSTS INCURRED PRIOR TO THE BILLING TRANSITION DATE OF PROJECT TRANSPORTATION FACILITIES TO [DISTRICT]

Year	Projected Allocation in Thousands of Dollars
1*	
2	
3	
4	

* Year in which State commences construction of Project Transportation Facilities.
(This table was labeled Table C in original contract provisions)

(3) *Determination of Capital Component of Transportation Charge for Costs Incurred Prior to the Billing Transition Date.* The [District]'s annual payment of its allocated Capital Costs Incurred prior to the Billing Transition Date and interest thereon, computed at the Project Interest Rate and compounded annually, shall be determined in accordance with a repayment schedule established by the State and determined in accordance with the principles set forth in (A), (B), and (C) below, which principles shall be controlling as to the [District]'s payment of its allocated Capital Costs. The [District]'s repayment schedule will be set forth in Table I by the State as soon as designs and cost estimates are prepared by it subsequent to receipt of requests from the [District] as to the maximum monthly delivery capability to be provided in each aqueduct reach for transport and delivery of Project Water to the [District], pursuant to Article 17(a); *provided* that the amounts set forth in Table I shall be subject to redetermination by the State, pursuant to Article 28.

(A) The [District]'s annual payment shall be the sum of the amounts due from the [District] on the [District]'s allocated Capital Costs for the then current year and for each previous year where each such amount will pay, in not more than fifty (50) equal annual installments of principal and interest, the [District]'s allocated Capital Costs for the respective year and interest thereon, computed at the Project Interest Rate and compounded annually.

(B) The [District] may make payments at a more rapid rate if approved by the State.

(C) Such annual Transportation Charge payments shall cease when all allocated Capital Costs and interest thereon, computed at the Project Interest Rate and compounded annually, are repaid.

TABLE I
TRANSPORTATION CHARGE FOR COSTS INCURRED PRIOR TO THE BILLING TRANSITION DATE-- CAPITAL COST COMPONENT
[DISTRICT]

(In Thousands of Dollars)

Year	Annual Payment of Principal	Annual Interest Payment	Total Annual Payment by [District]
1*			
2**			
3			
4			

* Year in which State commences construction of Project Transportation Facilities.

** Year of first payment.

(This table was labeled Table D in original contract provisions)

(4) Notwithstanding provisions of subdivisions 24(a)(1) through (a)(3) of this article, the capital component of the Transportation Charge for costs Incurred prior to the Billing Transition Date shall include an annual charge to recover the [District]’s share of the portion of Water System Facility Revenue Bond Financing Costs allocable to Project Transportation Facilities. Charges to the [District] for these costs shall be calculated in accordance with Article 50(a).

(b) **Transportation Charge Capital Component for Costs Incurred On or After the Billing Transition Date***.* The provisions of this subdivision (b) shall apply only to Capital Costs Incurred on or after the Billing Transition Date.

(1) The amount of the capital component of the Transportation Charge for costs Incurred on or after the Billing Transition Date shall be determined in three steps as follows:

(A) first, an allocation of Capital Costs to the Contractor as provided in subdivision (b)(2) of this article,

(B) second, a determination of the type and source of payment of each Capital Cost as provided in subdivision (b)(3) of this article, and

(C) third, a computation of the annual payment to be made by the Contractor as provided in subdivision (b)(4) and (b)(5) of this article.

(2) The total amount of Capital Costs of each aqueduct reach to be returned to the State under the Transportation Charge for costs Incurred on or after the Billing Transition Date shall be allocated among all Contractors entitled to delivery of Project Water from or through the reach by the proportionate use of facilities method of cost allocation and in accordance with Article 23(c) and subdivision (c)(1) of this article.

(3) Annual Capital Costs of Project Transportation Facilities shall be divided into five categories of type and source of payment:

(A) Project Transportation Facility Capital Costs paid with the proceeds of Water System Facility Revenue Bonds,

(B) Project Transportation Facility Capital Costs paid with the proceeds of bonds issued under the Burns-Porter Bond Act,

(C) Project Transportation Facility Capital Costs paid with amounts in the SWRDS Reinvestment Account,

(D) Project Transportation Facility Capital Costs paid annually for assets that will have a short Economic Useful Life or the costs of which are not substantial, and

(E) Project Transportation Facility Capital Costs prepaid by the [District].

The projected amounts of Project Transportation Facility Capital Costs of each type to be allocated annually to the [District] shall be determined by the State in accordance with the cost allocation principles and procedures set forth in Article 23(c)(1) through (c)(3) and this subdivision (b)(3), which principles and procedures shall be controlling as to allocations of each type of Capital Costs to the [District]; *provided* that these amounts shall be subject to redetermination by the State in accordance with Article 28. Such projected amounts will be set forth in Table J by the State.

TABLE J
PROJECTED ALLOCATIONS TO [DISTRICT] OF PROJECT TRANSPORTATION FACILITY CAPITAL COSTS INCURRED ON OR AFTER THE BILLING TRANSITION DATE

Year	**Allocations in Thousands of Dollars**				
	Costs to be Paid with Proceeds of Water System Facility Revenue Bonds	**Costs to be Paid with the Proceeds of Bonds issued under the Burns-Porter Bond Act**	**Costs to be Paid with Amounts in the SWRDS Reinvest-ment Account**	**Costs to be Paid Annually for Assets That Will Have a Short Economic Useful Life or the Costs of which are Not Substantial**	**Costs Prepaid by the [District]**
1*					
2					
3					

* Year commencing with the Billing Transition Date

(4) The capital component of the Transportation Charge for a calendar year for costs Incurred on or after the Billing Transition Date shall consist of the following to the extent the related Capital Costs are allocated to the [District]:

(A) Water System Facility Revenue Bond: a charge determined in accordance with Article 50(b) to recover Water System Facility Revenue Bond Financing Costs Incurred during such calendar year that relate to the financing of Water System Facilities that are Project Transportation Facilities,

(B) Burns-Porter Act Bonds: a charge to recover the amount to be paid by the State of California during such calendar year in accordance with the Burns-Porter Bond Act for the principal of and interest on bonds issued under the Burns-Porter Bond Act on or after the Billing Transition Date for Project Transportation Facility Capital Costs,

(C) SWRDS Reinvestment Account: a charge determined in accordance with subdivision (b)(5) of Article 61 to amortize Project Transportation Facility Capital Costs Incurred during prior calendar years (but not prior to the Billing Transition Date) that have been paid with amounts from the SWRDS Reinvestment Account, and

(D) Capital Assets with Short Economic Life or Costs of which are Not Substantial: a charge to recover the Capital Costs to be Incurred during such calendar year of Project Transportation Facility assets with a short Economic Useful Life or the costs of which are not substantial as determined by the State and any such Capital Costs Incurred but not charged in the prior two calendar years,

(5) *Projected Charges.* The projected amounts of the charges to be allocated annually to the [District] under the capital component of the Transportation Charge for costs Incurred on or after the Billing Transition Date shall be determined by the State in accordance with the cost allocation principles and procedures set forth in this Article, which principles and procedures shall be controlling as to allocations of capital component charges to the [District]; *provided* that these amounts shall be subject to redetermination by the State in accordance with Article 28. Such amounts are projected to be as set forth in Table K by the State.

TABLE K
PROJECTED CHARGES UNDER THE CAPITAL COMPONENT OF THE TRANSPORTATION CHARGE FOR COSTS INCURRED ON OR AFTER THE BILLING TRANSITION DATE TO [DISTRICT]

Year	**Projected Charges in Thousands of Dollars**			
	Costs to be Paid with Proceeds of Water System Facility Revenue Bonds	**Costs to be Paid with the Proceeds of Bonds issued under the Burns-Porter Bond Act**	**Costs to be Paid with Amounts in the SWRDS Reinvestment Account**	**Costs to be Paid Annually for Assets That Will Have a Short Economic Useful Life or the Costs of which are Not Substantial**
1*				
2				
3				

* Year commencing with the Billing Transition Date.

(c) **Provisions Applicable to the Transportation Charge For Costs Incurred Both Prior To and On or After the Billing Transition Date**. The provisions of this subdivision (c) shall be applicable to Capital Costs Incurred both prior to and on or after the Billing Transition Date.

(1) *Proportionate Use Factors.* The measure of the proportionate use by each Contractor of each reach shall be the average of the following two ratios:

(A) the ratio of the Contractor’s Maximum Annual Table A Amount to be delivered from or through the reach to the total of the Maximum Annual Table A Amounts of all Contractors to be delivered from or through the reach from the year in which charges are to be paid through the end of the Project Repayment Period, and

(B) the ratio of the capacity provided in the reach for the transport and delivery of Project Water to the Contractor to the total capacity provided in the reach for the transport and delivery of Project Water to all Contractors served from or through the reach from the year in which charges are to be paid through the end of the Project Repayment Period.

Allocations of Capital Costs to the [District] pursuant hereto shall be on the basis of relevant values which will be set forth in Table L by the State as soon as designs and cost estimates are prepared by it subsequent to receipt of requests from the [District] as to the maximum monthly delivery capability to be provided in each aqueduct reach of the Project Transportation Facilities for the transport and delivery of Project Water to the [District], pursuant to Article 17(a); *provided* that these values shall be subject to redetermination by the State in accordance with Article 28; *provided further* that the principles and procedures set forth in this subdivision shall be controlling as to allocations of Capital Costs to the [District]. Proportionate use of facilities factors for prior years shall not be adjusted by the State in response to changes or transfers of Table A Amounts among Contractors unless otherwise agreed by the State and the parties to the transfer and unless there is no impact on past charges or credits of other Contractors.

TABLE L
[TABLE L shall set forth the relevant values that shall serve as the basis for allocation of all Transportation Charge Costs]

(This table was labeled Table B in original contract provisions)

(2) *Determinations Using Proportionate Use Factors.* The total amount in each category of Capital Costs allocated to a Contractor shall be the sum of the products obtained when there is multiplied, for each aqueduct reach necessary to deliver water to the Contractor, the total amount of the Capital Costs of the reach in that category to be returned to the State under the Transportation Charge by the average of the two foregoing ratios for such reach as such average is set forth in the appropriate table included in its contract.

(3) *Excess Capacity.* In the event that excess capacity is provided in any aqueduct reach for the purpose of making Project Water available in the future to an agency or agencies with which the State has not executed contracts at the time of any allocation of costs pursuant to this subdivision, the prospective Maximum Annual Table A Amount or Amounts to be supplied by such excess capacity, as determined by the State, shall be deemed to be contracted for by such agency or agencies for the purpose of such allocation of costs, to the end that the Capital Costs of providing such excess capacity are not charged to any Contractor entitled by virtue of an executed contract to the delivery of Project Water from or through that aqueduct reach at the time of such allocation. Where additional capacity is provided in any aqueduct reach to compensate for loss of water due to evaporation, leakage, seepage, or other causes, or to compensate for scheduled outages for purposes of necessary investigation, inspection, maintenance, repair or replacement of the facilities of the Project Facilities, then, for the purpose of any allocation of costs pursuant to this subdivision:

(A) the Maximum Annual Table A Amount to be delivered from or through the reach of each Contractor entitled to delivery of Project Water from or through the reach shall be increased by an amount which bears the same proportion to the maximum annual delivery capability provided by such additional capacity that the Contractor's Maximum Annual Table A Amount to be delivered from or through the reach bears to the total of the Maximum Annual Table A Amounts to be delivered from or through the reach under all contracts; and

(B) the capacity provided in the reach for each Contractor entitled to delivery of Project Water from or through the reach shall be increased in the same proportion that the Contractor's Maximum Annual Table A Amount to be delivered from or through the reach is increased pursuant to (A) above.

(4) *Power Facilities.* The Capital Costs of project aqueduct power recovery plants shall be charged and allocated in accordance with this Article 24. The Capital Costs of off-aqueduct power facilities shall be charged and allocated in accordance with Article 25(d).

(5) *Capital Costs of Excess Capacity.* In the event that any Contractor, pursuant to Article 12(b), requests delivery capacity in any aqueduct reach which will permit maximum monthly deliveries to such Contractor in excess of the percentage amounts specified in such Article 12(b) for the uses designated therein, such Contractor shall furnish to the State, in advance of the construction of such aqueduct reach, funds sufficient to cover the costs of providing such excess capacity, which funds shall be in an amount which bears the same proportion to the total Capital Costs of such reach, including the costs of providing such excess capacity, as such excess capacity bears to the total capacity of such reach, including such excess capacity. For the purpose of any allocation of costs pursuant to subdivision (c)(1) of this article, the total Capital Costs of such aqueduct reach shall be allocated among all Contractors entitled to delivery of Project Water from or through the reach in the following manner:

> (A) The costs which would have been Incurred for such reach had no such excess capacity been provided shall be estimated by the State and allocated among all such Contractors in the manner provided in such subdivision (c)(1); and
>
> (B) the amount of the difference between such estimated costs and the projected actual costs of such reach shall be allocated to the Contractor or Contractors for which such excess capacity is provided.

Where such excess capacity is provided for more than one Contractor, the costs allocated to them under (B) above shall be further allocated between or among them in amounts which bear the same proportion to the total of such allocated costs as the amount of such excess capacity provided for the respective Contractor bears to the total of such excess capacity provided in such reach. In the event that the funds advanced by a Contractor pursuant to this subdivision are more or less than the costs so allocated to such Contractor under (B) above, the account of such Contractor shall be credited or debited accordingly.

(6) *Replacement Cost Treatment*. Replacement costs of Project Transportation Facilities shall be treated as either Capital Costs or as minimum operation, maintenance, power and replacement costs, as determined by the State considering the Economic Useful Life of the asset being replaced and other relevant factors.

(7) *East Branch Enlargement.* Notwithstanding provisions of Articles 24(a) through 24(c), Capital Costs associated with East Branch Enlargement

Facilities as defined in Article 49(a) shall be collected under the capital component of the East Branch Enlargement Transportation Charge Article 49(d). Any Capital Costs of off-aqueduct power facilities associated with deliveries through East Branch Enlargement Facilities shall be charged and allocated in accordance with Article 25(d).

25. TRANSPORTATION CHARGE -- MINIMUM OPERATION, MAINTENANCE, POWER, AND REPLACEMENT COMPONENT.

The provisions of this article shall apply to costs incurred both prior to and on or after the Billing Transition Date.

(a) **Purpose**. The minimum operation, maintenance, power, and replacement component of the Transportation Charge shall return to the State those costs of the Project Transportation Facilities necessary to deliver water to the Contractor which constitute operation, maintenance, power, and replacement costs Incurred irrespective of the amount of Project Water delivered to the Contractor and which are allocated to the Contractor pursuant to subdivision (b) of this article; *provided* that to the extent permitted by law, the State may establish reserve funds to meet anticipated minimum replacement costs; and deposits in such reserve funds by the State: (1) shall be made in such amounts that such reserve funds will be adequate to meet such anticipated costs as they are incurred, and (2) shall be deemed to be a part of the minimum replacement costs for the year in which such deposits are made

(b) **Allocation**. The total projected minimum operation, maintenance, power, and replacement costs of each aqueduct reach of the Project Transportation Facilities for the respective year shall be allocated among all Contractors entitled to delivery of Project Water from such facilities by the proportionate use of facilities method of cost allocation, in the same manner and upon the same bases as are set forth for the allocation of Capital Costs in subdivisions (c)(1) through (c)(3) of Article 24; *provided* that such minimum operation, maintenance, power, and replacement costs as are Incurred generally for the Project Transportation Facilities first shall be allocated to each aqueduct reach in an amount which bears the same proportion to the total amount of such general costs that the amount of the costs Incurred directly for the reach bears to the total of all direct costs for all aqueduct reaches.

(c) **Determination; Repayment Table**. The amount to be paid each year by the [District] under the minimum operation, maintenance, power, and replacement component of the Transportation Charge shall be determined in accordance with subdivision (b) of this article on the basis of the relevant values to be set forth for the respective aqueduct reaches in Table L, included in Article 24; *provided* that these values shall be subject to redetermination by the State in accordance with Article 28. Such amounts and any appropriate interest thereon for costs incurred prior to the Billing Transition Date shall be set forth by the State in Table M as soon as designs and cost estimates have been prepared by it subsequent to receipt of requests from the [District] as to the maximum monthly delivery capability to be provided in each aqueduct reach for transport and delivery of Project Water to the [District], pursuant to Article 17(a); *provided* that the amounts set forth in Table M shall be subject to redetermination by the State in accordance with Article 28.

TABLE M
TRANSPORTATION CHARGE -- MINIMUM OPERATION MAINTENANCE, POWER, AND REPLACEMENT COMPONENT
[DISTRICT]

Year	Total Annual Payment by [District]*
1**	
2	
3	
4	

* Payment shall start with respect to each aqueduct reach in the year following the year in which the State completes construction of the respective reach.

** Year in which the State commences construction of Project Transportation Facilities.

(This table was labeled Table E in original contract provisions)

(d) **Off-Aqueduct Power Facilities**. Notwithstanding the provisions of subdivisions (a) through (c) of this Article or of Article 1(h), the costs of off-aqueduct power facilities shall be determined and allocated as follows:

(1) The off-aqueduct power costs shall include all annual costs the State incurs for any off-aqueduct power facility, which shall include, but not be limited to, power purchases, annual Financing Costs, and associated operation and maintenance costs of such facility, less any credits, interest earnings, or other monies received by the State in connection with such facility or Revenue Bonds issued to finance the Capital Costs of such facility. In the event the State finances all or any part of an off-aqueduct power facility directly from funds other than bonds or borrowed funds, in lieu of such annual principal and interest payments, the repayment of Capital Costs as to that part financed by such other funds shall be determined on the basis of the schedule that would have been required under Article 24.

(2) The annual costs of off-aqueduct power facilities as computed in (1) above shall initially be allocated among Contractors in amounts which bear the same proportions to the total amount of such power costs that the total estimated electrical energy (kilowatt hours) required to pump through Project Transportation Facilities the desired delivery of Annual Table A Amounts for that year, as submitted pursuant to Article 12(a)(1) and as may be modified by the State pursuant to Article 12(a)(2), bears to the total estimated electrical energy

(kilowatt hours) required to pump all such amounts for all Contractors through Project Transportation Facilities for that year, all as determined by the State.

(3) An interim adjustment in the allocation of the power costs calculated in accordance with (2) above, may be made in May of each year based on April revisions in approved schedules of deliveries of project and nonproject water for Contractors for such year. A further adjustment shall be made in the following year based on actual deliveries of project and nonproject water for Contractors; *provided, however,* that in the event no deliveries are made through a pumping plant, the adjustments shall not be made for that year at that plant.

(4) To the extent the monies received or to be received by the State from all Contractors for off-aqueduct power costs in any year are determined by the State to be less than the amount required to pay the off-aqueduct power costs in such year, the State may allocate and charge that amount of off-aqueduct power costs to the [District] and other Contractors in the same manner as costs under the capital component of the Transportation Charge are allocated and charged. After that amount has been so allocated, charged and collected, the State shall provide a reallocation of the amounts allocated pursuant to this paragraph (4), such reallocation to be based on the allocations made pursuant to (2) and (3) above for that year, or in the event no such allocation was made for that year, on the last previous allocation made pursuant to (2) and (3) above. Any such reallocation of costs incurred prior to the Billing Transition Date shall include appropriate interest thereon at the Project Interest Rate.

(e) The total minimum operation, maintenance, power and replacement component due that year from each Contractor shall be the sum of the allocations made under the proportionate use of facilities method provided in subdivision (b) of this article and the allocations made pursuant to subdivision (d) of this article for each Contractor.

(f) Notwithstanding provisions of Articles 25(a) through 25(c) and 25(e), minimum operation, maintenance, power, and replacement costs associated with deliveries through East Branch Enlargement Facilities as defined in Article 49(a) shall be collected under the minimum operation, maintenance, power, and replacement component of the East Branch Enlargement Transportation Charge as determined under Article 49(e).

26. TRANSPORTATION CHARGE -- VARIABLE OPERATION, MAINTENANCE AND POWER COMPONENT.

The provisions of this article shall apply to costs Incurred both prior to and on or after the Billing Transition Date.

(a) **Purpose**. The variable operation, maintenance, and power component of the Transportation Charge shall return to the State those costs of the Project Transportation Facilities necessary to deliver water to the Contractor which constitute operation, maintenance, power and replacement costs Incurred in an amount which is dependent upon and varies with the amount of Project Water delivered to the Contractor and which are allocated to the Contractor pursuant to (1) and (2) below; *provided* that to the extent permitted by law, the State may establish reserve funds to meet anticipated variable replacement costs; and deposits in such reserve funds by the State: (1) shall be made in such amounts that such reserve funds will be adequate to meet such anticipated costs as they are incurred, and (2) shall be deemed to be a part of the variable replacement costs for the year in which such deposits are made.

(b) **Determination**. The amount of this variable operation, maintenance, and power component shall be determined as follows:

> (1) *Determination of Charge Per Acre-Foot.* There shall be computed for each calendar year for each aqueduct reach of the Project Transportation Facilities a charge per acre-foot of water which will return to the State the total projected variable operation, maintenance and power costs of the reach for such calendar year. This computation shall be made by dividing such total by the number of acre-feet of Project Water estimated to be delivered from or through the reach to all Contractors during the year.
>
> (2) *Determination of Charge Per Reach to the Contractor.* The amount of the variable component shall be the product of the sum of the charges per acre-foot of water, determined under (1) above, for each aqueduct reach necessary to deliver water to the Contractor, and the number of acre-feet of Project Water delivered to the Contractor during the year through such reach; *provided* that when Project Water has been requested by a Contractor and delivery thereof has been commenced by the State, and, through no fault of the State, such water is wasted as a result of failure or refusal by the Contractor to accept delivery thereof, the amount of such variable component to be paid by such Contractor during such period shall be the product of the above sum and the sum of the number of acre-feet of Project Water delivered to the Contractor and the number of acre-feet wasted.

(c) **Credit Relating to Project Aqueduct Power Recovery Plants**. There shall be credited against the amount of the variable operation, maintenance, and power component to be paid by each Contractor, as determined pursuant to subdivision (a) of this article, a portion of the projected net value of any power recovered during the respective year at project aqueduct power recovery plants located upstream on the particular aqueduct reach from the delivery structures for delivery of Project Water to the Contractor. Such portion shall be in an amount which bears the same proportion to such projected net value that the number of acre-feet of Project Water delivered to the Contractor through such plants during the year bears to the number of acre-feet of Project Water delivered to all Contractors through such plants during the year.

(d) **Determination of Total Variable Component Charge**. The amount to be paid each year by the [District] under the variable operation, maintenance, and power component of the Transportation Charge shall be determined in accordance with subdivision (a) of this article for the respective aqueduct reaches in Table L included in Article 24. Such amounts and any appropriate interest thereon for costs incurred prior to the Billing Transition Date shall be set forth by the State in Table N as soon as designs and cost estimates are prepared by it subsequent to receipt of requests from the [District] as to the maximum monthly delivery capability to be provided in each aqueduct reach for transport and delivery of Project Water to the [District], pursuant to Article 17(a); *provided* that the amounts set forth in Table N shall be subject to redetermination by the State in accordance with Article 28.

TABLE N
TRANSPORTATION CHARGE -- ESTIMATED VARIABLE OPERATION, MAINTENANCE, AND POWER COMPONENT
[DISTRICT]

Year	Total Annual Payment by [District]*
1**	
2	
3	
4	

* Payments start with year of initial water delivery.

** Year in which the State commences construction of the Project Conservation Facilities.

(This table was labeled Table F in original contract provisions)

(e) **No Separate Variable Component for East Branch Enlargement Facilities***.* There shall be no separate variable operation, maintenance, and power component for deliveries of water through East Branch Enlargement Facilities defined in Article 49(a).

27. TRANSPORTATION CHARGE -- REPAYMENT SCHEDULE.

The amounts to be paid by the [District] for each year under the Capital Cost and minimum operation, maintenance, power, and replacement components of the Transportation Charge, and under the variable operation, maintenance, and power component of such charge on the basis of then estimated deliveries, shall be set forth by the State in Table O as soon as designs and cost estimates have been prepared by it subsequent to receipt of requests from the [District] as to the maximum monthly delivery capability to be provided in each aqueduct reach for transport and delivery of Project Water to the [District], pursuant to Article 17(a), which Table O shall constitute a summation of Tables I, K, M, and N; *provided* that each of the amounts set forth in Table O shall be subject to redetermination by the State in accordance with Article 28; *provided further* that the principles and procedures set forth in Articles 24, 25, and 26 shall be controlling as to such amounts. Such amounts shall be paid by the [District] in accordance with the provisions of Article 29.

TABLE O
REPAYMENT SCHEDULE--TRANSPORTATION CHARGE
[DISTRICT]

Year	Capital Cost Component	Minimum Component	Variable Component	Total
1*				
2**				
3				
4				

* Year in which State commences construction of Project Transportation Facilities.

** Year of first payment.

(This table was labeled Table G in original contract provisions)

28. DELTA WATER CHARGE AND TRANSPORTATION CHARGE -- REDETERMINATION.

(a) **Redetermination of Transportation Charges for Costs Incurred Prior to the Billing Transition Date**. The provisions of this subdivision (a) shall apply only to costs Incurred prior to the Billing Transition Date.

(1) *Determinative Factors Subject to Retroactive Change*. The State shall redetermine the values and amounts set forth in Tables H through O (referred to in the original contract provisions as Tables B through G) of this contract in the year following the year in which the State commences construction of the Project Transportation Facilities and each year thereafter during the Project Repayment Period in order that the Transportation Charge to the [District] and the components thereof may accurately reflect the increases or decreases from year to year in projected costs, outstanding reimbursable indebtedness of the State Incurred prior to the Billing Transition Date to construct the Project Transportation Facilities described in Table G of this contract, Annual Table A Amounts, estimated deliveries, Project Interest Rate, and all other factors which are determinative of such charges. In addition, each such redetermination shall include an adjustment of the components of the Transportation Charge to be paid by the [District] for succeeding years which shall account for the differences, if any, between those factors used by the State in determining the amounts of such components for all preceding years and the factors as then currently known by the State. Such adjustment shall be computed by the State and paid by the [District] or credited to the [District]'s account in the manner described in (b) and (c) below.

(2) *Adjustment: Transportation Charge -- Capital Component For Costs Incurred Prior to the Billing Transition Date*. Adjustments for prior underpayments or overpayments of the capital component of the Transportation Charge to the [District] for costs Incurred prior to the Billing Transition Date, together with accrued interest charges or credits thereon computed at the then current Project Interest Rate on the amount of the underpayment or overpayment and compounded annually for the number of years from the year the underpayment or overpayment occurred to and including the year following the redetermination, shall be paid in the year following the redetermination; *provided* that the [District] may elect to exercise the option whereby when the redetermined Transportation Charge for the following year, with adjustments, including adjustments of the operation, maintenance, power, and replacement components provided for in subdivision (a)(3) of this article, is more or less than the last estimate of the charge provided pursuant to Article 27 for the corresponding year, without adjustments, an amount equal to the total of such difference shall be deducted

from or added to the adjusted capital component for that year and paid or credited in accordance with the following schedule:

Percent that Transportation Charge for costs Incurred prior to the Billing Transition Date differs from last estimate (+ or -)	**Period, in years, for amortizing the difference in indicated charge**
for 10% or less	no amortization
more than 10%, but not more than 20%	2
more than 20%, but not more than 30%	3
more than 30%, but not more than 40%	4
more than 40%	5

Such payments or credits shall be equal semi-annual amounts of principal and interest on or before the 1st day of January and the 1st day of July, with interest computed at the Project Interest Rate and compounded annually, during varying amortization periods as set forth in the preceding schedule; *provided* that for the purpose of determining the above differences in the Transportation Charge for costs Incurred prior to the Billing Transition Date, the variable operation, maintenance, and power component shall be computed on the basis of the same estimated Project Water deliveries as was assumed in computing pursuant to Article 26(c).

(3) *Adjustment: Transportation Charge -- Minimum and Variable Components for costs Incurred prior to the Billing Transition Date*. One-twelfth of the adjustments for prior underpayments or overpayments of the [District]'s minimum and variable operation, power, and replacement components for each year shall be added or credited to the corresponding components to be paid in the corresponding month of the year following the redetermination, together with accrued interest charges or credits thereon computed at the then current Project Interest Rate on the amount of the underpayment or overpayment and compounded annually for the number of years from the year the underpayment or overpayment occurred to and including the year following the redetermination.

(4) *Exercise of Option*. The option provided for in subdivision (a)(2) of this article shall be exercised in writing on or before the January 1 due date of the first payment of the capital component of the Transportation Charge for the year in which the option is to become effective. Such option, once having been exercised, shall be applicable for all of the remaining years of the Project Repayment Period.

(5) *Project Interest Rate Adjustments.* Notwithstanding the provisions of subdivision (a)(2) of this article, adjustments for prior overpayments and underpayments shall be repaid beginning in the year following the redetermination by application of a unit rate per acre-foot which, when paid for the projected portion of the [District]'s Annual Table A Amount will return to the State, during the Project Repayment Period, together with interest thereon computed at the Project Interest Rate and compounded annually, the full amount of the adjustments resulting from financing after January 1, 1987, from all bonds, advances, or loans listed in Article 1(ad) except for Article 1(ad)(3) and except for bonds issued by the State under the Central Valley Project Act after January 1, 1987 for facilities not listed among the Water System Facilities in Article 1(ap). Notwithstanding the immediately preceding exception, such amortization shall also apply to any adjustments in this component charge resulting from a change in the Project Interest Rate due to any refunding after January 1, 1986 on bonds issued under the Central Valley Project Act. However, amortization of adjustments resulting from items listed in subdivisions (1)(ad)(4) through (7) of Article 1 shall be limited to a period which would allow the Department to repay the debt service on a current basis until such time as bonds are issued to reimburse the source of such funding. In no event shall this amortization period be greater than the Project Repayment Period.

(6) *No Adjustment of Water System Facility Revenue Bond Financing Costs*. The use of Water System Facility Revenue Bonds for financing facilities listed in Article 1(ap) shall not result in adjustments for prior underpayments or overpayments of the capital component of the Transportation Charge to the [District] under the provisions of this article. In place of making such adjustments, charges to the [District] for Water System Facility Revenue Bond Financing Costs will be governed by Article 50(a).

(b) **Redetermination of Delta Water Charges and Transportation Charges for Costs Incurred On or After the Billing Transition Date**. The provisions of this subdivision (b) shall apply only to costs Incurred on or after the Billing Transition Date.

(1) *Determinative Factors Subject to Retroactive Change*. The State shall redetermine the values and amounts set forth in Tables B through F and Tables J through O of this contract each calendar year commencing on or after the Billing Transition Date in order that the Delta Water Charge and the Transportation Charge to the [District] for costs Incurred on or after the Billing Transition Date and the components thereof may accurately reflect the increases or decreases from year to year in projected costs, outstanding reimbursable indebtedness of the State Incurred to construct Project Conservation Facilities and Project Transportation Facilities, Annual Table A Amounts, estimated deliveries, and all other factors which are determinative of such charges. In addition, each such redetermination shall include an adjustment of the components of the Delta Water Charge and Transportation Charge to be paid by the [District] for

succeeding years which shall account for the differences, if any, between those factors used by the State in determining the amounts of such components for all preceding years and the factors as then currently known by the State, as applicable. Such adjustment shall be computed by the State and paid by the [District] or credited to the [District]'s account in the manner described in subdivisions (b)(2) and (b)(3) of this article.

(2) *Adjustment: Delta Water Charge and Transportation Charge -- Capital Components for Costs Incurred On or After the Billing Transition Date*. Adjustments for prior underpayments or overpayments of the capital component of the Delta Water Charge and the Transportation Charge to the [District] for costs Incurred on or after the Billing Transition Date shall be paid in the year following the redetermination.

(3) *Adjustment: Delta Water Charge and Transportation Charge -- Minimum and Variable Components for Costs Incurred On or After the Billing Transition Date* One-twelfth of the adjustments for prior underpayments or overpayments of the [District]'s minimum operation, maintenance, power, and replacement component and variable operation, maintenance and power component of the Delta Water Charge and Transportation Charge for each year shall be added or credited to the corresponding components to be paid in the corresponding month of the year following the redetermination.

29. TIME AND METHOD OF PAYMENT OF DELTA WATER CHARGE AND TRANSPORTATION CHARGE.

The provisions of this article shall apply to costs Incurred both prior to and on or after the Billing Transition Date. References to the Delta Water Charge shall include the Delta Water Charge for costs Incurred prior to the Billing Transition Date and the Delta Water Charge for costs Incurred on or after the Billing Transition Date, separately, as applicable, and references to the Transportation Charge shall include the Transportation Charge for costs Incurred prior to the Billing Transition Date and the Transportation Charge for costs Incurred on or after the Billing Transition Date, separately, as applicable.

(a) **Initial Payments**.

(1) *Delta Water Charge.* Payments by the [District] under the Delta Water Charge shall commence in the Year of Initial Water Delivery to the [District].

(2) *Capital Component of the Transportation Charge*. Payments by the [District] under the capital component of the Transportation Charge shall commence in the year following the year in which the State commences construction of the Project Transportation Facilities.

(3) *Minimum Operation, Maintenance, Power, and Replacement Component*. Payments by the [District] under the minimum operation, maintenance, power, and replacement component of the Transportation Charge shall commence for each aqueduct reach in the year following the year in which construction of that reach is completed.

(4) *Variable Operation, Maintenance, Power, and Replacement Component*. Payments by the [District] under the variable operation, maintenance, power and replacement component of the Transportation Charge shall commence in the Year of Initial Water Delivery to the [District].

(b) **Annual Statement of Charges**. The State shall, on or before July 1 of each year, commencing with the year preceding the year in which payment of the respective charge is to commence pursuant to this article, furnish the [District] with a written statement of the following items:

(1) the charges to the [District] for the next succeeding year under the capital components and minimum operation, maintenance, power, and replacement components of the Delta Water Charges and Transportation Charges; *provided* that charges for Financing Costs shall be stated as separate items in the Statement of Charges;

(2) the unit charges to the [District] for the next succeeding year under the variable operation, maintenance, power and replacement components of the Delta Water Charge and Transportation Charge; and

(3) the total charges to the [District] for the preceding year under the variable operation, maintenance, power and replacement components of such Delta Water Charge and Transportation Charge; *provided* that through December 31, 1969, the Delta Water Charge shall be based upon a unit rate of $3.50 per acre-foot and shall be paid by the Contractors on the basis of their respective Annual Table A Amounts, as provided in Article 22(b).

All such statements shall be accompanied by the latest revised copies of the documents amendatory to Article 22 and of the tables included in Articles 24 through 27, together with such other data and computations used by the State in determining the amounts of the above charges as the State deems appropriate.

(c) **Monthly Statements**. The State shall, on or before the fifteenth day of each month of each year, commencing with the Year of Initial Water Delivery to the [District], furnish the [District] with a statement of the charges to the [District] for the preceding month under the variable operation, maintenance, power and replacement components of the Delta Water Charge and Transportation Charge. Such charges shall be determined by the State in accordance with the relevant provisions of Articles 22 and 26 of this contract, upon the basis of metered deliveries of Project Water to the [District], except as otherwise provided in those articles.

(d) **Semiannual Payments of Capital Components**. The [District] shall pay to the State, on or before January 1 of each year, one-half (1/2) of the charge to the [District] for the year under the capital component of the Delta Water Charge and one-half (1/2) of the charge to the [District] for the year under the capital component of the Transportation Charge, as such charges are stated pursuant to subdivision (b) of this article; and shall pay the remaining one-half (1/2) of each of such charges on or before July 1 of that year.

(e) **Monthly Payments of Minimum Operation, Maintenance, Power, and Replacement Component**. The [District] shall pay to the State, on or before the first day of each month of each year, one-twelfth (1/12) of the sum of the charges to the [District] for the year under the minimum operation, maintenance, power, and replacement components of the Delta Water Charge and Transportation Charge, respectively, as such charges are stated pursuant to subdivision (b) of this article.

(f) **Monthly Payments of Variable Operation, Maintenance, Power, and Replacement Component**. The [District] shall pay to the State on or before the fifteenth day of each month of each year, the charges to the [District] under the variable operation, maintenance, power, and replacement components of the Delta Water Charge and Transportation Charge, respectively, for which a statement was received by the [District] during the preceding month pursuant to subdivision (c) of this article, as such charges are stated in such statement.

(g) **Contest of Charges**. In the event that the [District] in good faith contests the accuracy of any statement submitted to it pursuant to subdivision (b) or (c) of this article, it shall give the State notice thereof at least ten (10) days prior to the day upon which payment of the stated amounts is due. To the extent that the State finds the [District]'s contentions regarding the statement to be correct, it shall revise the statement accordingly, and the [District] shall make payment of the revised amounts on or before the due date. To the extent that the State does not find the [District]'s contentions to be correct, or where time is not available for a review of such contentions prior to the due date, the [District] shall make payment of the stated amounts on or before the due date, but may make the contested part of such payment under protest and seek to recover the amount thereof from the State.

50. WATER SYSTEM FACILITY REVENUE BOND FINANCING COSTS.

(a) **Water System Facility Revenue Bonds to Finance Capital Costs Incurred Prior to the Billing Transition Date**. The provisions of this subdivision (a) shall apply to the Financing Costs of Revenue Bonds issued to finance Water System Facility Capital Costs Incurred prior to the Billing Transition Date. Charges to all Contractors for such Financing Costs shall return to the State each year an amount equal to the Financing Costs the State incurs in that year for such Water System Facility Revenue Bonds.

(1) *Elements of Charge*. Annual charges to recover such Water System Facility Revenue Bond Financing Costs shall consist of two elements.

(A) The first element shall be an annual charge to the [District] for repayment of Capital Costs of Water System Facilities as determined under Articles 22(a) and 24(a) of this contract with interest at the Project Interest Rate. For conservation facilities, the charge shall be a part of the capital component of the Delta Water Charge in accordance with the provisions of Article 22(a) applicable to Capital Costs Incurred prior to the Billing Transition Date. For transportation facilities, the charge shall be a part of the capital component of the Transportation Charge in accordance with the provisions of Article 24(a) applicable to Capital Costs Incurred prior to the Billing Transition Date.

(B) The second element shall be the [District]'s share of a Water System Facility Revenue Bond Surcharge to be paid in lieu of a Project Interest Rate adjustment. The total annual amount to be paid by all Contractors under this element shall be the difference between the total annual charges under the first element and the annual Financing Costs of the related Water System Facility Revenue Bonds. The amount to be paid by each Contractor shall be calculated annually as if the Project Interest Rate were increased to the extent necessary to produce revenues from all Contractors sufficient to pay such difference for that year. In making that calculation, adjustments in the [District]'s transportation capital component charges for prior overpayments and underpayments shall be determined as if amortized over the remaining years of the Project Repayment Period.

(2) *Identification of Surcharge on Invoices.* The Water System Facility Revenue Bond Surcharge will be identified in the [District]'s invoice.

(3) *Timing of Surcharge Payments*. Surcharge payments shall be made in accordance with Article 29(f) of this contract.

(4) *Termination of Surcharge*. The Water System Facility Revenue Bond Surcharge under Article 50(a)(1)(B) shall cease for each series of Water

System Facility Revenue Bonds when that series is fully repaid. However, the annual charge determined pursuant to Article 50(a)(1)(A) shall continue to be collected for the time periods otherwise required under Articles 22 and 24.

(5) *Reduction of Charges.* After the Department has repaid the California Water Fund in full and after each series of Water System Facility Revenue Bonds is repaid, the Department will reduce the charges to all Contractors in an equitable manner in a total amount that equals the amount of the charges under Article 50(a)(1)(A) that the Department determines is not needed for future financing of facilities of the System which, in whole or in part, will serve the purposes of the water supply contract with the [District].

(b) **Water System Facility Revenue Bonds to Finance Capital Costs Incurred On or After the Billing Transition Date**. The provisions of this subdivision (b) shall apply to the Financing Costs of Revenue Bonds issued to finance Water System Facility Capital Costs Incurred on or after the Billing Transition Date. Charges to all Contractors for such Financing Costs shall return to the State each year an amount equal to the Financing Costs the State incurs in that year for such Water System Facility Revenue Bonds. The amount of this charge shall be calculated in two steps as follows:

(1) *Allocation of Water System Facility Capital Costs*. Capital Costs Incurred on or after the Billing Transition Date of Water System Facilities that are conservation facilities shall be allocated among all Contractors in proportion to each Contractor's Maximum Annual Table A Amount. Capital Costs Incurred on or after the Billing Transition Date of Water System Facilities that are transportation facilities shall be allocated among all Contractors in accordance with Article 24(c).

(2) *Determination of Annual Financing Cost Amounts*. The State shall determine and charge the [District] each year the amount of the Financing Costs the State incurs in that year for the Water System Facility Revenue Bonds issued to finance such Water System Facility Capital Costs allocated to the [District].

(c) **Provisions Applicable to All Water System Facility Revenue Bonds**. The provisions of this article shall apply to all Water System Facility Revenue Bonds.

(1) *Credits for Excess Amounts.* The State shall provide credits to the Contractors for excess reserve funds, excess debt service coverage, interest, and other earnings of the State in connection with payment of the Financing Costs of such Water System Facility Revenue Bonds, when and as permitted by the applicable bond resolution or indenture. When such credits are determined by the State to be available, such credits shall be promptly provided to the Contractors and shall be in proportion to the payments of Water System Facility Revenue Bond Financing Costs from each Contractor. Reserves, bond debt

service coverage, interest, and other earnings may be used to retire bonds.

(2) *Allocation of Maturities Permitted.* When calculating charges for Water System Facility Revenue Bond Financing Costs, the State may allocate portions of particular maturities of Water System Facility Revenue Bonds and the Financing Costs associated with such maturities to particular Water System Facilities, in order to establish a reasonable relationship between the Economic Useful Life of such facilities and the term of bonds issued to finance such facilities, and may determine the Financing Costs allocated to the [District] on the basis of such maturity allocation.

(3) *Supplemental Bills for Unanticipated Financing Costs.* The State may submit a supplemental bill to the [District] for the year if necessary to meet unanticipated costs for Water System Facility Revenue Bond Financing Costs for which the State can issue a statement of charges under this article and any other article of this contract providing for payments that are pledged to the payment of Revenue Bonds issued to finance Project Facility Capital Costs allocated to the [District]. The relative amounts of any supplemental billing made to the [District] and to other Contractors for Revenue Bond purposes shall be governed by the otherwise applicable article. Payment of any supplemental billing shall be due thirty days after the date of the invoice.

(4) *Insurance on Contractor Obligations.* To the extent economically feasible and justifiable, as determined by the State after consultation with Contractors, the State shall maintain insurance or other forms of security protecting bondholders and non-defaulting Contractors against costs resulting from the failure of any Contractor to make the payments required by this article.

(5) *Consultation on Financing Plan.* Before issuing each series of Water System Facility Revenue Bonds, the State shall consult with the Contractors, prepare a plan for the State's future financing of Water System Facilities, and give the [District] an opportunity to comment on the plan. The plan shall include but not be limited to the size of any Water System Facility Revenue Bond issuances and the form of any necessary resolutions, indentures or supplements.

(6) *Defaults*.

> (A) If a Contractor defaults partially or entirely on its payment obligations with respect to Water System Facility Revenue Bond Financing Costs and sufficient insurance or other security protecting the non-defaulting Contractors is not provided under subdivision (c)(4) of this article, the State shall allocate a portion of the default to each non-defaulting Contractor. The [District]'s share of the default shall be equal to an amount determined by multiplying the total default amount to be charged to all non-defaulting Contractors by the ratio that the [District]'s

Maximum Annual Table A Amount bears to the total of the Maximum Annual Table A Amounts of all non-defaulting Contractors. However, such amount shall not exceed in any year 25 percent of the Water System Facility Revenue Bond Financing Costs that are otherwise payable by the [District] in that year. The amount of default to be charged to non-defaulting Contractors shall be reduced by any receipts from insurance protecting non-defaulting Contractors and bond debt service coverage from a prior year and available for such purpose.

(B) If a Contractor defaults partially or entirely on its payment obligations under this article, the State shall also pursuant to Article 20, upon six months' notice to the defaulting Contractor, suspend water deliveries under Article 20 to the defaulting Contractor so long as the default continues. The suspension of water deliveries shall be proportional to the ratio of the default to the total Water System Facility Revenue Bond Financing Cost payments due from the defaulting Contractor. However, the State may reduce, eliminate, or not commence suspension of deliveries pursuant to this subparagraph if it determines suspension in the amounts otherwise required is likely to impair the defaulting Contractor's ability to avoid further defaults or that there would be insufficient water for human consumption, sanitation, and fire protection. The State may distribute the suspended water to the non-defaulting Contractors on terms it determines to be equitable.

(C) During the period of default, credits otherwise due the defaulting Contractor shall be applied to payments due from the defaulting Contractor.

(D) Except as otherwise provided in subparagraph (c) of this article, the defaulting Contractor shall repay the entire amount of the default to the State with interest compounded annually at the Surplus Money Investment Fund rate before water deliveries that had been suspended shall be fully resumed to that Contractor. If the defaulting Contractor makes a partial repayment of its default, the Department may provide a proportional restoration of suspended deliveries. The amount of the default to be repaid shall include any amounts previously received by the State from insurance proceeds, bond debt service coverage, or other reserves, and payments from other Contractors pursuant to this subparagraph (c)(6). The defaulting Contractor shall not be entitled to any make-up water deliveries as compensation for any water deliveries suspended during the period when the Contractor was in default.

(E) At such time as the default amount is repaid by the defaulting Contractor, the non-defaulting Contractors shall receive credits in proportion to their contributions towards the amount of the default with interest collected by the State on the defaulted amount.

(F) In the event there is an increase in the amount a non-defaulting Contractor contributes to reserves and/or bond debt service coverage, such increase shall be handled in the same manner as provided in subparagraph (a) of this article.

(G) Action taken pursuant to this subdivision shall not deprive the State of or limit any remedy provided by this contract or by law for the recovery of money due or which may become due under this contract.

(7) *No Article 51 Reduction.* Amounts of Water System Facility Revenue Bond Financing Costs payable under this contract shall not be affected by any reductions in payments pursuant to Article 51.

(8) *Contract Extension.* In the event the Contract Extension Amendment takes effect, but not all Contractors sign the amendment, the following shall apply: If and to the extent that the charges under Article 50(b)(1) and 50(b)(2) of the water supply contracts of Contractors that have not executed the Contract Extension Amendment (“non-signing Contractors”) are not sufficient to recover the annual Financing Costs that relate to Revenue Bonds issued to finance capital costs that are Incurred after the Billing Transition Date and are allocable to such non-signing Contractors, the amount of the shortfall shall be determined. Such shortfall shall be charged to the Contractors that have executed the Contract Extension Amendment (“signing Contractors”) in proportion to each such signing Contactor’s total Water System Facility Revenue Bond Financing Cost charges under Article 50(b) of this contract.

51. FINANCIAL ADJUSTMENTS

(a) Article Expiration

This Article 51 shall be effective through December 31, 2035 and shall be of no further effect on and after January 1, 2036; provided, however, that the provisions of this Article 51 may, to the extent applicable, continue to be used and applied on and after January 1, 2036 for the purpose of truing up amounts owed by the [District] to the State or by the State to the [District] for the calendar years up to and ending with calendar year 2035.

(b) State Water Facilities Capital Account

(1) The State shall establish a State Water Facilities Capital Account to be funded from revenues available under Water Code section 12937(b)(4). Through procedures described in this article and as limited by this article, the State may consider as a revenue need under subdivision (c)(2)(v) of this article and may deposit in the State Water Facilities Capital Account the amounts necessary to pay capital costs of the State Water Facilities for which neither general obligation bond nor revenue bond proceeds are available, including but not limited to planning, reconnaissance and feasibility studies, the San Joaquin Valley Drainage Program and, through the year 2000, the CALFED Bay-Delta Program.

(2) The Director of the Department of Water Resources shall fully consult with the Contractors and consider any advice given prior to depositing funds into this account for any purposes. Deposits into this account shall not exceed the amounts specified in subdivision (c)(2)(v) of this article.

(3) The State shall use revenue bonds or other sources of moneys rather than this account to finance the costs of construction of any major capital projects.

(4) Five years following the Contract Extension Amendment Effective Date, the SWRDS Finance Committee shall review the State Water Facilities Capital Account to determine whether to recommend to the Director that this account be closed. If the Director determines to close the account, the State shall transfer any balance in the account to the SWRDS Support Account.

(5) Unless closed sooner, the State Water Facilities Capital Account shall terminate on December 31, 2035 and the State shall transfer any balance in such account to the SWRDS Support Account.

(c) **Calculation of Financial Needs**

(1) Each year the State shall calculate in accordance with the timing provisions of Articles 29 and 31 the amounts that would have been charged (but for this article) to each Contractor as provided in other provisions of this contract.

(2) Each year the State shall also establish its revenue needs for the following year for the following purposes, subject to the following limitations:

> (i) The amount required to be collected under the provisions of this contract, other than this article, with respect to all revenue bonds issued by the State for Project Facilities.
>
> (ii) The amount required for payment of the reasonable costs of the annual maintenance and operation of the State Water Resources Development System and the replacement of any parts thereof as described in Water Code section 12937(b)(1). These costs shall not include operation and maintenance costs of any Federal Central Valley Project facilities constructed by the United States and acquired by the State of California after 1994, other than the State's share of the joint use facilities which include San Luis Reservoir, the San Luis Canal and related facilities.
>
> (iii) The amount required for payment of the principal of and interest on the bonds issued pursuant to the Burns-Porter Act as described in Water Code section 12937(b)(2).
>
> (iv) Any amount required for transfer to the California Water Fund in reimbursement as described in Water Code section 12937(b)(3) for funds utilized from said fund for construction of the State Water Resources Development System.
>
> (v) For the years 1998 and thereafter, the amount needed for deposits into the State Water Facilities Capital Account as provided in subdivision (b) of this article, but (A) not more than $6 million per year for the years 1998, 1999 and 2000, and (B) not more than $4.5 million per year for the years 2001 and thereafter.

(3) The State shall reduce the annual charges in the aggregate for all Contractors by the amounts by which the hypothetical charges calculated pursuant to subdivision (c)(1) above exceed the revenue needs determined pursuant to subdivision (c)(2) above; provided that the reduction in annual charges in the aggregate for all Contractors shall not exceed $48 million in any year beginning with the first calendar year following the Contract Extension Amendment Effective Date. The provisions regarding the reduction in annual charges that were in effect prior to the Contract Extension Amendment Effective Date shall continue to apply to

the entire calendar year in which the Contract Extension Amendment Effective Date occurs. The reductions under this article shall be apportioned among the Contractors as provided in subdivisions (d), (e), (f) and (g) of this article. Reductions to Contractors shall be used to reduce the payments due from the Contractors on each January 1 and July 1; provided, however, that to the extent required pursuant to subdivision (h) of this article, each Agricultural Contractor shall pay to the Agricultural Rate Management Trust Fund an amount equal to the reduction allocated to such Agricultural Contractor. Any default in payment to the trust fund shall be subject to the same remedies as any default in payment to the State under this contract. To determine whether the reduction in annual charges in the aggregate for all Contractors equals the $48 million limit specified in this subdivision (c)(3), it shall be assumed that all Contractors have executed the Contract Extension Amendment and will share in the available rate reductions consistent with the proportions as provided in this contract, regardless of whether one or more Contractors do not receive a reduction under their respective Water Supply Contracts.

(4) The supplemental billing provisions authorized under this Article 51(c)(4) shall remain in effect through December 31, 2035, unless the Director determines in his or her discretion to eliminate the use of supplemental billing prior to that date or the Director in his or her discretion accepts a recommendation from the SWRDS Finance Committee to eliminate the use of supplemental billing prior to that date.

(i) The State shall inform the SWRDS Finance Committee if the available System cash balances are projected by the State to fall during the succeeding one hundred twenty (120) days to an amount below an amount equal to ninety (90) days operating expenditures. The SWRDS Finance Committee shall make a recommendation in light of such circumstances to the Director.

(ii) The State may submit a supplemental billing to the [District] for the year in an amount not to exceed the amount of the prior reductions for such year under this Article if necessary to meet unanticipated costs for purposes identified in Water Code Section 12937(b)(1) and (2) for which the State can issue billings under other provisions of this contract, subject to the following procedures and limitations:

(a) The State may only issue supplemental bills pursuant to the provisions of this Article 51(c)(4) when available System cash balances are projected to be less than the amount equal to 90 days operating expenditures.

(b) The term “available System cash balances,” for purposes of subdivision (a) of this Article 51(c)(4)(ii) shall mean available amounts in the following California Water Resources Development Bond Fund accounts: System Revenue Account (to the extent the funds in the System Revenue Account are not projected to be needed for payment of Burns-Porter General Obligation Bond debt service within the next two years), General Operating Account, SWRDS Reinvestment Account, and SWRDS Support Account (to the extent the funds in the SWRDS Support Account are not projected to be needed for non-reimbursable expenditures within the next two years).

(c) The term “operating expenditures” for purposes of subdivision (a) of this Article 51(c)(4)(ii) shall mean the costs described in California Water Code Section 12937(b) chargeable to the State Water Project as water supply.

(d) Any supplemental billing made to the [District] for these purposes shall be in the same proportion to the total supplemental billings to all Contractors for these purposes as the prior reduction in charges to the [District] in that year bears to the total reduction in charges to all Contractors in that year and shall be treated as reducing the amount of the reduction made available for that year to the Contractor by the amount of the supplemental bill to the Contractor.

(5) The State may also submit a supplemental billing to the [District] for the year if necessary to meet unanticipated costs for revenue bond debt service and coverage for which the State can issue a statement of charges under provisions of this contract other than this article. The relative amounts of any supplemental billing made to the [District] and to other Contractors for revenue bond purposes shall be governed by such other applicable provisions of this contract.

(6) Payment of any supplemental billing shall be due thirty days after the date of the invoice. Delinquency and interest on delinquent amounts due shall be governed by Article 32.

(d) **Apportionment of Reductions between Agricultural and Urban Contractors:**

(1) Commencing with the first calendar year following the Contract Extension Amendment Effective Date, the State shall apportion available reductions for each year in accordance with this Article.

(2) Annual reductions in the aggregate amount of $48 million are projected to be available in the first calendar year following the Contract Extension Amendment Effective Date and each succeeding year through calendar year 2035 and shall be applied as follows:

(i) If reductions are available in an aggregate amount that equals $48 million, $11,856,000 of reductions shall be apportioned among the Agricultural Contractors, and $36,144,000 of reductions shall be apportioned among the Urban Contractors.

(ii) If reductions are available in an aggregate amount less than $48 million in any of these years, the reductions shall be divided on a 24.7%-75.3% basis between the Agricultural Contractors and the Urban Contractors respectively.

(3) No Contractor shall be entitled to receive in any year any additional reductions, including any additional reductions to make up for deficiencies in past projected reductions and any additional reductions above an aggregate annual amount of $48 million.

(4) Reductions in annual charges to a Contractor pursuant to this Article 51 (d) shall only be made prospectively beginning with the later of the first calendar year following the Contract Extension Amendment Effective Date or the first calendar year following the date the Contractor executes the Contract Extension Amendment. Apportionments of reductions shall be calculated on the assumption that all Contractors have executed such amendment.

(e) **Revenues and Reports**

(1) Each year, beginning with the first calendar year commencing after the Contract Extension Amendment Effective Date, the Director shall determine the amount of available Article 51(e) Amounts. The Director shall determine the aggregate amount that would have been charged to all Contractors in any year but for this Article 51 and from that amount shall deduct the sum of

(i) the amount of revenues needed for the purposes specified in subdivisions (c)(2)(i), (ii), (iii), (iv) and (v) plus

(ii) $48 million.

The remaining amount, if any, shall be referred to herein as “Article 51(e) Amounts”.

(2) The State shall allocate available Article 51(e) Amounts as follows: The Director in his or her discretion shall allocate and transfer or deposit up to 80% of available Article 51(e) Amounts, as determined on a projected basis, and up to 100% of available Article 51(e) Amounts, as determined on an actual basis, into the General Operating Account, the SWRDS Support Account and/or the SWRDS Reinvestment Account. Any Article 51(e) Amounts determined on an actual basis to be remaining in the Systems Revenue Account after the Director allocates and transfers such amounts to the General Operating Account, the SWRDS Support Account and/or the SWRDS Reinvestment Account shall remain in the Systems Revenue Account and shall be tracked separately in the State’s Financial Information System. The Director shall have full discretion regarding the use of the amounts remaining in the Systems Revenue Account.

(3) The State shall prepare and distribute an Annual Rate Reduction Determination Report setting out the factors used to determine reductions in rates pursuant to Article 51(c). The report shall include a display of the distribution of gross annual revenues before, among other items, recreation and fish and wildlife expenditures, contributions to the State Water Facilities Capital Account and reduction in rates pursuant to Article 51(c). The report shall also include a display of the distribution and/or allocation of net annual revenues after reduction in rates pursuant to Article 51(c), to the General Operating Account, SWRDS Support Account, SWRDS Reinvestment Account, 51(e) Sub-Account of the Systems Revenue Account, Davis-Dolwig Fund, State Water Facilities Capital Account, and Suspended Costs, as applicable.

(4) The System Financial Activity Report, which is required to be prepared quarterly pursuant to Article 61(d), shall include annual and accumulated Article 51(e) Amounts and expenditure activity, including the beginning balance, the annual activity and the ending balance for the year for each fund or account into which Article 51(e) Amounts have been transferred or deposited. The System Financial Activity Report should also have sufficient detail to provide comprehensive accounting of annual Article 51(e) Amounts and the uses of the annual Article 51(e) Amounts to enable the SWRDS Finance Committee to assess the use of these amounts.

(f) **Apportionment of Reductions Among Urban Contractors.** Reductions in annual charges apportioned to Urban Contractors under subdivision (d) of this article shall be further allocated among Urban Contractors pursuant to this subdivision. The amount of reduction of annual charges for each Urban Contractor shall be based on each Urban Contractor's proportionate share of total allocated capital costs as calculated below, for both project conservation and project transportation facilities, repaid by all Urban Contractors over the project repayment period.

(1) The conservation capital cost component of the reduction allocation shall be apportioned on the basis of maximum annual Table A amount. Each Urban Contractor's proportionate share shall be the same as the percentage of that Contractor's maximum annual Table A amount to the total of all Urban Contractors' maximum annual Table A.

(2) The transportation capital cost component of the reduction allocation shall be apportioned on the basis of transportation capital cost component repayment obligations, including interest over the project repayment period. Each Urban Contractor's proportionate share shall be the same as the percentage that the Contractor's total transportation capital cost component repayment obligation is of the total of all Urban Contractors' transportation capital cost component repayment obligations.

(i) Recalculations shall be made annually through the year 1999. Beginning in the year 2000 recalculations shall be made every five years unless an Urban Contractor requests a recalculation for an interim year and does so by a request in writing delivered to the Department by January 1 of the year in which the recalculation is to take place.

(ii) The transportation capital cost component repayment obligations, for purposes of this Article 51(f), shall be based in the year of recalculation on the then most recent Department of Water Resources Bulletin 132, Table B-15, "Capital Cost Component of Transportation Charge for Each Contractor," or its equivalent, excluding any costs or Table A amount associated with transfers of Table A amounts from Agricultural Contractors pursuant to Article 53.

(3) To reflect the relative proportion of the conservation capital cost component and the transportation capital cost component to the total of all capital cost repayment obligations, the two cost components shall be weighted as follows:

(i) The conservation capital cost component shall be weighted with a thirty percent (30%) factor. The weighting shall be accomplished by multiplying each Urban Contractor's percentage of maximum annual Table A Amounts as calculated in subdivision (f)(1) of this article by thirty percent (30%).

(ii) The transportation capital cost component shall be weighted with a seventy percent (70%) factor. The weighting shall be accomplished by multiplying each Urban Contractor's percentage of transportation capital cost component repayment obligations as calculated in subdivision (f)(2) of this article by seventy percent (70%).

(iii) A total, weighted capital cost percentage shall be calculated for each Urban Contractor by adding the weighted conservation capital cost component percentage to their weighted transportation capital cost component percentage.

(4) The total amount of the annual charges to be reduced to Urban Contractors in each year shall be allocated among them by multiplying the total amount of annual charges to be reduced to the Urban Contractors by the total, weighted capital cost percentages for each such Contractor. If the amount of the reduction to an Urban Contractor is in excess of that Contractor's payment obligation to the Department for that year, such excess shall be reallocated among the other Urban Contractors.

(5) In the case of a permanent transfer of urban Table A amounts, the proportionate share of annual charge reductions associated with that Table A amount shall be transferred with the Table A amount to the buying Contractor. In the case of an Table A amount transfer by either Santa Barbara County Flood Control and Water Conservation District or San Luis Obispo County Flood Control and Water Conservation District, the reductions in annual charges to that agency shall be allocated (a) on the basis of that Table A amount being retained by that agency which bears Coastal Branch Phase II transportation costs, (b) on the basis of that Table A amount being retained by that agency which does not bear Coastal Branch Phase II transportation costs, and (c) on the basis of the balance of that agency's Table A amount which also does not bear Coastal Branch Phase II transportation costs.

(g) **Apportionment of Reductions Among Agricultural Contractors.**

(1) Reductions in annual charges apportioned to Agricultural Contractors under subdivision (d) of this article shall be allocated among the Agricultural Contractors pursuant to this subdivision. The amount of reduction of annual charges for each Agricultural Contractor for the years 1997 through 2001 shall be based on each Agricultural Contractor's estimated proportionate share of the total project costs, excluding the variable operation, maintenance, power and replacement components of the Delta Water Charge and the Transportation Charge and also excluding off-aqueduct power charges, to be paid by all Agricultural Contractors for the years 1997 through 2035, calculated without taking into account this article. For purposes of these calculations, Kern County Water

Agency's and Dudley Ridge Water District's estimated project costs shall not include any costs associated with the 45,000 acre-feet of Annual Table A Amounts being permanently relinquished by those Contractors pursuant to subdivision (j) of Article 53. Also, for purposes of these calculations, an Agricultural Contractor's estimated project costs shall not be reduced by the transfer of any of the 130,000 acre-feet of Annual Table A Amounts provided for in subdivisions (a) through (i) of Article 53. The proportionate shares for 1997 through 2001 shall be calculated as follows:

(i) Each Agricultural Contractor's statement of charges received on July 1, 1994, shall be the initial basis for calculating the proportionate shares for the five years 1997 through 2001.

(ii) Each Agricultural Contractor's estimated capital and minimum components of the Delta Water Charge and the Transportation Charge (excluding off-aqueduct power charges) and Water Revenue Bond Surcharge shall be totaled for the years 1997 through 2035.

(iii) Kern County Water Agency and Dudley Ridge Water District totaled costs shall be reduced for the 45,000 acre-feet of annual Table A amount being permanently relinquished by them.

(iv) Any reductions in an Agricultural Contractor's totaled costs resulting from the transfer of any of the 130,000 acre-feet of annual Table A amount shall be re-added to that Contractor's costs.

(v) Each Agricultural Contractor's proportionate share shall be computed by dividing that Contractor's total costs by the total costs for all Agricultural Contractors determined pursuant to subparagraphs (ii), (iii) and (iv) above.

(2) The reductions in annual charges, for 1997 through 2001, shall be calculated using the method described in subdivision (g)(1) of this article.

(3) The allocation shall be recalculated using the same method described in subdivision (g)(1) of this article every five years beginning in 2002, if any Agricultural Contractor requests such a recalculation. Any recalculation shall be based on project cost data beginning with the year that the recalculation is to become effective through 2035.

(h) **Agricultural Rate Management Trust Fund.**

(1) Establishment. Through a trust agreement executed contemporaneously with this amendment, the State and the Agricultural Contractors that sign the Monterey Amendments shall establish the Agricultural Rate Management Trust Fund with a mutually agreed independent trustee.

(2) Separate Accounts. The trustee shall maintain within the trust fund a separate account for each Agricultural Contractor that signs the trust agreement to hold deposits made pursuant to this article.

(3) Deposits. Each Agricultural Contractor that signs the trust agreement shall deposit into such Contractor's account within the trust fund, at the same time as payments would otherwise be required by this contract to be made to the State, an amount equal to the amount by which such Contractor's charges under this contract have been reduced by reason of this article, until the balance in such Contractor's account within the trust fund is the same percentage of $150,000,000 as such Contractor's percentage share of reductions made available to all Agricultural Contractors as specified in subdivision (g) of this article. In 2002 and every fifth year thereafter, the Agricultural Contractors will review the maximum accumulation in the trust fund (the "Cap") and determine whether the cap should be adjusted. However, the Cap shall not be reduced below an aggregate of $150,000,000 for all Agricultural Contractor accounts.

(4) Trust Fund Disbursements.

(i) In any year in which the State's allocation of water to an Agricultural Contractor by April 15th of that year is less than one-hundred percent (100%) of the Contractor's requested annual Table A amount for that year, the trustee shall, to the extent there are funds in that Contractor's account, distribute to the State from such account for the benefit of that Contractor an amount equal to the percentage of the total of that Contractor's statement of charges for that year, as redetermined by the State on or about May 15th of that year, for (a) the Delta Water Charge; (b) the capital cost and minimum operation, maintenance, power and replacement components of the Transportation Charge (including off-aqueduct power charges); and (c) the water system revenue bond surcharge, that is equal to the percentage of that Contractor's annual Table A amount for that year that was not allocated to it by the State by April 15th of that year.

(ii) In addition to the provisions of subdivision (h)(4)(i) of this article, if on April 15 of any year any of the irrigable land within the Tulare Lake Basin Water Storage District (Tulare) is flooded, and Tulare in writing requests the trustee to do so, the trustee shall, to the extent there are funds in Tulare's account, distribute to the State from such account for the benefit of Tulare an amount equal to the percentage of the total of Tulare's statement of charges for that year, as redetermined by the State on or about May 15th of that year, for (a) the Delta Water Charge; (b) the capital cost and minimum components of the Transportation Charge (including off-aqueduct power charges); and (c) the water system revenue bond surcharge, that is equal to the percentage of the irrigable land within Tulare that is flooded on April 15.

(iii) Each Agricultural Contractor shall remain obligated to make payments to the State as required by other articles in this contract. Any amount to be disbursed pursuant to subdivisions (h)(4)(i) and (h)(4)(ii) shall be paid by the trustee to the State on July 1 of the year involved and shall be credited by the State toward any amounts owed by such respective Agricultural Contractor to the State as of that date. However, an Agricultural Contractor may direct the trustee to make the disbursement to that Agricultural Contractor which shall in turn make the payment to the State as required by other provisions of this contract. If the amount to be disbursed exceeds the amount owed to the State by such Contractor as of July 1, the excess shall be disbursed by the Trustee to the State at the time of and in payment of future obligations owed to the State by such Contractor. Alternatively, upon the request of such Contractor, all or part of the excess shall be paid by the trustee to that Contractor in reimbursement of prior payments by the Contractor to the State for that year.

(5) Payment of Supplemental Bills. In any year in which a supplemental bill has been submitted to an Agricultural Contractor pursuant to subdivision (c)(4) of this article, such supplemental bill shall be treated as reducing by an equal amount the obligation of such Contractor for that year to make payments into the Agricultural Rate Management Trust Fund. To the extent that such Contractor has already made payments to the trust fund in an amount in excess of such Contractor's reduced trust fund payment obligation, such Contractor may request the trustee to use the excess from the trust fund to pay the supplemental bill.

(6) Discharge of Payment Obligation. Each payment to the State by the trust fund shall discharge and satisfy the Agricultural Contractor's obligation to pay the amount of such payment to the State. No reimbursement of the trust fund by the Agricultural Contractor for such payments shall be required. However, each Agricultural Contractor shall continue to make deposits to the trust fund matching the amount of each year's reductions as provided in subdivision (d) of this article so long as the amount in that Contractor's account is less than its share of the Cap.

(7) Distribution of Funds in Excess of the Cap. Whenever accumulated funds (including interest) in an Agricultural Contractor's account in the trust fund exceed that Contractor's share of the Cap, or the estimated remaining payments

the Contractor is required to make to the State prior to the end of the project repayment period, that Contractor may direct the trustee to pay such excess to the Contractor.

(8) Termination of Trust Fund. At the end of the project repayment period, the Agricultural Rate Management Trust Fund shall be terminated and any balances remaining in the accounts for each of the Agricultural Contractors shall be disbursed to the respective Agricultural Contractors.

(i) **Definitions. For the purposes of this article, the following definitions will apply:**

(1) "Agricultural Contractor" shall mean the following agencies as they now exist or in any reorganized form:

(i) County of Kings,

(ii) Dudley Ridge Water District,

(iii) Empire West Side Irrigation District,

(iv) Kern County Water Agency for 848,130 acre-feet of its Table A amount,

(v) Oak Flat Water District,

(vi) Tulare Lake Basin Water Storage District.

(2) "Urban Contractor" shall mean every other agency having a long term water supply contract with the State as they exist as of the date of this amendment or in any reorganized form as well as Kern County Water Agency for 134,600 acre-feet of its Table A amount.

(j) **Except as provided in subdivisions (c)(4) and (c)(5)**, this article shall not be interpreted to result in any greater State authority to charge the Contractors than exists under provisions of this contract other than this article.

NEW CONTRACT ARTICLE

II. ARTICLE 61 IS ADDED TO THE CONTRACT AS A NEW ARTICLE AS FOLLOWS:

61. FINANCIAL ACCOUNTS AND ACTIVITIES

(a) **General Operating Account**

(1) The State shall maintain a General Operating Account to provide the moneys needed for the following purposes:

(i) To pay or provide for the payment of System costs which are reimbursable by one or more Contractors under their respective Water Supply Contracts in the event System revenues available for such payment are insufficient for such purpose; or

(ii) To pay or provide for the payment of System costs for any System purpose in the event of a System emergency as defined in Article 61(a)(1)(iii).

(iii) A System Emergency, as used in this Article 61(a)(1)(ii) shall mean an immediate, urgent, critical, unexpected, or impending situation that, in the judgment of the Director may cause or pose a risk of causing injury, loss of life, damage to the property, impairment of the financial condition, and/or interference with the normal activities of the System which requires immediate attention and remedial action.

(2) The maximum amount in the General Operating Account shall be set, adjusted and funded as follows:

(i) Upon the Contract Extension Amendment Effective Date, the maximum amount shall be $150 million.

(ii) On or before the first September 1 occurring five (5) years after the Contract Extension Amendment Effective Date and every five (5) years thereafter, the State shall present a business case analysis of the maximum amount reasonably necessary or appropriate to be maintained in the General Operating Account, including an evaluation of the maximum amount and its relationship to the business risks associated with the System cash flow, to the SWRDS Finance Committee for recommendation to the Director regarding a General Operating Account maximum amount adjustment, provided that the maximum amount shall not be less than $150 million.

(iii) To fund the General Operating Account to its maximum amount, the Director may, in his or her discretion, transfer to the General Operating Account (1) amounts determined to be available pursuant to Article 51(e); (2) earnings from the investment of amounts in the General Operating Account; (3) amounts in the SWRDS Reinvestment Account; and (4) amounts in the SWRDS Support Account.

(iv) If the Director determines to decrease the maximum amount pursuant to Article 61(a)(2)(ii), or the maximum amount is otherwise exceeded, the excess amount in the General Operating Account shall be transferred to the SWRDS Reinvestment Account.

(v) The State shall replenish the amounts used from the General Operating Account (1) through charges to the Contractors to the extent the Contractors are obligated to reimburse the State for the costs paid with such amounts and (2) from the SWRDS Support Account or other available revenues (including the sources described in subparagraph (iii) of this Article 61(a)(2)) for costs not reimbursable by the Contractors under their respective Water Supply Contracts.

(vi) General Operating Account investment earnings shall be used to fund the General Operating Account to its maximum amount or, in the Director's discretion, transferred to the SWRDS Support Account and/or the SWRDS Reinvestment Account.

(3) The State shall prepare monthly reports on the balance in and use of the General Operating Account for the Director, and shall provide those reports to the SWRDS Finance Committee. The SWRDS Finance Committee may periodically review reporting frequency and make recommendations to the Director regarding reporting frequency.

(b) **SWRDS Reinvestment Account**

(1) Commencing with the Contract Extension Amendment Effective Date, the State shall establish and maintain a SWRDS Reinvestment Account to provide a continuing source of investment revenue to provide amounts to be transferred to or deposited in the General Operating Account, the SWRDS Reinvestment Account, and the SWRDS Support Account.

(2) To fund the SWRDS Reinvestment Account, the Director may, in his or her discretion, transfer to the SWRDS Reinvestment Account (i) amounts determined to be available pursuant to Article 51(e), (ii) earnings from the

investment of amounts in the SWRDS Reinvestment Account, (iii) payments by the Contractors for capital costs funded from the SWRDS Reinvestment Account, (iv) amounts from the SWRDS Support Account, and (v) amounts from the General Operating Account.

(3) Amounts in the SWRDS Reinvestment Account may be used and/or invested as follows:

(i) To pay capital costs of project facilities to the extent those costs are reimbursable by one or more Contractors under their respective Water Supply Contracts. Such capital costs shall be reimbursed to the State in accordance with item 5 of this subparagraph (b) below.

(ii) To pay capital costs of project facilities pending reimbursement of the State with the proceeds of revenue bonds issued by the State; and

(iii) To make temporary investments in accordance with the statutory limitations on such investments.

(4) The State shall prepare regular reports on the SWRDS Reinvestment Account for the Director and shall provide those reports to the SWRDS Finance Committee. The State shall consult with the SWRDS Finance Committee about the investments and activities to be funded from the SWRDS Reinvestment Account.

(5) *Amortization of Costs Financed with Amounts in the SWRDS Reinvestment Account.* Charges to amortize Project Facility Capital Costs paid with amounts from the SWRDS Reinvestment Account shall return to the State, in equal annual amounts over an amortization period determined by the State, the amount of each such cost together with an interest charge on the unamortized balance thereof.

(i) The length of such amortization periods may be from ten (10) to fifty (50) years, *provided* that if the capital asset has an Economic Useful Life of less than ten (10) years, the amortization period may be a comparable period of less than ten (10) years.

(ii) The interest charge shall be at a rate equal to the market interest rate at the time the cost is Incurred on municipal Revenue Bonds with the following characteristics:

(a) the same rating as the rating on Revenue Bonds issued by the State to finance Project Facilities, and

(b) the same term as the length of the amortization period, all as determined by the State.

(iii) For the purposes of this subdivision (b)(5), the State may aggregate the Capital Costs of each project facility Incurred during each calendar year and determine a composite interest rate and a composite amortization period applicable to the amortization of such costs.

(iv) The amortization charges relating to the costs Incurred during each calendar year shall commence the calendar year starting one year after the end of the calendar year in which such costs were Incurred, and the amount to be amortized shall include capitalized interest for the period from the date or dates the costs are Incurred to the date of commencement of amortization.

(c) **SWRDS Support Account**

(1) Commencing with the Contract Extension Amendment Effective Date, the State shall establish and maintain a SWRDS Support Account to provide a source of funds to pay System costs that are not chargeable to the Contractors under their respective Water Supply Contracts and for the payment of which there are no other monies available.

(2) To fund the SWRDS Support Account, the Director may, in his or her discretion, transfer to the SWRDS Support Account (i) amounts determined to be available pursuant to Article 51(e); (ii) amounts in the SWRDS Reinvestment Account, (iii) investment earnings in the General Operating Account; (iv) earnings from the investment of amounts in the SWRDS Support Account; and (v) other available revenues. The State shall not charge the [District] to replenish the SWRDS Support Account for costs not otherwise chargeable to the [District] under this contract.

(3) If the State is reimbursed or other amounts are appropriated and received for a cost paid from the SWRDS Support Account, the State shall deposit the amount reimbursed or received in the SWRDS Support Account.

(4) The State shall prepare regular reports on the SWRDS Support Account for the Director and shall provide those reports to the SWRDS Finance

Committee. The State shall consult with the SWRDS Finance Committee about the investments and activities to be funded from the SWRDS Support Account.

(d) System Financial Activity Report and Reporting Principles

(1) The State shall prepare and distribute quarterly a System Financial Activity Report that contains the following information:

(i) By fund or account, the activity in the following funds and accounts: the General Operating Account, the SWRDS Support Account, the SWRDS Reinvestment Account, the 51(e) Sub-Account of the Systems Revenue Account, the Davis-Dolwig Fund, and the State Water Facilities Capital Account, and the activity with respect to suspended costs.

(ii) The data in the System Financial Activity Report shall be auditable, which includes an audit trail from the costing ledger (currently the Utility Cost Accounting Billing System, as of the Contract Extension Amendment Effective Date) to the general ledger (currently SAP, as of the Contract Extension Amendment Effective Date) or the Bulletin 132 estimates to the System Financial Activity Report.

(2) Appendix B, entitled System Reporting Principles, contains principles and guidelines which shall be followed, to the extent applicable, in the preparation of System financial reports and financial management reports.

(e) State Water Resources Development System Finance Committee

(1) The State shall establish a joint State and Contractors finance committee, which shall be referred to as the State Water Resources Development System Finance Committee or SWRDS Finance Committee. The membership of the SWRDS Finance Committee shall include both representatives from the State and the Contractors.

(2) The primary purpose of the SWRDS Finance Committee shall be to make recommendations to the Director concerning the financial policies of the System. The State and the Contractors shall describe the scope of the SWRDS Finance Committee in a charter mutually agreeable to the State and the Contractors.

(f) Cost Recovery

In general, the State should seek reimbursement for all System costs from the appropriate customers and users of System facilities. With respect to those

System costs that are reimbursable by the Contractors, the State should allocate financial responsibility for such costs in a manner that is both lawful and equitable, and which endeavors to recover such costs from the appropriate Contractors. If the State proposes to not charge any Contractor the full amount that the State is entitled to charge the Contractor under the contract, the State shall present a written proposal to the SWRDS Finance Committee for purposes of developing a recommendation to the Director regarding the proposal. The State shall submit such proposal in writing to the SWRDS Finance Committee 90 days in advance of the Director issuing any decision and within such 90 day period the SWRDS Finance Committee shall provide the Director with a recommendation regarding such proposal. Such proposals shall comply with the structure set out in the SWRDS Finance Committee charter referenced in Article 61(e)(2).

NEW CONTRACT APPENDIX

III. APPENDIX B IS ADDED TO THE CONTRACT AS A NEW APPENDIX AND SHALL READ AS FOLLOWS:

APPENDIX B
SYSTEM REPORTING PRINCIPLES

A. During the term of the water supply contracts, it is likely that financial reports and financial management reports will change in scope, nature, and frequency. Regardless of the exact reports used, such reports shall follow the below principles and guidelines to the extent applicable.

1. Principle 1: Financial reporting will be generated from the general ledger or data warehouse of the financial information system (system of record), such as SAP. The financial system of record is the authoritative source for financial reporting data values in a system. To ensure data integrity, there must be one, and only one, system of record for financial reporting values.

2. Principle 2: Financial reporting is not limited to annual financial statements but will be developed for regular reporting periods.

3. Principle 3: Financial management reporting generated from other financial systems, such as Utility Cost Accounting Billing System (UCABS), will identify and analyze significant variances from prior years or budgets.

4. Principle 4: Financial reporting and financial management reporting will identify unusual items and exceptions, and these items will be documented, reviewed, and resolved by management.

5. Principle 5: DWR will use standardized System-wide business rules and utilize a centralized financial system, such as SAP, UCABS, or other system, to provide controls/validations to ensure data integrity and reliable reporting.

6. Principle 6: DWR will use standardized data integrity rules in the development and publication of reports, including but not limited to the following:

   (1) Data integrity refers to the accuracy and consistency of data stored in a database, data warehouse, data mart or other construct.

   (2) Data integrity processes verify that data has remained unaltered in transit from creation to reception or remains unaltered in transit from one system to the next. Data used outside of the Enterprise Resource Planning (ERP) systems to meet the reporting needs of Program will undergo any number of operations in support of decision-making, such as capture, storage,

retrieval, update and transfer. It is important to have confidence that during these operations, the data will be kept free from corruption, modification and remain unaltered.

(3) Data with “integrity” has a complete or whole structure. Data values are standardized according to a data model and/or data type. All characteristics of the data must be correct – including business rules, relations, dates, definitions and lineage – for data to be complete.

(4) Data integrity is imposed within an ERP database when it is created and is authenticated through the ongoing use of error checking and validation routines.

(5) Data integrity state or condition is to be measured by the validity and reliability of the data values.

(6) Data integrity service and security maintains information exactly as it was input, and is auditable to affirm its reliability.

The SWRDS Finance Committee is charged with providing financial policy recommendations to the Director, and the Director has final discretion on whether or not to accept the recommendations. While the SWRDS Finance Committee is not charged with reviewing the content of financial reports, timely and accurate financial reporting and financial management reporting provides technical committees access to useful information that can be used to formulate proposals on financial policy matters that may be brought to the SWRDS Finance Committee.

IT IS FURTHER MUTUALLY AGREED that the following provisions, which shall not be part of the Water Supply Contract text, shall be a part of this Amendment and be binding on the Parties.

AMENDMENT IMPLEMENTING AND ADMINISTRATIVE PROVISIONS

1. EFFECTIVE DATE OF CONTRACT EXTENSION AMENDMENT

(a) The Contract Extension Amendment shall take provisional effect ("provisional effective date pursuant to subparagraph (a)") on the last day of the calendar month in which both of the following occur: (i) the State and 15 or more Contractors, with an aggregate maximum annual Table A amount exceeding 3,200,000 acre feet, have executed (or committed in a form satisfactory to the State to execute) the Contract Extension Amendment and (ii) no legal action addressing the validity or enforceability of the Contract Extension Amendment or any aspect thereof has been filed within sixty days of such execution or, if filed, a final judgment of a court of competent jurisdiction has been entered sustaining or validating the Contract Extension Amendments. Subject to subparagraph (b), the provisional effective date pursuant to paragraph (a) shall be the Contract Extension Amendment Effective Date if the conditions set out in subparagraph (e) are met.

(b) If any part of the Contract Extension Amendment of any Contractor is determined by a court of competent jurisdiction in a final judgment or order to be invalid or unenforceable, the Contract Extension Amendments of all Contractors shall be of no force and effect except as provided in subparagraph(c).

(c) The unenforceability and lack of effectiveness of all Contractors' Contract Extension Amendments as provided for in subparagraph (b) may be avoided only if the part of the Contract Extension Amendment determined to be invalid or unenforceable is explicitly waived in writing by the State and 15 or more Contractors, with an aggregate maximum annual Table A amount exceeding 3,200,000 acre feet, in which case the Contract Extension Amendment shall take provisional effect ("provisional effective date pursuant to subparagraph (c)") on the last day of the calendar month in which the requisite waivers are received, but only as to those Contractors submitting such a waiver in writing, subject to subparagraph (e). The provisional effective date pursuant subparagraph (c) shall become the Contract Extension Amendment Effective Date if the conditions set out in subparagraph (e) are met.

(d) If any Contractor has not executed a Contract Extension Amendment or has not submitted a waiver pursuant to subparagraph (c), whichever is applicable, within sixty (60) days of the provisional effective date pursuant to subparagraph (a) or the provisional effective date pursuant to subparagraph (c), as applicable, the amendment shall not take effect as to such Contractor, unless the Contractor and the State, in its discretion, thereafter execute such Contractor's contract extension amendment or the Contractor thereafter submits, and the State in its discretion accepts, the waiver, whichever applies, in which case the Contract Extension Amendment Effective Date for purposes of that Contractor's contract and any associated terms shall be as agreed upon by the State and Contractor.

(e) (1) If at the end of the applicable 60-day period specified in subparagraph (d), 24 or more Contractors with an aggregate maximum annual Table A amount exceeding 3,950,000 acre feet have executed the amendment (or committed to execute the amendment in a form satisfactory to the State) or submitted a waiver pursuant to subparagraph (c), as applicable, the provisional effective date pursuant subparagraph (a) or the provisional effective date pursuant to subparagraph (c), as applicable, shall become the Contract Extension Amendment Effective Date.

(2) If at the end of the applicable 60 day period specified in subparagraph (d), 24 or more Contractors with an aggregate maximum annual Table A amount exceeding 3,950,000 acre feet have not executed (or committed to execute) the amendment or submitted a waiver pursuant to subparagraph (c), as applicable, then the State, after consultation with the Contractors that have executed (or committed to execute) the amendment or submitted a waiver, as applicable, shall within 30 days following such 60 day period determine in its discretion whether to make the provisional effective date pursuant to subparagraph (a) or the provisional effective date pursuant to subparagraph (c), as applicable, the Contract Extension Amendment Effective Date. The State shall promptly notify all Contractors of the State's determination. If the State determines, pursuant to this subparagraph 1(e)(2) to allow the contract amendment to take effect, it shall take effect only as to those Contractors consenting to the amendment taking effect pursuant to this subparagraph 1(e)(2)

(f) (1) During the pendency of a legal action addressing the validity or enforceability of the Contract Extension Amendment, the State and a minimum of 24 Contractors with an aggregate maximum annual Table A amount exceeding 3,950,000 acre feet which have executed (or committed to execute) the Contract Extension Amendment may agree in writing to waive any limitation barring the Contract Extension Amendment from taking effect until a final judgment of a court of competent jurisdiction has been entered (including to waive the "no force and effect " provision in subsection (b)) and instead allow the Contract Extension Amendment to take effect as to such Contractors, subject to such conditions, if any, agreed upon, by the State and such contactors. In such case, the State shall promptly notify all Contractors of the effective date of the Contract Extension Amendment.

(2) If, during the pendency of a legal action addressing the validity or enforceability of the Contract Extension Amendment, less than 24 Contractors with an aggregate maximum annual Table A amount exceeding 3,950,000 acre feet have agreed in writing to waive any limitation barring the Contract Extension Amendment from taking effect until a final judgment of a court of competent jurisdiction has been entered as provided in subsection (1)(f)(1) above, then a Contractor which has so

agreed in writing may request the State to consider allowing the contract extension amendment to take effect with the agreement of less than 24 Contractors. Upon receiving such a request, the State, after consultation with the Contractors that have agreed in writing to waive any limitation as provided in subsection (1)(f)(1) above, may determine in its discretion whether to allow the Contract Extension Amendment to take effect with less than 24 Contractors agreeing in writing to waive the limitation. The State shall promptly notify all Contractors if the State's determines to allow the Contract Extension Amendment to take effect, and include in such notice the effective date of the Contract Extension Amendment and any conditions that would apply. If the State determines, pursuant to this subparagraph 1(f)(2) to allow the contract amendment to take effect, it shall take effect only as to those Contractors consenting to the amendment taking effect pursuant to subparagraph 1(f)(1).

2. POST BILLING TRANSITION DATE ESTIMATES

If the State determines it to be necessary, the State may rely on estimates and later true-up for billing and reporting purposes in the initial years after the Billing Transition Date.

3. WAIVER AND RELEASE:

Subject to the Contract Extension Amendment taking effect, the [District] does hereby forever waive, release and discharge the State, and its current and former officers, agents and employees, from any and all past and present protests, claims, damages, actions and causes of action of every kind and description, now existing or hereafter arising, known or unknown, that were or could be or could have been asserted relating to the State's adjustment made prior to the execution date of this Contract Extension Amendment in connection with the proportional responsibility, for System facilities south of and including the Dos Amigos Pumping Plant, between (i) water supply and (ii) recreation and fish and wildlife enhancement.

4. OTHER CONTRACT PROVISIONS:

Except as amended by this amendment, all provisions of the contract shall be and remain the same and in full force and effect, provided, however, that any reference to the definition of a term in Article 1, shall be deemed to be a reference to the definition of that term, notwithstanding that the definition has been re-lettered within Article 1. In preparing a consolidated contract, the parties agree to update all such references to reflect the definitions' lettering within Article 1.

IN WITNESS WHEREOF, the Parties hereto have executed this Amendment on the date first above written.

Approved as to Legal Form and Sufficiency:	STATE OF CALIFORNIA DEPARTMENT OF WATER RESOURCES
________________________________ Chief Counsel Department of Water Resources	________________________________ Director

[NAME OF DISTRICT]

____
Signature

____
Title

____
Date

Exhibit B

Comment Letters Received on the Draft EIR with Attachments

Letter 1 County of Santa Barbara, Public Works

From: Alvarez, Ted@DWR
To: Cohen, Steve@DWR; Sandronsky, Vera@DWR; Ely, Terri@DWR; Sandino, David@DWR
Subject: FW: State Water Contract Extension EIR
Date: Thursday, October 06, 2016 7:46:14 AM
Attachments: Notice of Preparation - Water Supply Contract Extension Project Environm....pdf

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FYI, first comment letter on the Draft EIR

Ted Alvarez, P.E.
SWP Support Branch
State Water Project Analysis Office
(916) 653-6271
ted.alvarez@water.ca.gov

-----Original Message-----
From: Stewart, Bret [mailto:Bstewart@cosbpw.net]
Sent: Wednesday, October 05, 2016 12:00 PM
To: Alvarez, Ted@DWR
Cc: Crease, Fray@CountyofSantaBarbara; Hartley, Johannah; tfayram@cosbpw.net; Lackie, David; Paul, Mark
Subject: RE: State Water Contract Extension EIR

Greetings Mr. Alvarez,

I have attached a copy of a comment package dated October 7, 2014 which was sent to you on behalf of the County of Santa Barbara regarding the NOP for the Water Supply Extension Project EIR. Page three of the comment package is from Public Works and requested that the EIR address our liability concern that if a contractor default should occur, the County would be held responsible for covering the default without the taxation ability that exists under the current contract, because of its pre-Prop 13 legal status. In reviewing the current Draft EIR, we see that our comment has not been addressed.

We feel strongly that this is a valid liability concern for the County of Santa Barbara and potentially other similar agencies, and should be discussed and addressed in the EIR.

Please feel free to reply or phone me at (805) 568-3041 if you have any questions.

Sincerely,

Bret A. Stewart, PE
Civil Engineer Specialist
County of Santa Barbara

Letter 2 Stanislaus County Environmental Review Committee

Stanislaus County
Striving to be the Best

CHIEF EXECUTIVE OFFICE

Stan Risen
Chief Executive Officer

Patricia Hill Thomas
Chief Operations Officer/
Assistant Executive Officer

Keith D. Boggs
Assistant Executive Officer

Jody Hayes
Assistant Executive Officer

1010 10th Street, Suite 6800, Modesto, CA 95354
Post Office Box 3404, Modesto, CA 95353-3404

Phone: 209.525.6333 Fax 209.544.6226

STANISLAUS COUNTY ENVIRONMENTAL REVIEW COMMITTEE

October 3, 2016

Ted Alvarez, Project Manager
Department of Water Resources
State Water Project Analysis Office
PO Box 942836
Sacramento, CA 94236-0001

SUBJECT: ENVIRONMENTAL REFERRAL – DEPARTMENT OF WATER RESOURCES – WATER SUPPLY CONTRACT EXTENSION PROJECT – DRAFT ENVIRONMENTAL IMPACT REPORT

Mr. Alvarez:

Thank you for the opportunity to review the above-referenced project.

The Stanislaus County Environmental Review Committee (ERC) has reviewed the subject project and has no comments at this time.

The ERC appreciates the opportunity to comment on this project.

Sincerely,

Patrick Cavanah

Patrick Cavanah
Management Consultant
Environmental Review Committee

PC:ss

cc: ERC Members

Letter 3 County of Santa Barbara, Executive Office

County Of Santa Barbara

Mona Miyasato
County Executive Officer

105 East Anapamu Street, Room 406
Santa Barbara, California 93101
805-568-3400 • Fax 805-568-3414
www.countyofsb.org

Executive Office

October 17, 2016

Mr. Ted Alvarez
State Water Project Analysis Office
Department of Water Resources
1416 Ninth Street, Room 1620
Sacramento, CA 95814

E-mail: ted.alvarez@water.ca.gov

Re: Draft Environmental Impact Report – Water Supply Contract Extension Project Environmental Impact Report

Dear Mr. Alvarez:

Thank you for the opportunity to comment on the draft Environmental Impact Report for the Department of Water Resources' Water Supply Contract Extension Project. At this time, the County is submitting the attached letter from the County Public Works Department.

The County has no further comments on this project at this time and looks forward to hearing more about the project's progress. If you should have any further questions, please do not hesitate to contact my office directly, or Glenn Russell, Director, Planning and Development Department, at (805) 568-2085.

Sincerely,

Mona Miyasato
County Executive Officer

cc: Glenn Russell, Ph.D., Director, Santa Barbara County Planning and Development Department
Tom Fayram, Deputy Director, Flood Control, Public Works Department

Attachments: October 12th Letter, County of Santa Barbara Public Works Department

COUNTY OF SANTA BARBARA
PUBLIC WORKS DEPARTMENT
123 E. Anapamu Street
Santa Barbara, California 93101
805\568-3000 • FAX 805\568-3019

SCOTT D. MCGOLPIN
Director

October 12, 2016

Mr. Teodoro Alvarez, Supervising Engineer
California Department of Water Resources
1416 9th Street
Sacramento, CA 95814

RE: Comments on Draft Contract Extension EIR – State Water Project (SWP)

Dear Mr. Alvarez:

The Santa Barbara County Flood Control and Water Conservation District (District) appreciates the opportunity to comment on the draft EIR for the Proposed Contract Extension. We offer the following comments:

1. As we commented at the outset on the Notice of Preparation, the fiscal impacts of how the contract extension impacts the ability of the District and other Contractors to meet its obligations under our existing SWP Contract through tax assessments in the case of a failure of payment to the State by one of our water purveyors have not been addresses in the draft EIR. Ultimately a tax assessment is the only practical way the District can assure payments. It seems a cornerstone issue in this contract extension to either assure the taxing ability is intact or provide relief from the requirement. Please address this issue in the Final EIR.
2. Alternative 7 indicates that if a Contractor fails to sign a contract amendment that their water service would only continue until the expiration of their contract. Such a statement is in conflict with the provisions of the existing executed Water Supply Contracts, including the Water Supply Contract executed with the District. In particular Article 4 of the Water Supply Contract gives the Contractor the option to extend the contract. While it is understood certain financial changes may not be implemented if the Contractors do not approve an extension before the timeframes included in Article 4, this alternative incorrectly presumes that contractors must commit to an extension of the Water Supply Contract more than 6 months in advance of the contract's expiration.
3. Finally, the EIR provides no timeline for executing a Contract Amendment. The District recognizes that conditions are different for the various SWP Contractors and as such a contract extension would need to address specific conditions and concern applicable to that Contractor, including the Prop 13 issues.

Thank you again for the opportunity to provide these comments and we look forward to the State's responses to these critical issues.

Sincerely,

Bret A. Stewart, P.E.
Santa Barbara County Department of Public Works

cc: Tom Fayram, Deputy Director, Flood Control

Letter 4 Plumas County Flood Control & Conservation District

PLUMAS COUNTY FLOOD CONTROL & CONSERVATION DISTRICT
1834 East Main Street, Quincy, CA 95971 Telephone: (530) 283-6268

Submitted on October 17, 2016 via e-mail to: watercontractextension@water.ca.gov

Mr. Ted Alvarez
State Water Project Analysis office
Department of Water Resources
P.O. Box 942836
Sacramento, Ca. 94236-0001

RE: Draft Environmental Impact Report for the Water Supply Extension Project

Dear Mr. Alvarez:

Plumas County Flood Control and Water Conservation District (Plumas) appreciates the opportunity to provide public comments on the Contract Extension Project – Draft Environmental Impact Report (DEIR). Having participated actively throughout the Contract Negotiation and Agreement in Principle (AIP) process, Plumas officials appreciate the amount of effort that it has taken the parties to reach this milestone.

Plumas concluded the AIP development process with the expectation that the final AIP, now the proposed project in the DEIR, would include resolution of the Objective 4 issue that was brought forth by Plumas and Butte Counties. That anticipated resolution has not occurred because the DEIR does not address the outstanding Objective 4 issue. Please see attached letters from Plumas and the Department of Water Resources (DWR) concerning Objective 4.

Objective 4 would have provided State Water Project (SWP) Contractors the option to "opt out" from the BDCP project. The DWR position in the DEIR is that the California Water Fix (the name for the revised BDCP or "Tunnels" projects) is not part of this DEIR. The Plumas concerns with having an "opt out" option for financing new projects are not resolved by the DEIR because the DEIR's proposed project includes providing financing mechanisms for undefined new projects that appear to total over 2 billion dollars in new debt service compression by 2085 (from Figure D2).

The DEIR fails to describe the magnitude of new debt that results in over 2 billion dollars in new debt compression by 2085, despite pay as go financing. For comparison, the current compression "cliff" that is driving the need for a contract extension appears to be approximately 400 million dollars (Figure D1). The need for financing future debt and the magnitude of that future debt is fundamentally another purpose and the need for the project, in addition to paying off the existing SWP project and securing the financing for the operation and maintenance of the existing SWP project through 2085 or 2110.

Failing to distinguish between financing existing debt and new debt in the project description leads to in inadequate range of DEIR alternatives.

The DEIR fails to identify two potentially environmentally superior alternatives because the financing of the existing SWP project, where environmental impacts are defined and mitigated, is intertwined with the financing of new SWP projects having unknown environmental impacts. Strengthening the financial integrity of the existing SWP system is, arguably, an environmentally superior alternative to alternatives where the environmental effects are unknown. Therefore, final EIR needs to analyze an environmentally superior Alternative for a SWP contract extension to 2085 that does not include new SWP debt financing and unknown environmental impacts for new SWP projects. This is partially accomplished in the DEIR Alternative 4.

However, the DEIR Alternative 4 does not include the new financing aspects of the AIP and the DEIR's proposed project that Plumas believes will provide needed financial security for the existing SWP system. It needs to be noted that Article 4 in the Original Contract fails to provide DWR with the new financing tools such as the increased GOA and the SSA that Plumas supports. Increasing reserves for SWP emergencies by increasing the GOA from 32 million to 150 million dollars, and securing bridge funding for recreation and environmental SWP project features (the SSA) are new financing provisions that will enhance the environmental and recreational performance and security of the existing SWP. Plumas contends that for the purposes of environmental analysis, new financing mechanisms for extending financial security for the existing SWP system can be "severed" from the new financing mechanisms for new SWP projects even though they were developed as integrated parts of a larger financing package during Contract Extension Negotiation process.

When new financing mechanisms are applied to the existing SWP system two potentially environmentally superior alternatives emerge.

A new Alternative 4 applies the new GOA and SSA provisions of DEIR Objective 2 to the existing SWP system. The new Alternative 4 includes authorization for revenue bond issuance for current projects with known and fully mitigated environmental effects, and simplified billing (for existing SWP projects) in DEIR Objective 3. Thus, the new Alternative 4 more fully achieves Objectives 1-3 by extending the existing Contracts to 2085 without incurring new debt compression associated with post 2016 SWP projects (Figure D2). The new Alternative 4 fully supports and secures the existing SWP system without binding Contractors to "blank check" liabilities for undefined projects with undefined environmental consequences.

The DEIR Alternative 5 commits all "affected" Contractors to financing new projects if 80% of "affected" Table A Contractors agree, but proposes a delay in implementing the proposed project until 2035. Thus, Alternative 5 becomes another potentially environmentally superior alternative to the proposed project if the almost 20 year delay in financing for new projects allows new projects to mature to the point that their environmental effects and mitigations become available to the public in advance of financing commitments for those projects. For transparency, the Alternative 5 should include "the list" of new SWP projects from 1987-2016 that are potentially fungible with DWR issues revenue bonds and their current status.

In addition to failing to identify environmentally superior alternatives, the DEIR is defective because it fails to describe a transparent and consistent process for determining the affected Contractors and affected environments for new projects, and for assigning financing liabilities for new projects among Contractors in the event of defaults.

In summary, the final EIR should include:

- A new Alternative 4 that includes the GOA, SSA and, simplified billing provisions described in the DEIR as parts of Objectives 2 and 3.
- A more defined Alternative 5 that commits the DWR during the "delay period" between 2016 and 2035, to provide sufficient detail for the public to be able assess the environmental and economic outcomes. By 2035, DWR would:

  (1) describe the new projects requiring financing,

  (2) disclose the anticipated environmental effects and

  (3) identify the benefits and costs for the "affected" (as defined) Contractors and environments.
- The process that the DWR will utilize for determining the affected contractors and environments for financing new projects.
- The process that the DWR will utilize for redistributing debt for new projects where one or more of the "affected Contractors" default on their financing obligations.

The Plumas Amendment:

Plumas offers other recommendations for the final EIR to remedy the outstanding obligations on the part of DWR to Plumas regarding the Objective 4 in Contract Extension Negotiation process through the development of the Plumas Amendment under the Monterey Settlement Agreement.

Plumas is one of two SWP Contractors that did not sign the Monterey Amendments. Instead the Plumas Amendment is provided in the Monterey Settlement Agreement, as a mechanism whereby the DWR and Plumas can negotiate contract amendments for the SWP facilities located in Plumas SWP service area.

Given Plumas's unique location as the sole, headwater Contractor that is entirely upstream of the SWP's Oroville –Thermalito Complex, Plumas anticipates no benefits from any new projects that will become eligible to be financed by the proposed project. Plumas will receive no new water supplies, nor has Plumas ever used water supplies from the Oroville Reservoir and from the Thermalito forebay and afterbay, or from the rest of the SWP system downstream of the

Oroville-Thermalito facilities. Plumas will receive no new power supplies, nor has Plumas ever used power from Oroville -Thermalito Complex or from SWP facilities downstream of the Oroville-Thermalito Complex. Plumas has received no water supply or power benefits from SWP projects constructed after 1987. And Plumas neither proposes nor anticipates any water supply or power benefits from any new SWP projects that will be financed from 2016 to 2085 or 2110.

In recognition of the different water management needs for the SWP Contractors located upstream of the Delta, DWR has developed and Initial Study and has executed contract amendments for the other "North of Delta"(NOD) or "Area of Origin" Contractors (Yuba, Butte, Napa, and Solano) http://www.water.ca.gov/swpao/wsc.cfm displays the SWP Original Contracts with amendments. Appendix A of the Initial Study quantifies and specifies modifications to each of the contractors' SWP allocations, and thereby, defines the companion contract amendment for each of the four NOD Settlement Agreement Contractors.

The Plumas Amendment has yet to be negotiated. Plumas anticipates that the Plumas Amendment will not change Table A Allocations for any SWP Contractor. And because instream flows would be maintained below the SWP Antelope, Frenchman, and Davis reservoirs, downstream effects to SWP Contractors would remain unchanged. The three SWP reservoirs would continue to be operated for their original project purposes for recreational, environmental and water supply benefits.

The pre-Monterey Amendment SWP Contract provisions include Section 18b. In the spirit of Section 18b, Plumas declares that the SWP projects for the Plumas SWP service area of the Oroville-Thermalito Complex are finished and complete for the entire duration of the new contract period. The SWP developments authorized in Original SWP Contract for the Plumas SWP service area that are not already built will never be built. Therefore, the final EIR should make the determination that Plumas is not an "affected Contractor" for any new SWP projects or new project-related environmental mitigations after 1987. Nor is Plumas liable for any portion of the new compression debt "cliff" (despite "pay as go" financing) that the rest of the SWP Contractors will incur as a result of debt financing for the proposed project after 1987 or that will be built during the new Contract Extension period.

In summary, Plumas recommends that the final EIR provide the "new Alternative 4" option for all SWP contractors. Or the final EIR should provide a definition of "affected contractors" for new projects that specifically excludes Plumas. These are reasonable and feasible ways to allow Plumas to continue as a SWP Contractor during the Contract Extension period of 2016-2085 (or 2110) without being forced to finance new SWP projects under the SRA and other new debt financing provisions in the DEIR's proposed project.

The final DEIR should disclose that the proposed project will provide the future payments to the Monterey Plaintiffs that were stipulated in the Monterey Settlement Agreement, and that the

DWR and Plumas will negotiate the Plumas Amendment in good faith, including the extension of the Bridge Agreement in order to address the aforementioned concerns and recommendations raised by Plumas in this comment letter.

Thank you for the opportunity to comment.

Very truly yours,

Robert A. Perreault, Jr.
Co-Manager, for the Plumas County Flood Control and Water Conservation District, and
Director of Public Works
County of Plumas

1834 East Main Street
Quincy, California 95971
bobperreault@countyofplumas.com
(530) 283-6268

Attachments (2): Correspondence letters between DWR and Plumas regarding Objective 4 in the Contract negotiation process

cc: Governing Board, Plumas County Flood Control and Water Conservation District

Randy Wilson, Co-Manager, for the Plumas County Flood Control and Water Conservation District, and Planning Director, County of Plumas

Craig Settlemire, County Counsel for the County of Plumas

PLUMAS COUNTY FLOOD CONTROL & CONSERVATION DISTRICT
1834 East Main Street, Quincy, CA 95971 *Telephone: (530) 283-6268*

February 21, 2014

Mr. Carl Torgersen, Deputy Director, State Water Project and
Lead DWR Negotiator for the Contract Extension Project
Department of Water Resources
PO Box 942836
Sacramento, CA 94236

Subject: Objective 4 – Contract Extension Project – State Water Project

Dear Mr. Torgersen:

On February 18, 2014, the Governing Board of the Plumas County Flood Control & Water Conservation District ("Plumas County") received a status report from its staff lead negotiator in the current process to negotiate a Contract Extension in the subject project. The last minute change in the process that was unilaterally imposed – not suggested – by your agency during the February 12, 2014 Public Negotiating Meeting (No. 20) is the subject of this letter. This letter is also submitted as a last ditch attempt to prevent the disruption of an existing process that was initiated by the California Department of Water Resources ("DWR") on April 13, 2013.

At issue is the consideration of four (4) separate "Objectives" that have formed the basis of the present contract extension negotiations. As you know, those four (4) Objectives were identified and proposed early in the process, circa May 2013, and have been considered as a group until earlier this month when DWR negotiators stated their intention to split Objective 4 into a separate, second public negotiation process as well as to expand the scope of the second public negotiation process to include final commitments of all 29 state water contractors in regard to BDCP and DHCCP cost allocations. While such a goal may ultimately be necessary, there does not appear a compelling basis for such a significant change in the scope of the existing negotiation process. This is particularly true in that DWR appears to be the only party making statements during the Public Negotiation Meetings seeking such a re-arrangement of scope that was established ten (10) months ago.

Of immediate focus is the DWR's response to a letter authored by several members of SWC, Inc. – a letter not drafted through the extension project's established caucus procedure. In fact, that letter does not contain the signature of a single designated lead negotiator. It is addressed to the Director of DWR, not any of its negotiators. To be clear on this matter, Plumas County representatives did not receive a draft copy until it was authored in its final form. There was no opportunity for input by Butte County or Plumas County other than Plumas noting during a SWC Caucus that the letter does not specifically suggest a "separate" second public process for the

BDCP and DHCCP cost allocations that are recognized to be a part of the future contract extension that is now 10 months old – and still actively and productively in progress. The January 28, 2014 letter is a product of SWC, Inc., but not a document representative of the 29 State Water Contractors.

During the February 12th Public Negotiation Meeting, DWR negotiators finally responded with some substance to the long-advanced established Objective 4. The February 12th response of DWR consisted of a statement of intention by DWR to split Objective 4 from the current group of existing Objectives, expand the Objective 4 scope to include all cost allocation issues of interest to all 29 state water contractors, and replace the existing project Facilitator with a different facilitator that is more experienced in financial matters, a consultant selection process that DWR states will take at least two (2) months.

As stated by the Butte County negotiator, and reaffirmed by the Plumas County negotiator, the simple issue set forth in Objective 4 proposes to establish that:

> ***" ... Each contractor's participation in the implementation and financing of the BDCP and DHCCP should be voluntary. The Agreement in Principle and subsequent contract amendments should limit each contractor's obligation to fund any implementing and related BDCP and DHCCP projects to only those contractors that agree to participate in those projects. Butte and Plumas shall not be responsible for any costs incurred by the Department for the BDCP and DHCPP unless each of them agrees to pay for such costs in the Agreement in Principle and subsequent contract amendments to the Statement of Charges."***

There is no reason why that limited concept contained within Objective 4 cannot be fully vetted along with Objectives 1, 2 and 3 that are now under Public Meeting negotiations. This assertion is further reinforced by the above referenced SWC, Inc. letter of January 28th, which states:

> ***" ... there is general agreement on an assumption that North of Delta SWP contractors will be largely excluded from repayment obligations for the costs of BDCP CM1, although they would continue to be responsible for past obligations for existing facilities and Endangered Species Act compliance that are existing obligations of SWP contractors. ... "***

One would reasonably conclude that the above two (2) citations have more in common than not, which further justify the current consideration of Objective 4 in the existing Public Negotiating Meetings.

Plumas County officials respectfully contend that it is time for all parties to give deference to a full consideration of Objective 4 in the transparent atmosphere of the *existing* Public Negotiating Meetings. Furthermore, it is respectfully asserted that if DWR believes that involvement of a specialty financial consultant is necessary, then such a consultant can be immediately retained by

DWR as a resource participant to the existing process without the disruption of replacing the existing Moderator. This approach, by the way, would be entirely consistent with the Rules and Procedures that have been in place for the existing Public Negotiating Meetings since its inception.

Plumas County officials recognize that the above approach could enable the existing four (4) Objectives to be substantially finalized and quickly proceed to the "Agreements in Principle" phase, while the more encompassing cost allocation issues could then be addressed at its own pace. This approach, by the way, would enable DWR to avoid violation of the ground rules of the current negotiations (Rules and Procedures No. 2), which states, "Abide by the 'no surprises' rule …" which has been in place for the existing Public Negotiating Meetings since its inception.

Sincerely,

Robert A Perreault Jr.

Robert A. Perreault, Jr.
PC Lead Negotiator, Contract Extension Project

PLUMAS COUNTY FLOOD CONTROL & CONSERVATION DISTRICT

1834 East Main Street, Quincy, CA 95971 *Telephone: (530) 283-6268*

May 8, 2014

Carl Torgersen, Deputy Director, State Water Project and
Lead DWR Negotiator for the Contract Extension Project
Department of Water Resources
PO Box 942836
Sacramento, CA 94236

Subject: Objective 4 – Contract Extension Project – State Water Project

Dear Mr. Torgersen:

This letter responds to your letter, same subject, of April 2, 2014.

It is also noted that the AIP and Legal Review Teams have apparently completed their work in the preparation of the Final Draft Agreement in Principle (AIP), dated 5/6/2014.

The AIP drafting team has essentially reinforced the segregation of Objective 4 from the process that is the subject of the AIP by stating that the "Objective [4] will not be a part of the SWP contract amendment based on this AIP." As previously stated, Plumas County officials oppose the segregation of Objective 4 from the process embodied in the AIP now being drafted.

Furthermore, as stated at Public Negotiation Meeting No. 22, Plumas County would not object to the current drafting of the AIP drafting if DWR quickly selected a new facilitator, thus enabling the vetting of Objective 4 before the environmental review process is completed.

The implementation schedule set forth in your April 2nd letter is excessively drawn out. It is capable of being accomplished in a more expedited fashion. This is demonstrated by the fact that the process for Objectives 1 – 3 proceeded much more quickly than the time ranges that are projected for Objective 4. To date, DWR has not even demonstrated a good faith effort toward initiating the proposed additional process. With regard to Objective 4, the North of Delta aspect certainly does not require the length of time indicated in the proposed timeline.

The time consuming process set forth in your April 2nd letter likely thwarts the ability of any State Water Contractor that has desired, since April 2013, to have Objective 4 considered and vetted and included in the environmental review process that is about to commence. This is most troubling, since every previous attempt to discuss options to address Objective 4 during the negotiation process were dismissed.

Plumas County officials re-assert that the de facto deletion of Objective 4 at this time requires discussion and action at a new Public Negotiation Meeting.

Plumas County officials note that Butte County officials have also made assertive statements that oppose the present course of action. Unfortunately, DWR and the AIP drafting team leave Plumas County no alternative other than refusal to sign the AIP document in its present form.

Sincerely,

Robert A Perreault Jr

Robert A. Perreault, Jr.
Plumas County Lead Negotiator,
Contract Extension Project

cc: David B. Okita, State Water Contractors, Inc.
Paul Gosselin, Butte County

Letter 5 Central Delta Water Agency

CENTRAL DELTA WATER AGENCY
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October 17, 2016

Via email watercontractextension@water.ca.gov
and First Class U.S. Mail

Ted Alvarez
State Water Project Analysis Office
Department of Water Resources
P.O. Box 942836
Sacramento, California 94236-0001

Re: Water Supply Extension Project.
Draft Environmental Impact Report.

Dear Mr. Alvarez:

Please accept these comments on behalf of the Central Delta Water Agency and the South Delta Water Agency concerning the Draft Environmental Impact Report ("DEIR") for the Water Supply Extension Project ("Project"), including the comments set forth in the attached Public Draft SWP Contract Renewal EIR: Additional Central and South Delta Water Agency Comments.

1. Extend the Comment Period and Delay Action.

Informed and meaningful evaluation, analysis, comment and public participation as well as the development and analysis of realistic alternatives is not possible until a complete DEIR is provided. An informed administrative decision cannot be made in the absence of a complete DEIR and knowing the outcome of several issues. Without an actual, final form contract to review, the environmental review process cannot proceed.

It is unknown whether the Twin Tunnels project will go forward. Viability of the existing project appears in doubt given the uncertainty in the State Water Resources Control Board

("SWRCB") water quality and flow proceedings, particularly given the negative impacts on the Delta of existing project operations and the requirement of the Delta Reform Act that there be reduced reliance on the Delta. In the Delta Stewardship Council Cases, Judicial Council Coordination Proceeding No. 4758, Superior Court Judge Michael P. Kinney found that the Delta Plan failed to include quantifiable or otherwise measurable targets associated with achieving reduced Delta reliance required by the Delta Reform Act. The uncertain future of the various Delta related proceedings in and of itself militates against proceeding with environmental review at this time, much less a 50 year extension of the water contract.

The DEIR also fails to take proper account of the impacts on Salmon, Delta Smelt, ground water pumping, the Sustainable Groundwater Management Act ("SGMA"), global warming trends, and the trend in SWP service areas toward the planting of permanent crops and the associated long term demands thus made upon already insufficient water supplies. Further, the DEIR fails to consider impacts of the project on the Delta, the inadequacy and future uncertainty of supplies, the SWRCB proceedings, and the relationship of contract renewal with the San Joaquin River Restoration Plan.

It would be premature to impatiently move forward at this time on such a long term extension of the project for another 50 years without addressing these and other public and environmental needs. These problems, as well as the possible lack of participation due to the DEIR's fatal approach of characterizing the project as limited to financial issues rather than the project as a whole, require delay and preparation of a proper DEIR at the proper time.

2. The Incomplete And Poorly Defined Project Renders The Pending Draft Environmental Impact Report Premature.

At this time there is merely an Agreement in Principle ("AIP") "that could provide the foundation for an agreement . . ." according to the DEIR. This is a gaping whole of uncertainty as to what the actual contract terms will be. In the absence of a final version to evaluate, adequate review and comment cannot be made. Further, any variations between the AIP and a final, execution version are likely to generate further controversy and cause the need for a further environmental review process.

3. The DEIR Fails To Analyze And Address The Issues Raised In The Scoping Comments Of October 13, 2014.

CDWA provided detailing scoping comments, including the enclosed Attachment to Central Delta Water Agency's Comments on the Notice of Preparation of an EIR for the "Water Supply Contract Extension Project" dated October 13, 2014. We herewith resubmit those comments and the DEIR is defective in its failure to analyze and address each of the concerns raised therein.

4. The No Project Alternative Is Not Properly Formulated, And Speculatory.

The No Project alternative is characterized as taking no action and allowing the continuation of operations, until 2035, but speculating the contractors would renew under the existing contract. However, without the ability to continue long term financing at subsidized rates, and the need to pay-off overdue capital expenditures exacerbated by increased regulatory and supply constrictions, some contractors may chose not to renew. Moreover, any failure to renew could free up supplies for other purposes. Such events, as well as other potential scenarios, should have been evaluated. DWR prejudiced the DEIR by limiting its description of the No Project alternative to a view most favorable to the contractors, and abrogated its responsibilities.

5. Statewide Impacts Were Not Evaluated.

By limiting the study area, the DEIR fails to analyze the potential environmental impacts of the 50 year extension in areas outside the areas analyzed, including impacts on listed and non-listed species outside the area of study. Most noticeably, the potential impacts in the area where the water supply is taken from, the Sacramento-San Joaquin Delta, as well as other areas of the entire state not analyzed.

It is misleading to state in the Notice of Availability that the project location itself merely consists of operations and facilities areas, and service areas, particularly where projects outside those areas may be financed and such areas may be impacted. Even more misleading is the statement that the project will not "Alter the existing authority to build new or modify existing facilities . . ." since part and parcel with authority is the ability to finance, and the thrust of the project was to pave the way for the BDCP and the Twin Tunnels.

6. Expansion of Water System Facilities to be Financed by Water System Revenue Bonds.

This proposal to revise Article I, to expand the authorized facilities, would dramatically increase the projects capable of being financed, such that it prospectively could sanction the financing of projects such as the Twin Tunnels, include financing by state revenue bonds. Attempting such an end-run around consideration and analysis on a project by project basis evidences piece-mealing of the environmental review process. This deprives the public of and avoids the proper analysis and vetting of each project on its own. The need for analysis of funding for any project beyond that already authorized, on a case by case basis, points up the overreaching of the existing the DEIR and the AIP. If this is to be permitted, the DEIR should have described, evaluated and reviewed each project that could be financed using this new, open-ended expansion of project funding that seeks to avoid such public review.

The proposal lays the groundwork, and is an integral part of undescribed, unknown and unevaluated facilities.

7. Environmental Review Was Improperly Limited To Financial Aspects.

While certain segments of the extended contract that may be the subject of revision pursuant to the AIP may be financial in nature, the true project is not limited to financial aspects, but instead is an outright renewal of the entire contract for 50 years. Accordingly, review should have been made of the environmental effects of the project as a whole, and the contract as a whole. By failing to analyze the effects of the renewal of the contract as a whole, the environmental impacts were not properly analyzed and mitigated is absent.

8. Supply Reductions for Area of Origin.

Any contract extension would be subject to reductions in deliveries in order to meet the water needs within Areas of Origin pursuant to law, including without limitation the requirements of California Water Code section 11460, et seq. Greater emphasis and analysis should have been provided in the DEIR of these aspects.

9. River Regulation Including Salinity Control.

Any contract extension should expressly be subject to the greater need to provide river regulation, including salinity control, from time to time, that may result in reductions of contractual deliveries. This should be made abundantly clear to assure that there is no undue reliance on the over-stated quantities specified in the contracts. Such issues should be analyzed within the current context.

10. Mitigation, Public Trust, and the Endangered Species Act.

All contract deliveries under any extension should expressly be evaluated and conditioned on meeting mitigation, public trust, and Endangered Species Act ("ESA") responsibilities, and State Water Resources Control Board ("SWRCB") requirements and standards. These obligations are indisputable and should be expressly delineated in their current context in the contract and analyzed in the DEIR. (See also 11. below). Instead, the AIP proposes a sweetheart extension of the contracts in which DWR appears to have abandoned its public trust duties and responsibilities.

11. The DEIR Should Have Analyzed The Need to Limit Supply to Capacity of Existing Facilities and Supplies.

It is egregious in the extreme to continue with the over-subscription by both state and federal contractors in relationship to the undeniable insufficiency of existing supplies. The original planned supply was to develop North Coast waters, but that never did happen. See Bulletin No. 76 Delta Water Facilities CDWR December, (1960), provided by mail only, excerpt page 11 provided by email. The water to be made available should be expressly limited to those designed historical amounts which could be legally and reliably provided without unbuilt North Coast facilities or operations, and consistent with existing trends of shortage. If new facilities or operations are built to provide water in excess of supplies currently capable of delivery, such should be clearly stated and the subject of separate long term contracts. It should also await the required environmental review and the actual permitting and completion of the facilities and operations necessary to fulfill such a contract for supplies not presently capable of being delivered. The time for the overstated Table A contract amounts and the supply of unclaimed water and vague Article 21 "interruptible water" should be ended instead of continuing to manipulate supplies in a manner conducive to creating hard demands for unavailable water. See The State Water Project Final Delivery Capability Report 2015 (DWR July, 2015), provided by mail only. Intermittent and unreliable supplies encourage and soon develop into hardened demands to supply urban grown and permanent crops such as orchards.

The quantities of water should be reduced to a level not in excess of the greatest quantity supplied under the existing long-term supply contract. The quantities should also be reduced pro-rata by the quantities of water required to be supplied for other purposes.

12. Project Mischaracterized As "Amendment to financial provisions".

The DEIR mischaracterizes the project as mere amendments to financial provisions, and in so doing limits and fails to analyze and address the task that should have been at hand: analysis of environmental impacts of the contract amendments themselves, including the term and the contract as a whole. While amending the contract for ease of administration, expanding the scope to allow financing of other capital expenses, and extending the term for 50 years may all have financial effects, it is the environmental impacts of the whole of the project which need to be studied, rather than the limited environmental impacts of the financial issues studied and analyzed. By describing the project as merely amending the financial provisions, DWR improperly limited the scope of the analysis in the DEIR.

13. Premature Project

The DEIR admits it will not only amend existing articles, but would add new articles. This is further evidence of an incomplete project not yet ready for environmental review.

14. Erroneous Assumption That Water Supply Amounts Would Not Change And Would Continue To Be Delivered.

Without any basis in fact the EIR assumes that water supply amounts would not change and would continue to be delivered. It is beyond reason that such assumption could be made during a period of extended drought, whether characterized as a weather drought or a regulatory drought. Assuming no change in past supplies which had anticipated undeveloped North Coast supplies, maintaining past deliveries which were harmful to the Delta and its species, and maintaining never provided contract quantities, is unreasonable and unsupportable.

15. Impacts and Mitigation Measures Not Property Analyzed.

With the scope of the project description described as limited to financial provisions, every single segment of the DEIR concerning impacts and mitigation measures is myopic, tainted, and deficient. Indeed, the scant impacts and mitigation measures analysis is nearly identical in almost all segments of the Environmental Analysis, paying token lip-service to the EIR process. In this regard, it is concluded in nearly every Impacts and Measures provision, as follows:.

> "The proposed project would amend and add financial provisions to the Contracts based on the negotiated AIP between DWR and the Contractors. The proposed project would not change or create new water management measures, alter the existing authority to build new or modify existing facilities, or change water allocation provisions of the current Contracts.
>
> . . . .
>
> Because the proposed amendments to financial provisions would not change Contractors' water operations and no structures would be constructed as part of the proposed project, no substantial adverse effect . . . . Furthermore, the proposed project would not have a substantial adverse effect. Therefore, no impacts would occur . . ."

These conclusions are unreasonable and reflect the flawed nature of the DEIR. A 50 year extension of a contract for the most scarce public resource in the state by definition will have profound environmental impacts that need to be analyzed and considered.

For all of these reasons we respectfully submit the DEIR should be rejected and a new DEIR should be prepared when the illusory AIP has matured to a true, proposed contract, and proper consideration is given to the substantial environmental concerns present.

Yours very truly,

DANIEL A. McDANIEL
Counsel

cc: Board of Directors
South Delta Water Agency

Public Draft SWP Contract Renewal EIR: Additional Central and South Delta Water Agency Comments

The SWP contract renewal proposed project does not mitigate any on-going impacts of the SWP (e.g. fish genetic introgression from continued blockage of fish upstream passage by the continued existence of the Oroville Dam, degradation of genetic integrity from continued unnatural reproductive selection resulting from elevated water temperatures from the continued existence of and operation of Oroville Dam, on-going habitat quality and quantity degradation from continued sediment and large woody debris capture at Orville Dam, continued salt accumulation degradation of soils and agricultural productivity in the SWP service area from on-going SWP export of salts in the delivered irrigation water, continued groundwater overdraft and subsidence in the SWP service areas from variations in SWP water delivery quantities, etc. - see Oroville Relicensing EIR Cumulative Impacts for a more comprehensive list of on-going SWP impacts.) Similarly, the BOR Remand EIS identifies similar on-going impacts of the operations of the CVP. The revised draft EIR for the SWP Contract Renewals must include identification, evaluation, quantification, mitigation and disclosure of these environmental impacts from the on-going operations of the SWP that would continue as a result of the water supply delivery contract renewal.

The EIR is not suitable to support agency decision making. The EIR finding of no significant impacts is incorrect as there are many significant impacts of continuing water supply deliveries as compared to not continuing operations (which must be the No Project definition - see related comments). DWR's EIR/S of the California Water Fix identified many significant impacts of continued operation of the SWP - see related comments. Reclamation's Remand EIS also found may significant impacts of continued operations of the CVP - see related comments. The on-going impacts of the operations of the CVP and SWP would largely be the same. CEQA requires "lead agencies" to include in their Environmental Impact Reports ("EIRs") information deemed necessary for Projects to be taken or considered by "responsible agencies." (CEQA Guidelines, § 15082, subd. (b)) Information provided in this EIR is not sufficient to support decision making for responsible agencies issuance of permits, including, but not limited to: Central Valley Regional Water Quality Control Board certification as compliant with the Water Quality Control Plan for the Delta, Delta Stewardship Council Delta Plan Consistency Certification, local Reclamation Districts, etc. Because the finding of no significant impacts in contradiction to the findings of other contemporary documents that analyze the same impacts and the incorrect definition of the No Project as the basis of comparison, the EIR is not suitable as a decision support document for the lead agencies.

Failure of Alternatives to Meet Project Objectives:

In DWR's November 2013 BDCP EIR/S, page 2-5, line 7 "As indicated by the "up to full contract amounts" phrase, alternatives need not be capable of delivering full contract amounts on average in order to meet the project purposes. Alternatives that depict design capacities or operational parameters that would result in deliveries of less than full contract amounts are consistent with this purpose." So DWR is saying that when they deliver less than the contract amounts that these lower delivery quantities still meet the SWP project purpose. The SWP Contract Renewal must consider alternative which include reduced water deliveries as DWR has already said that reduced deliveries still meet the project purpose.

All of the alternatives assume the same delivery amounts as the original water supply contracts. The quantities identified in the original contracts were predicated on the completion of the build out of the SWP as it was planned at the time of the contract origination. Many facets of the originally planned SWP were never completed so the potential to deliver the quantities identified in the original contract were never fulfilled. "The original 1957 California Water Plan included provisions for dams on the Klamath, Eel, Mad and Smith Rivers of California's North Coast. Fed by prolific rainfall in the western Coast Ranges and Klamath Mountains, these rivers discharge more than 26 million acre feet (32 km^3) to the Pacific each year, more than that of the entire Sacramento River system. A series of dams in these watersheds would have shunted water through interbasin transfers into the Klamath River system. The centerpiece of the project would be a 15-million-acre-foot (19 km^3) reservoir on the Klamath River – the largest man-made lake in California – from where the water would flow through the 60-mile (97 km) Trinity Tunnel into the Sacramento River, and thence to the canals and pump systems of the SWP. This would have provided between 5 and 10 million acre-feet (4.0–8.1 km^3) of water each year for the SWP." (https://en.wikipedia.org/wiki/California_State_Water_Project) This large component of the SWP was never built, so a large portion of the originally anticipated water supply was never realized. Since the current actually built portions of the SWP almost never fulfills the full contract amount and the SWP is not built to reliably deliver the current contract quantities, it is only reasonable that the contract renewal alternatives consider reduced delivery quantities below those of the original contract amounts. In fact, it is unreasonable, with the definitions of CEQA alternatives development, to include aspects of a project definition that cannot be consistently be met with the current and reasonably foreseeable SWP infrastructure.
DWR has not complied with the vast majority of the current OCAP BO RPAs - see related comments. As required by Davis-Dolwig, the State Water Contractors are responsible for paying for all operations costs of the SWP. The lack of DWR compliance with the OCAP BO RPAs represents an unfulfilled cost commitment by the SWP Water Contractors. There is a very significant unstated objective for this project and that is for the SWP to become completely compliant with the current legal obligations of the project. The SWP has always claimed that compliance with the OCAP BOs would come through the implementation of the BDCP, but the new BDCP (Water Fix) alternatives do not include Projects that satisfy this project objective. The responsible agencies must not approve a project or issue permits based on an alternative that fails to result in compliance with the OCAP BO RPAs.
Beneficial uses of Delta water include: municipal, industrial, and agricultural water uses, fish and wildlife uses, environmental protection, flood management, navigation, water quality, power, and recreation. There is not a single one of these non-SWP beneficial uses of water that are not degraded by the on-going impacts the project from continued operation of the SWP. If the No Project had been correctly defined as not renewing the contract, the impact analysis would have correctly determined that all alternatives that include renewal of the contracts would have significant impacts to designated beneficial uses of water as compared to the No Project (with no contract renewal).
Ongoing impact - The water rights of the SWP and CVP are conditioned by the State Water Board to protect the beneficial uses of water within the Delta under each respective project's water rights. As Junior water rights holders, the SWP operations are not allowed to impair the water rights of senior water rights holders. Under the existing conditions the SWP routinely violate water quality standards which impair the suitability of irrigation water quality of senior water rights holders. Under the proposed project and all of the alternatives, the SWP Contract Renewal would continue the frequency, severity, duration and number of affected parties with their continued operations would perpetuate the rate of water quality violations - see related comments.

The "project objective" that is missing from this discussion is that the SWP needs to stop operationally violating water quality standards. The SWP contract renewal must add this criteria to its project objectives and the responsible agencies considering issuing permits on this project must not issue permits for a project that violates the law by exceeding water quality parameters. The analysis of all of the project alternatives and the No Project/No Project demonstrate that the project does, will under the no Project and under all alternatives continue to violate water quality standards, which literally cannot be permitted. The lead agencies must not approve a project that they know will result in the continued violation of state water quality protection laws.

Inconsistencies with Current Plans, Policies and Regulations:

The SWP Contract Renewal project is inconsistent with and is in direct conflict with existing policy and water code of the state of California. Water Code § 85021: "The policy of the State of California is to reduce reliance on the Delta in meeting California's future water supply needs through a statewide strategy of investing in improved regional supplies, conservation, and water use efficiency." The SWP Contract Renewal by not considering any alternatives in which there is a reduced reliance upon the delta as a water supply source is in conflict with the California Water Code. The project is in fact attempting to make the recipients of the water from the SWP even more reliant upon delta exported water by taking time, human resources, motivation and available funding for projects that would reduce reliance on delta water and would be consistent with this water code requirement. The contract renewal further increases dependency upon delta water supplies as it provides the water contractors with a greater certainty of water supply over a longer period of time which reduces their motivation to seek out and develop more regionally self reliant supplies as is required by law. The project must propose an alternative which is consistent with this water code requirement to reduce reliance on Delta water supplies.

The SWP Contract Renewal is not consistent with flow criteria for the delta contained in "Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem Prepared Pursuant to the Sacramento-San Joaquin Delta Reform Act of 2009", SWRCB, August 3, 2010. "Water Code section 85086 (See Appendix B), contained in the Delta Reform Act, was enacted as part of the comprehensive package of water legislation adopted in November 2009. Water Code section 85086 requires the State Water Resources Control Board (State Water Board) to use the best available scientific information gathered as part of a public process conducted as an informational proceeding to develop new flow criteria for the Delta ecosystem to protect public trust resources. The purpose of the flow criteria is to inform planning decisions for the Delta Plan and the BDCP." (http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/deltaflow/docs/final_rpt080310.pdf, page 2, paragraph 1) The SWRCB developed the flow criteria as required by the Delta Reform Act, but the SWP Contract Renewal proposed alternatives operations are not consistent with this SWRCB flow criteria. The Delta Reform Act required the SWRCB to produce "flow criteria for the delta" it did not require the update of the Bay-Delta Plan. The SWP Contract Renewal operations must conform to the flow criteria to be compliant with the Delta Reform Act. The SWRCB considered these flow criteria to be necessary for the protection of fish in the delta and any less flow regime proposed by the SWP Contract Renewal operations would be, by definition, not fully protective of fish species in the delta.

Here is a comparison of the SWRCB recommended flow criteria to be protective of fish species in the delta to the average flow conditions from the CVP/SWP that the SWP Contract Renewal proposes to perpetuate. "In order to preserve the attributes of a natural variable system to which native fish species are adapted, many of the criteria developed by the State Water Board are crafted as percentages of natural or unimpaired flows. These criteria include:

- 75% of unimpaired Delta outflow from January through June;

- 75% of unimpaired Sacramento River inflow from November through June"

" In comparison, historic flows over the last 18 to 22 years have been:

- approximately 30% in drier years to almost 100% of unimpaired flows in wetter years for Delta outflows;

- about 50% on average from April through June for Sacramento River inflows"

(http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/deltaflow/docs/final_rpt080310.pdf, page 5) The SWP Contract Renewal proposed perpetuation of the historical flows above Freeport in the Sacramento River result in flows being 50% lower in April through June than the flow criteria specified by the SWRCB that are defined as being protective of delta fish species. The delta outflows under the proposed project and alternatives are 50% below the flow criteria deemed by the SWRCB to be necessary for protection of delta fish species. These proposed project and alternatives flows obviously would not protective of delta fish species and should be deemed unacceptable by the fisheries agencies charged with protection of these public trust resources.

The SWP Contract Renewal project and alternatives do not comply with the flow criteria or biological objectives contained in the CDFW document, "Quantifiable Biological Objectives and Flow Criteria for Aquatic and Terrestrial Species of Concern Dependent on the Delta Prepared pursuant to the Sacramento-San Joaquin Delta Reform Act of 2009". "In November 2009 the Legislature passed several bills focused on better protecting Delta resources. Senate Bill No. 1 (SB 1) (Stats. 2009 (7th Ex. Sess.) ch 5, § 39) contains the Sacramento-San Joaquin Delta Reform Act of 2009 (Delta Reform Act) which establishes and requires the Delta Stewardship Council (DSC) to develop, adopt, and commence implementation of a comprehensive management plan for the Delta (Delta Plan) on or before January 1, 2012. To inform the planning processes of the Delta Plan, the Delta Reform Act requires that the State Water Resources Control Board (SWRCB) develop new flow criteria for the Delta ecosystem and that DFG identify quantifiable biological objectives and flow criteria for the species of concern in the Delta. " (https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=25987, pdf page 5, paragraph 3)

Comment continued: "**Aquatic Species Biological Goals**

- Halt species population declines and increase populations of ecologically important native species, as well as species of commercial and recreational importance, by providing sufficient water flow and water quality at appropriate times to promote species life stages that use the Delta.
- Establish water flows through the Delta that will likely benefit particular species, community or ecosystem functions in a manner that is: (1) comprehensive, (2) not overly complex, and (3) encourages production. Functional flow criteria shall be established for at least:

Yolo Bypass
Sacramento River and its basin
San Joaquin River and its basin

Eastside streams and their basins Interior Delta including Old and Middle rivers Delta outflow" (https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=25987, pdf page 6) The current SWP Contract Renewal alternatives would perpetuate the SWP violation of these flow criteria and biological objectives. The project must develop alternatives that are consistent with these legal requirements and the lead agencies must not approve any project that is not consistent with these legal requirements.
The OCAP BO determined that without the RPAs that the SWP continued operations would result in jepeoardy of listed species. The environmental analysis in the draft EIR of the continued operations of the SWP at the current contract amounts is in direct conflict with and is inconsistent with the OCAP BO impact findings. Six and seven years respectively after the FWS and NMFS BO's made their jepeoardy determinations, DWR and Reclamation have yet to implement the vast majority of these mandatory Projects to avoid jepeoardy. The mandatory Projects from the OCAP BOs are still part of the environmental baseline as they were required prior to the initiation of the SWP Contract Renewal project and baseline date definitions for the project. The CA Water Fix has dropped the BO RPAs from the project scope as well as the other Projects which were designed to contribute to the conservation of the proposed covered listed species, the CA Water Fix is proposing to implement a project that will continue to jepeoardize these species and result in continued violation of ESA and the requirements of the OCAP BOs. The CA Water Fix is also not a finalized EIR/S and is to date still not funded so it does not qualify for this EIR as a reasonably foreseeable project to include in the No Project baseline assumptions. There are also no other projects in progress which address the implementation of the OCAP BO RPAs which meet the criteria of reasonably foreseeable. Therefore the SWP is not legally compliant with the legal obligations of the OCAP BO RPAs and has no plans or projects in motion that qualify as reasonably foreseeable for being compliant. The SWP must not be allowed to renew water supply contracts for a project that is currently out of legal compliance and has no plans to become compliant. To remedy this, the SWP Contract Renewal must add actions to its project alternatives that would result in the SWP becoming legally current and compliant.
The SWP Contract Renewal has omitted from the scope of the Proposed Project and alternatives Projects that would bring the SWP into compliance with the OCAP BO RPAs. The OCAP BO RPAs are part of the baseline and No Project condition, but are not part of the Proposed Project. By not including compliance with the OCAP BO RPAs in the project scope, the project has deflected the impacts of the implementation of their current legal requirements to comply with the OCAP BOs to another, as yet to be initiated project, California EcoRestore. When the California EcoRestore project is finally started (a date yet to be officially determined) the impacts of that project will include the SWP contract renewal project (if approved) would be part of California EcoRestore's baseline and No Project condition. What California Eco Restore will find in its impact analysis, prior to approval or implementation, is that continued operations of the SWP under the renewed contract amounts precipitates unacceptable and unviable environmental impacts and continues to jeopardize endangered and threatened special status species and result in adverse modifications to designated critical habitat. If the SWP Contract Renewal project is approved with the current delivery amounts prior to implementation of the OCAP BO RPAs, the OCAP BO RPAs will never be approved as the impacts that will occur will be adverse to the requirements of not jeopardizing the T&E species. Therefore, the SWP must comply with the pre-existing OCAP BO RPAs to avoid jeopardy of T&E species before approval of the SWP Contract Renewal can ever be considered. Otherwise, the NMFS and USFWS agencies that issued the OCAP BO RPAs will be precluding implementation of the BO conditions and therefore jeopardizing the species they are supposed to protect.

The SWP does not have incidental take permits for the operations of the south delta diversions. The contract renewal must be staid until such time as DWR has the appropriate permits in place as to allow lawful and compliant operations of the SWP. The primary requirement for issuance of the incidental take permit is that the Project must minimize and fully mitigate the impacts of the proposed take. The SWP Contract Renewal project has not addressed or mitigated the ongoing impacts of the SWP operations in adverse modification of designated critical habitat for ESA listed species or jeopardy of listed species as determined by the OCAP BOs. These SWP significant impacts are not mitigated or even mitigated to less than significant levels by the SWP Contract Renewal. Since there are significant impacts to ESA listed species that the SWP Contract Renewal does not mitigate, the fisheries agencies may not issue any incidental take permits for the SWP Contract Renewal project based on this environmental document.

The SWP Contract Renewal is not consistent with the Delta Plan and must not be certified as compliant with the Delta Plan. The Draft EIR failed to include the review and analysis of compliance with the delta plan. This is a material omission that must be rectified in a revised and recirculated public draft EIR. The public must be allowed to review and comment on this important disclosure on the compliance of the project (or in this case, the lack thereof) the project with this legal requirement of all projects implemented within the boundaries of the statutory delta as this project is.

The SWP still does not have Incidental Take Permits (ITPs) required for operations of the south delta intake pumps. The contract renewals project must not be approved until the ITP permits have been approved by the fisheries agencies and acquired by DWR. Alternatively, the Contract Renewal alternatives could include actions which would justify the issuance of ITPs for the SWP. An example project alternative which would merit issuance of ITPs is the construction of criteria compliant fish screens onto the SWP south delta intakes -see related comments.

Inadequacies of Alternatives:

Previously submitted alternatives and alternatives components that meet the Project Objectives must be included for full evaluation in the EIR. Examples of previously proposed alternatives and alternative components (and in various combinations) which better meet the Project Objectives include, but are not limited to: some amount of reduced water deliveries to address the requirement for reduced reliance upon delta water supplies, reduced contract duration to address uncertainties with climate change, and compliance with all existing laws and obligations prior to contract renewals (Incidental Take Permits and OCAP BOs, etc.)

The alternatives included in the EIR included versions which did not include fundamental elements from the AIP. The inclusion of alternatives that omit the financial component of the AIP provides a precedent for the project to consider other alternatives which also omit or alter some fundamental components of the AIP and would still, based on this precedent, be considered reasonable in achieving the objectives of the project. The alternative component that was never considered in the EIR is the incorporation of alternatives that include reduced water supply contract amounts. Given the precedent of the no financial component alternatives, the EIR must include alternatives which also consider different (lower) water supply contract amounts. It would be considered reasonable by any measure to consider a contract delivery amount of one gallon less than the current contract delivery amounts and still meet all tests of reasonably meeting the project objective. It may be argued that a 50% reduction in the delivery amount would not meet the project objective. The project must provide a rationale as to what level of reduction in contract delivery amount is reasonable and still does meet the objectives of the project. This is an important variable to make up defensible alternatives and DWR must disclose the rationale supporting the definition of the reasonable contract delivery amount which still meets the project objectives. Since this will result in material new information and new alternatives, the EIR will require recirculation for additional public comment.

The project did not provide an Alternatives Scoping Report for the EIR. The Alternatives Scoping Report is an integral component of the process and deliverable product of preparing an EIR (Title 14 California Code of Regulations section 15000 et seq.)(40 Code of Federal Register 1501.7). The SWP Contract Renewal has failed to disclose this essential and material information on how the alternatives passed each of the screening criteria used for developing project alternatives. The project must show their rationale and justification as to how these alternatives meet the project objectives which are the basis of the alternatives development screening criteria. The draft EIR must be recirculated with this require and material information.

The public draft EIR did not identify, evaluate, minimize or mitigate all of the on-going impacts from the continued operation of the SWP resulting from the contract renewals. These on-going impacts of continued SWP operations that are not covered by the EIR impact analysis include, but are not limited to: salt accumulation in the soils and groundwater in the SWP service areas, groundwater overdraw in SWP service areas, water quality violations in the delta, degradation of designated essential fisheries habitat for T&E species, genetic introgression of fish at the Oroville dam, reservoir operations affects on reservoir and upstream fisheries and wildlife, hatchery impacts, California aqueduct leaks, greenhouse gasses, and other comments included herein - see related comments.

Title 14, section 15082, subdivision (b)(1)(B) of the California Code of Regulations, requires that responsible and trustee agencies should indicate their respective level of responsibility for the project to the Lead Agency (Cal. Code Regs., title 14, div.6, ch. 3 (CEQA Guidelines), section 15082, subdivision (b)(1) (B)). The draft EIR is deficient as it did not disclose this required and material information. The Draft EIR must be recirculated for additional public comment once this information has been added.

Title 14, section 15082, subdivision (c)(1) and section 15206, subdivision (b)(4)(E), state that projects of statewide significance should provide notice to cities/counties within which the project would be located. The project notices did not include areas and communities which are in downstream drainages of the SWP service area but are not in SWP service area, e.g. Lathrop, Manteca, French Camp, Dos Rios, Riperdan, Vernalis, etc. These communities are affected by the SWP contract renewals by ongoing flow and water quality impacts to their municipal surface and groundwater water supplies from the SWP water delivery drainage flows. This EIR process deficiency must be corrected with a noticing of these communities and a round of public scoping which would afford them the opportunity to provide input to the project alternatives development and the scope of the issues that the EIR would address.

Under CEQA, any alternatives that are put forward for consideration in the EIR for potential adoption must be feasible. CEQA defines “feasible” as “capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors.” (CEQA Guidelines, § 15364) The SWP Contract Renewal alternatives are not "feasible" in that they result in significant and unavoidable environmental effects which adversely alters designated critical habitat for listed species - see related comments. The SWP Contract Renewal alternatives are not compliant with the Delta Reform Act, so they are not legally feasible either - see related comments. Since these alternatives are not environmentally or legally feasible, they must be dropped from further consideration in the EIR. Reduced contract deliveries would avoid and minimize at least some of the on-going impacts of SWP operations that would result from the contract renewals and therefore may potentially be determined as environmentally and legally feasible.

As previously commented, renewal of the SWP contracts results in the continuation of operations which degrade designated critical fisheries habitat. As the project jeopardizes federally listed fish species, the FWS and NMFS must evaluate the project impacts in a Biological Opinion. Section 7 of ESA requires that a federal agency may not take any Project that would "jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification" of designated critical habitat. (16 U.S.C. § 1536(a)(2)) The SWP Contract Renewal operations adversely modifies designated critical habitat of several fisheries species by continuing to degrade the dissolved oxygen, salinity, selenium concentration, methyl mercury concentration and other habitat suitability criteria - see related comments. The alternatives do not include implementation of the OCAP BO RPAs which were required by FWS and NMFS to avoid a jepeoardy call on listed species (see related comments), SWP contract renewal alternatives would result in the continued jepeoardy of listed species and therefore the lead agencies must not approve this project.

DWR non-compliance with current OCAP BO RPAs: The OCAP BO RPAs are a part of the No Project definition for the project comparative analysis (see related comments) as they are current obligations of the SWP. The SWP Contract Renewal project has failed to accurately represent the vast majority of the OCAP BO RPAs in terms of their environmental affects and their impacts on water operations, storage; fish habitat quality, quantity and distribution; on water rights, water supplies, water quality and many other environmental resources. The project falsely claims that no details were available to represent these OCAP BO RPAs, but in fact most of the Projects do have available information and the project has failed to meet the CEQA test to utilize the best available information. Other comments included herein identify most of the OCAP BO RPA deliverables that are current obligations of DWR to fulfill. The comments identify the deadlines for the Projects and in some cases describe the nature of the information that should be available to the project to incorporate into their EIR. If none of this information is available to the project, then it means that DWR has not fulfilled their legal requirement to comply with the OCAP BO RPAs and the SWP is in violation of the ESA.

Clifton Court Forebay Criteria Compliant Fish Screen Alternative

The most significant on-going impact of the SWP contract renewals would be the continued take of listed fish species (without a take permit - see related comments) at the south delta pumps. The intakes do not have criteria compliant fish screens. An alternative which incorporated criteria compliant fish screens on the export pumps would reduce ESA species take associated with south delta pump operations and could be utilized as justification for issuance of Incidental Take Permits which would allow the future operations of the SWP to be ESA compliant. The SWP Contract Renewal must fully consider an alternative that includes compliant fish screens on the export pumps.

Comment continued: The ongoing impacts of operating the south delta intakes without criteria compliant fish screens must be fully mitigated for the SWP Contract Renewal. This impact can be avoided and minimized by including a project alternative or alternative component that includes criteria compliant fish screens for the south delta pumps. These south delta criteria compliant fish screens must be included as a mitigation measure for the on-going CVP/SWP impacts and for other alternatives as they are a feasible method to avoid and minimize significant impacts to listed fish species that otherwise go unmitigated by the current proposed contract renewal-related operations.

Comment continued: The core of the Coordinated Long-Term Operations (CLTO) of the CVP/SWP is a simple reoperation of the CVP/SWP south delta intakes to reduce the magnitude of reverse flows in Old and Middle River which the last few years of reoperation have proven to significantly reduced fish salvage rates that resulted in a significant reduction of the principle impact of the SWP/CVP on the fish species that the project was putting into jepeoardy. Since the CLTO CVP/SWP reoperation has been so successful, it makes sense to combine project alternatives components with that reoperation to form other viable project alternatives to further reduce the rate of take from the CVP/SWP south delta intake operations. First and foremost in these considerations would be a reduced contract delivery quantity in the SWP contract renewals. This alternative should include reverse flow restricted operations with other physical modifications to the existing CVP/SWP south delta facilities such as, but not necessarily limited to: fish screens with criteria compliant approach and sweeping velocities; a reduced distance fish path through Clifton Court Forebay to reduce duration of exposure of fish to predators in the Forebay; fish behavioral modification devices to manage fish distribution away from the intakes (bubble curtains, acoustic and light deterrents); and improved fish salvage capture, storage and release facilities and operations.

Comment continued: Designs for an isolated Clifton Court Forebay have been discussed many times by DWR and through the CALFED project, so these concepts should have been evaluated as avoidance and minimization measures for the SWP Contract Renewal alternatives.

Comment continued: Isolation of Clifton Court Forebay as a fish free facility would reduce the magnitude of impacts on fisheries from SWP south delta operations. Following is a description of an fish free isolated Clifton Court Forebay facility with the option for an integrated CVP intake that have been previously discussed and proposed in the DWR California Water Fix Revised EIR/S comments.

Comment continued: Here are the basic elements to this Clifton Court criteria compliant fish screen alternative component: widen the Clifton Court operable gates, install trash racks outside the operable gates, install a course large fish exclusion screen between the trash racks and operable gates, construct a conveyance channel in Clifton Court Forebay from the operable gates to the western side of Clifton Court Forebay, install criteria compliant fish screens in the conveyance channel, reengineer the current fish salvage facilities, and (optionally) plumb the CVP intake into the fish free north side of Clifton Court via a short tunnel. Following is a more detailed description of each of these elements.

Comment continued: Widen the Clifton Court Forebay operable gates to the north from their existing location. The width of the new operable gates needs to be sufficient to create a channel cross section of about 15,000 square feet. Dredge and reinforce channels as most economical and reliable from an engineering standpoint. As an example, dredge the approach and channel at the operable gates to a tidal working channel depth of 30' for a total operable gate width of 500'. The new gates should be set back into Clifton Court sufficiently to allow installation of trash racks and course large fish exclusion screens in front of them without reducing the existing channel cross section outside of Clifton Court. The Clifton Court Forebay Gates and tidal operations/storage can continue to function as they do under the existing conditions and No Project/Project so there are no operational impacts from this alternative component on tidal operations of Clifton Court Forebay.

Comment continued: Install trash racks outside Clifton Court Forebay outside of the widened Clifton Court operable gate. The trash racks will intercept debris coming in with the diversion water and serve as a behavioral deterrent to the fish to stay in the main channel as much as possible.

Comment continued: Behind the trash racks and just in front of the operable gates would be a course fish screen designed to keep out only larger "predator" size fish that have much higher swimming performance capability from entering Clifton Court Forebay. With the new 15,000 square foot cross section of the operable gates and surface area of the course fish screens, at full capacity CVP/SWP diversions the approach velocity at the course fish screens would be one foot per second. Predator sized fish would easily out swim this approach velocity, but smelt and juvenile salmonid would be pulled through and past the course large fish exclusion screen. There would be some predation at the trash racks and course fish screens but this can be managed and reduced with predator removal Projects and fish traps. The level of predation at the trash racks and course fish screens would be the same as the predation rates that occur at the current SWP trash racks and fish louvers under the No Project. This course fish screen outside of Clifton Court Forebay is designed to pass smelt and juvenile salmonids without risk of impingement, e.g. 15 - 25mm wide screen inlets. This screen would significantly reduce the exposure of juvenile salmonids and delta smelt to predation as larger predators would be excluded from within Clifton Court Forebay where a large amount of current predation is documented to occur.

Comment continued: A conveyance channel would be created in Clifton Court Forebay by segmenting the northern and southern parts of the Forebay with a new sheet pile partition that would draw water from the Clifton Court Forebay operable gates channel directly toward the existing SWP intakes on the southwestern side of the Forebay. The conveyance channel would start at the east side of the Forebay at the north and south ends of the widened operable gates channel. The partition would then quickly (but maintaining orderly water flow vectors) narrow from 500' wide to a width of approximately 250' wide and deepen from the initial 30' channel depth at the operable gates to a conveyance channel depth of 60 feet deep. The rest of the length of the conveyance channel would be dredged to a 60 feet deep with the channel partitions reinforced as necessary for stability. The channel depth is to accommodate the large surface area of fish screens and to increase the channel cross section to reduce water velocities. The channel would speed the transit of the fish across the Forebay (as compared to the No Project) and keep them from straying out into the Forebay so that they would have a significantly reduced duration of exposure to predation. Fish predation studies of the current Forebay operations have shown that a large portion of the juvenile salmonid and delta smelt population that enter the Forebay do not make it to the salvage facilities due to predation. By excluding predator size fish from entering Clifton Court, not allowing the smelt and juvenile salmonid fish to stray into the larger part of the Forebay and by shortening the duration and distance of their transit across the Forebay prior to capture and salvage; predation rates on juvenile salmonids and delta smelt would be significantly reduced with the Clifton Court criteria compliant fish screen alternative as compared to the existing condition, No Project/No Project or in comparison to any of the other alternative which retain dual operations without south delta intake screens that are criteria compliant.

Comment continued: Install criteria compliant fish screens in the conveyance channel in Clifton Court Forebay. Orient the screens in the conveyance channel in a "deep V" (10 to 15 degree angle) across the Clifton Court Conveyance Channel with the bottom of the V in the middle of the new conveyance channel approximately 1/4 mile from the west side of Clifton Court Forebay. The fish screens would be oriented vertically on the sides of the V. The top of the V is on the east side of Clifton Court Forebay and is attached to the sides of the conveyance channel partitions where the channel comes to approximately 250 feet wide. Each side of the V fish screen would be approximately 6850 feet long with a depth of 60 feet for a total working surface area in their vertical orientation of 822,000 square feet. If greater surface area is desired, alternatives designs where the screens are sloped in towards the middle of the conveyance channel at the bottom can be evaluated for cost, operational flexibility and fish protection performance. The deep V shape of the screen orientation in the conveyance

channel creates a shallow angle of approach of water to the screens and creates a sufficient surface area to reduce approach velocities and to have the draw of the export pumps create sweeping velocity across the screens.
Comment continued: As an example, water approaching a screen at a 15 degree oblique angle has an approach velocity that is 3.5% of the sweeping velocity. With the conveyance channel at 250 foot wide and 60 feet deep, at maximum CVP/SWP diversion volumes of 15,000cfs the water column velocity in the conveyance channel would be one foot per second. With a water column velocity of 1 foot per second, a 15 degree angled V screen would result in a sweeping velocity of 0.965 feet per second and an approach velocity of 0.035 feet per second.
Comment continued: The total surface area of vertically oriented deep V fish screen configuration is 822,000 square feet with the above assumptions. (As previously mentioned, sloped screen designs could have even larger surface areas if desired.) At the maximum combined CVP/SWP volume of 15,000 cfs the approach velocity to screens with this large surface area is just over 0.018 feet per second. 0.2 foot per second screen approach velocity is the compliance criteria for delta smelt so the fish screens as described would be only be 10% of the maximum approach velocity for smelt at the maximum CVP/SWP intake volume operations. If this screen configuration is considered over-designed with the 10% of the allowed approach velocity criteria and is excessively protective, and a more relaxed (but still compliant) approach velocity is deemed by the fisheries agencies to be adequately protective, the channel depth could be reduced along with the fish screen height and a narrower channel with a shorter length fish screen could be applied and still easily meet the fish screen criteria requirements. As an example a fish screen only 30 feet deep and half as long would still result in approach velocities that were half as fast as are delta smelt criteria compliant.
Comment continued: The fish capture/salvage facility for the Clifton Court criteria compliant fish screen starts at the very bottom end of the fish screen deep V (western side). There is a separation of the "water intake" portion of the screens on the sides of the V for a "fish intake" opening (slot) at the very bottom end of the V that is 4" to 6" wide. A shade structure should be built from the bottom of the V out to at least 50 feet to the east up the V so the intake slot is in deep shade so that fish do not attempt to evade the fish intake. The fish salvage pumps draw water into the fish intake slot at an approach velocity of 3 feet per second. The higher approach velocity of the fish intake slot is so the fish are quickly drawn in and do not swim away. The top 25 feet and the bottom 5 feet of the conveyance channel at the end of the water intake screen would have this fish intake slot. The top and bottom fish intake slots are to reflect the fish distribution in the water column. The juvenile salmonids and smelt will generally be concentrated in this top 25 feet of water column and the juvenile sturgeon at or near the bottom of the water column. With a 30 foot long total intake slot height, 6 inch width and 3 foot per second approach velocity, the fish salvage pumps would need to intake a maximum of 45 cubic feet per second to bring the fish into the fish collection facility. The current collection facility will need to be redesigned and enlarged to support fish/water separation of fish into transport tanks with this larger than current fish capture water flow. The same principles of the current fish salvage facility still apply, but will have improved handling of fish directly into holding tanks with reduced holding times prior to transport and active predator removal with nets (for the few that get through the large fish exclusion course fish screens). Other fish salvage facilities, handling, storage, transportation and release protocols can be developed and integrated with this Clifton Court criteria compliant fish screen alternative component.
Comment continued: The current fish separation, handling, storage and release operations would need to be revamped as has been previously recommended in many previous meetings, projects and communications. Under the Clifton Court criteria fish screen alternative, predation from salvage operations would be further reduced as compared to the existing conditions, No Project/Project or any

of the other project alternatives because captured juvenile salmonids and smelt would not be stored, shipped and released with predator sized fish.
Comment continued: Since the concept of an isolated Clifton Court Facility has been discussed, described and debated publicly and by the lead agencies many times (e.g. CALFED) and the SWP Contracts should not be renewed while the project still lacks the ITPs that would make the continued operations legally compliant, there is no excuse for the SWP Contract Renewal project to not have addressed this important project alternative in their alternatives development, screening and alternatives analysis process. None of the project features described in this Isolated Clifton Court Criteria Fish Screen alternative require new technology and all features described have built out project examples to rely upon for their engineering design, construction methods and for expectations regarding as-built real world performance characteristics.
Comment continued: Without inclusion and due consideration of this fish screen alternative component, the current EIR document is deficient and should be recirculated after it has been revised to include this alternative.
Comment continued: The Fisheries Facilities Technical Team (FFTT) must be convened to review, refine and more fully develop this concept into a fully formed and project-level project description that is suitable for full analysis in a revised EIR. This group is well qualified to adapt the preceding description as needed to optimize its function, performance and cost effectiveness. They can adapt the dimensions of the channels and cross sections to manipulate channel velocities under different tidal and operational scenarios. They can adapt screen size, depth, length, angles and configurations to optimize fish protection, costs, maintenance, etc. As the preceding description and analysis proves, building a criteria compliant fish screen in Clifton Court is technically feasible. This criteria compliant Clifton Court Fish Screen is a win-win alternative. Fish are protected, water supply delivery capacity is optimized, and delta water quality is protected.
CEQA compels an interactive process of assessment of environmental impacts and responsive project modification which must be genuine. It must be open to the public, premised upon a full and meaningful disclosure of the scope, purposes, and effect of a consistently described project, with flexibility to respond to unforeseen insights that emerge from the process. DWR should pursue permit terms shorter than 50 years due to the levels of uncertainty regarding the future effects of climate change on the Delta and the Sacramento River watershed. The SWP Contract Renewal Project must include a 30 year alternative. CEQA requires inclusion of alternatives that reasonably meet the project objectives and this suggestion for a shorter duration contract alternative more reasonably meets the project objectives taking into account the uncertainties of climate change in the currently proposed longer contract period.
DWR is non-compliant with current OCAP BO RPAs. The OCAP BO RPAs are a part of the No Project definition for the SWP Contract Renewal comparative analysis (see related comments) as they are current obligations of the SWP. DWR has failed to accurately represent the vast majority of the OCAP BO RPAs in terms of their environmental affects and their impacts on water operations, storage, fish habitat quality, quantity and distribution, on water rights, water supplies, water quality and many other environmental resources. The SWP Contract Renewal falsely claims that are insufficient detail available to represent these OCAP BO RPAs, but in fact most of the Projects do have available information and project has failed to meet the CEQA test to utilize the best available information. The following comments identify most of the OCAP BO RPA deliverables that are current obligations of DWR to fulfill. The comments identify the deadlines for the Projects and in some cases describe the nature of the information that should be available to the project to incorporate into their EIR baseline definitions and operations modeling. If none of this information is available to the project, then it means that DWR have not fulfilled their legal requirement to comply with the OCAP BO RPAs and they

are in violation of the ESA.

Comment continued: • Plans, status and annual reports submitted to NMFS on the Lower Putah Creek enhancements in compliance with the 2009 NMFS OCAP BO Project I.6.3. By December 31, 2015, DWR shall develop and implement. As described in Appendix 2-C, including stream realignment and floodplain restoration for fish passage improvement and multispecies habitat development on existing public lands. By September 1 of each year, DWR shall submit to NMFS a progress report towards the successful implementation of this Project. Since this BO RPAs required implementation of this Project by 12/31/15, these plans must have either been available for inclusion in the EIR baseline definition and operations modeling or DWR has failed to comply with the OCAP BO RPA implementation schedule and failed to meet the test of even a good faith effort to develop and implement these Projects.

Comment continued: • Annual reports submitted to NMFS on the Lisbon Weir improvements in compliance with the 2009 NMFS OCAP BO Project I.6.4. By December 31, 2015, DWR shall assure that improvements to the Lisbon Weir are made that are likely to achieve the fish and wildlife benefits described in Appendix 2-C. Improvements will include modification or replacement of Lisbon Weir, if necessary to achieve the desired benefits for fish. By September 1 of each year, DWR shall submit to NMFS a report on progress toward the successful implementation of this Project. Since this BO RPAs required implementation of this Project by 12/31/15, these plans must have either been available for inclusion in the EIR analysis or DWR have failed to comply with the OCAP BO RPA implementation schedule and failed to meet the test of even a good faith effort to develop and implement these Projects. • OCAP BO note regarding rationale for I.6.2 – I.6.4, "These improvements are necessary to off-set ongoing adverse effects of project operations, primary due to flood control operations." Since these have not been implemented, they do not offset the on-going impacts of flood control operations and therefore these species remain in jeopardy from the SWP operations which the contract renewal project proposes to perpetuate without mitigation.

Comment continued: • Plan submitted to NMFS in compliance with the 2009 NMFS OCAP BO Project I.7. By December 31, 2011, as part of the plan described in Project I.6.1, DWR shall submit a plan to NMFS to provide for high quality, reliable migratory passage for Sacramento Basin adult and juvenile anadromous fishes through the Yolo Bypass. Since this BO RPAs required implementation of this Project by 12/31/11, these plans must have either been available for inclusion in the EIR analysis or DWR has failed to comply with the OCAP BO RPA implementation schedule and failed to meet the test of even a good faith effort to develop and implement these Projects.

Comment continued: • Proposed engineering solutions submitted to NMFS in compliance with the 2009 NMFS OCAP BO Project IV.1.3. Due by March 30, 2012. DWR shall provide a final report on recommended approaches by March 30, 2015. If DWR had complied with the OCAP BO RPAs, this information would have been available for inclusion in the EIR baseline definition and impact analysis.

Comment continued: • Weekly reports from DWR to the interagency Data Assessment Team (DAT) regarding the results of monitoring and incidental take of winter-run, spring-run, CV steelhead, and Southern DPS of green sturgeon associated with operations of project facilities per the 2009 NMFS OCAP BO. This information would have informed DWR regarding relationships of operations and ESA species response to operations influenced behavioral responses. This information is for adaptive management of operations which DWR claims it does not have available to include in the EIR baselines, operational modeling and impact comparisons.

Comment continued: • DWR annual written report to NMFS following the salvage season of approximately October to May. This report shall provide the data gathered and summarize the results of winter-run, spring-run, CV steelhead, and Southern DPS of green sturgeon monitoring and incidental take associated with the operation of the Delta pumping plants (including the Rock Slough Pumping) per the 2009 NMFS OCAP BO. This information would have informed Reclamation regarding relationships of operations and ESA species response to operations influenced behavioral responses. This information is for adaptive management of operations which DWR claims it does not have available to include in the EIR.

Comment continued: • Reports to NMFS of facility salvage efficiency of 75 percent in compliance with the 2009 NMFS OCAP BO Project IV.4. DWR shall implement the following Projects to reduce losses associated with the salvage process, including: (1) conduct studies to evaluate current operations and salvage criteria to reduce take associated with salvage, (2) develop new procedures and modifications to improve the current operations, and (3) implement changes to the physical infrastructure of the facilities where information indicates such changes need to be made. Reclamation shall continue to fund and implement the CVPIA Fish Facility Program. In addition, DWR shall fund quality control and quality assurance programs, genetic analysis, louver cleaning loss studies, release site studies and predation studies. Funding shall also include new studies to estimate green sturgeon screening efficiency at both facilities and survival through the trucking and handling process. By January 31 of each year, DWR shall submit to NMFS an annual progress report summarizing progress of the studies, recommendations made and/or implemented, and whole facility salvage efficiency. This is probably the most important missed obligation by DWR as the plans to meet these salvage efficiencies would have become an important component of a project alternative that would have had lower environmental impacts than the proposed project - see related comments for a criteria compliant fish screen for the SWP intake at Clifton Court Forebay. In order to meet these goals, it is likely that full criteria fish screens would have been designed for implementation and should have been included in the EIR. DWR cannot both claim it is compliant with the OCAP BOs and that information is not available in sufficient detail to allow analysis in the EIR. DWR must provide NMFS with the designs and operations for the SWP to become compliant with this RPA and these Projects must be included in the EIR No Project baseline definitions and included in the detailed analysis of an alternative in a revised and recirculated EIR.

Comment continued: • Documentation of the Skinner Fish Protection Facility to achieving the minimum 75 percent salvage efficiency for CV salmon, steelhead, and Southern DPS of green sturgeon after fish enter the primary channels in front of the louvers in compliance with the 2009 NMFS OCAP BO Project IV.4.2.1). Due from DWR by December 31, 2012. If DWR had complied with the OCAP BO RPAs, this information would have been available for inclusion in the EIR baseline or as a project alternative component (see fish screen alternative related comments), in the impact analysis.

Comment continued: • Report to NMFS on compliance with the 2009 NMFS OCAP BO Project IV.4.2.2)a). DWR is to immediately commence studies to develop predator control methods for Clifton Court Forebay that will reduce salmon and steelhead pre-screen loss in Clifton Court Forebay to no more than 40 percent. Studies complete on or before March 31, 2011. 40% improved predator control shall be achieved by March 31, 2014. Failure to meet this timeline shall result in the cessation of incidental take exemption at SWP facilities unless NMFS agrees to an extended timeline. This OCAP BO RPA compliance information must also be in the EIR baseline definition. DWR's lack of compliance with this project legal requirements means the contract renewal will perpetuate these fisheries impacts which NMFS has determined in their OCAP BO result in jepeoardy of these listed species.

Comment continued: • Documentation of the completion of fish collection facilities in compliance with the 2009 NMFS OCAP BO Project V, NF4.1. DWR American River Fish Facility – Collection facility shall be operational no later than March 2012. DWR should have several years of operational data on the impacts of implementing these Projects and this information must be included in the revised baseline and recirculated EIR. DWR should also have completed an EIR/S on this project prior to its permitting and construction so those materials should also be available to use in the SWP Contract Renewal EIR and as part of the No Project/No Project baseline definition.

Comment continued: • Plans submitted to NMFS specifically in compliance with the 2009 NMFS OCAP BO RPA I.7 reduction of migratory delays and loss for salmon, steelhead and sturgeon. These were due from DWR by 6/30/11 and this information must be included in the SWP Contract Renewal EIR. Given that the plans were required more than 5 years ago, the project-level description of these Projects must be available and must be included in a revised and recirculated EIR.

Comment continued: • Reports to NMFS on specific Projects implemented specifically in compliance with the 2009 NMFS OCAP BO RPA I.7 reduction of migratory delays and loss for salmon, steelhead and sturgeon. These were due to be implemented by DWR by 12/31/11 so there should be 5+ years of information on these implemented Projects available for inclusion in the EIR baseline definition and comparative analysis.

Comment continued: • Reports submitted to NMFS on the reduction of fish predation rates to less than 10% in the primary channel in response to 2009 NMFS OCAP BO RPA IV.4.1. DWR is required to implement this no later than 12/31/12 so this information should have been included in the SWP Contract Renewal EIR baseline definition and a 10% predation loss rates in the primary channel should have been assumed in the impacts assessment for the No Project. All of these DWR mandatory improvements to predation rates and fish salvage rates must be included in the No Project and, if DWR were compliant with the OCAP BO RPA implementation schedule, the existing conditions/affected environment description. The EIR must be revised with all of these past implementation deadlines as part of the No Project definition and integrated into the alternatives comparisons to these baselines. The public draft EIR must be recirculated for this material new information for public comment and disclosure.

Comment continued: • Predation reduction method reports submitted to NMFS specifically in compliance with the 2009 NMFS OCAP BO RPA IV.4.3. DWR is required to complete this no later than 6/15/11 so this information should have been in the EIR baseline definition and description.

Comment continued: • Copy of reports submitted to NMFS documenting the improvements of fish salvage monitoring and release survival rates for the south delta pumps specifically in compliance with the 2009 NMFS OCAP BO RPA IV.4.3. DWR is required to complete this by 10/1/09 and annually thereafter. This information should have been in the EIR.

Comment continued: • Correspondence and joint work products with the CVP/SWP Fish Passage Steering Committee in response to the coordination requirements from the 2009 NMFS OCAP BO RPA NF 4.5. These materials should be available from DWR to inform the EIR analysis.

Comment continued: • Reports submitted to NMFS specifically regarding DWR's Skinner Fish Collection Facility reductions in fish predation rates in response to 2009 NMFS OCAP BO RPA IV.4.2. Compliance was required to be achieved no later than 3/31/14 and should have been included in the EIR baseline description and comparative analyses for the alternatives impact analyses.

Comment continued: • DWR reports, plans and correspondence to FWS specifically in response to FWS OCAP BO RPA "Component 4: Habitat Restoration, to implement a program to create or restore a minimum of 8,000 acres of intertidal and associated sub tidal habitat in the Delta and Suisun Marsh. The restoration efforts shall begin within 12 months of signature of this biological opinion and be completed by DWR (the applicant) within 10 years. The restoration sites and plans shall be reviewed and approved by the Service and be appropriate to improve habitat conditions for delta smelt. Management plans shall be developed for each restoration site with an endowment or other secure financial assurance and easement in place held by a third-party or DFG and approved by the Service. The endowment or other secure financial assurance shall be sufficient to fund the monitoring effort and operation and maintenance of the restoration site. An overall monitoring program shall be developed to focus on the effectiveness of the restoration Projects and provided to the Service for review within six months of signature of this biological opinion. The applicant shall finalize the establishment of the funding for the restoration plan within 120 days of final approval of the restoration program by the Service." Since there are only 2 years left for this Project to be completely implemented and contracting and construction will take at least that long, the plans and supporting detailed environmental documents and permitting must already be completed. This information should have been included in the EIR as part of the No Project and variants of this Project should have been included in some of the project alternatives. This omission makes the EIR materially incomplete and deficient. This deficiency must be remedied and a revised EIR recirculated for public comment.

Comment continued: • DWR reports or correspondence to FWS specifically in response to FWS OCAP BO RPA "Component 5: Monitoring and Reporting, Information on salvage at Banks and Jones is both an essential trigger for some of these Projects and an important performance measure of their effectiveness. In addition, information on OMR flows and concurrent measures of delta smelt distribution and salvage are essential to ensure that Projects are implemented effectively. Such information shall be included in an annual report for the Water Year (October 1 to September 30) to the Service, provided no later than October 15 of each year, starting in 2010." This information should have been included in the EIR as it would provide a basis to characterize the No Project as well as informed potential options in the development of alternatives and adaptive management measures.

Comment continued: • Notifications and reports to FWS for BO RPA Project 6. Documentation should include the location, plans, designs, evaluations, environmental documents, permit applications, and status updates and reports to FWS. "A program to create or restore a minimum of 8,000 acres of intertidal and associated sub tidal habitat in the Delta and Suisun Marsh shall be implemented. The restoration efforts shall begin within 12 months of signature of this biological opinion and be completed within a 10 year period." Since there are only 4 years left for this Project to be completely implemented and contracting and construction will take at least that long, the project-level description and land modification and water operations plans and supporting detailed environmental documents and permitting must already be completed. This information should be available if the SWP were compliant with the ESA as required in the OCAP BO RPAs. This information should have been included in the EIR. This omission makes the EIR materially incomplete and deficient. This deficiency must be remedied and a revised EIR recirculated for public comment.

Comment continued: • DWR reports to FWS regarding any information about take or suspected take of federally-listed species not authorized in the 2008 FWS OCAP BO. Notification must include the date, time, and location of the incident or of the finding of a dead or injured delta smelt. Jones Tract emergency levee repair and fish rescue are is an example of notifications that should have been given. Dissolved Oxygen crashes that result in adverse modification of critical habitat caused by or contributed to by SWP operations must also be included with this other information in a revised and recirculated EIR.

Comment continued: The NMFS BO requires addition of salt to water within the tanker trucks to haul salvaged fish to reduce stress of transport (NMFS OCAP BO pg 657, #5). The DWR 401 Certification from the water board does not cover this discharge and this impacts of adding salts to water discharged into the delta must be addressed in the EIR.

Comment continued: In conclusion to this series of comments related to information that should be available to the EIR from DWR 's compliance with the OCAP BOs, DWR has missed the vast majority of the OCAP BO RPA implementation deadlines and is grossly out of compliance with the OCAP BO RPA implementations required for the SWP to not continue to jeopardize ESA listed fish species. DWR's breach of the OCAP BO terms is a serious offense and as a result the SWP continues to jeopardize the listed species and has resulted in a significantly compromised and deficient EIR document. If DWR had complied with the OCAP BO RPA schedule of implementation, the No Project analysis would be complete and correct. Instead, due to DWR's non-compliance with the ESA requirements to implement the OCAP BO RPAs, the SWP Contract Renewal is claiming that it is not possible to include these Projects in the No Project definition and assumptions as they are not sufficiently developed to support analysis. The regulatory agencies utilizing this EIR document to support decision making should not accept this incomplete characterization of the No Project alternative as it corrupts all of the analysis that rely on this baseline for comparison. As required by CEQA, DWR must make full use of all available data to include in the No Project definition, modeling and impact analysis comparison. Since all of these OCAP BO RPAs are delinquent anyway and the agencies (DWR, CA DFW, USFWS and NMFS) in Project is resulting in continued jeopardy of ESA listed species from SWP operations, DWR must apply all of their human, technical and financial resources into becoming compliant with the OCAP BOs - to the exclusion of utilizing conflicting resources for the SWP Contract Renewals which would add further delays to compliance. Once the work to become compliant with the OCAP BOs is completed the SWP would have the benefit of avoiding jeopardy for the ESA listed species during the period of proposed contract renewal operations. Another likely benefit of completing the OCAP BO RPAs prior to the SWP Contract Renewal EIR advancing is that in the process of completing these compliance plans it is likely that new and more beneficial project alternatives would be identified and developed. An example of this would be the OCAP BO RPA required improvements to the south delta intake channels and fish screens. As the detailed designs and plans required by the OCAP BO RPAs are developed, it is likely that a more significant and comprehensive approach would be developed that not only exceeded the requirements of the OCAP BO fish salvage improvement goals, but became an important component of a new and more viable project alternative - see comments on south delta criteria fish screen alternative.

Comment continued: It is clear from the on-going failures of DWR to comply with the OCAP BiOps and the lack of sanctions on them by FWS and NMFS, that NMFS and FWS are failing to enforce their own OCAP BiOps. FWS and NMFS must immediately redress their lack of enforcement of the OCAP BiOps with DWR. FWS and NMFS should start this process by requiring that the OCAP BiOp RPAs are implemented prior to, not after, SWP Contract Renewals. Further, if DWR officers, representatives and staff continue to fail to apply even good faith efforts to implement the OCAP BO RPAs as expeditiously as possible, FWS and NMFS should begin pursuing civil and criminal penalties.

The Draft Environmental Impact Statement (EIS) for the Coordinated Long-Term Operation of the Central Valley Project (CVP) and State Water Project (SWP) (ES.3, line 17) acknowledges that many of the provisions of the RPAs identified in the biological opinions require further study and monitoring and further environmental documentation necessary before any future facilities can be constructed or modified. Therefore the assumption of RPA implementation prior to SWP Contract Renewal must take supremacy.

The EIR failed to identify significant impacts of continuing SWP operations. These ongoing significant impacts include, but are not limited to: salt accumulation in the SWP service area from salts delivered in the SWP water supply and alternative water supplies which are over-relied upon due to SWP contract amounts which are consistently not met; salmonid genetic introgression from straying from SWP operations, continuing blockage of upstream passage by the physical presence of Oroville Dam and the fish barrier dam and from Oroville hatchery operations which introgress spring- and fall-run Chinook salmon; depletion of downstream sediment and large wood debris load contribution from upstream tributaries by capture from Oroville Dam resulting in downstream degradation of fisheries and riparian habitat as well as salmonid spawning gravel; and many other impacts - see related comments.
See CEQA Guidelines, § 15126.4[a][1][D] "EIRs must discuss significant effects of mitigation measures,..." The EIR incorrectly concluded, without adequate supporting justification, that the contract renewal had no significant impacts so no mitigations were identified. The contract renewal does have significant on-going environmental impacts that must be mitigated. In this lack of detail and reliable determination of the general types and magnitudes of impacts from mitigation measures, the EIR is materially deficient and must be revised to provide this detail and recirculated for public comment.
One type of on-going impact of the contract renewal would be continued delivery of salts in the irrigation water to agricultural service areas of the SWP. Increased Electrical Conductivity (EC) from salinity in SWP irrigation water is bioaccumulative in plants and results in reduced yields and ultimately accumulation of salts in the soil results in conversion of farmland to a non-farmable condition. Some areas of the SWP service area will reach this unfarmable concentration of salts in the proposed SWP Contract Renewal project period. The degradation of soil quality from imported salts from continued irrigations from the contract renewal results in a change in land use from farmland to non-farmland. A change in land use is always determined to be a significant impact which must be mitigated. This material and significant impact is not identified, evaluated, quantified, disclosed or mitigated in the current draft EIR. The draft EIR must be revised to correct this deficiency and recirculated with this material new information.
Not all chemical components that contribute to EC are sodium salts. There are positively charged ions that contribute to EC and include sodium, calcium, potassium, and magnesium. Negatively charged ions that contribute to EC include chloride, sulfate, carbonate, and bicarbonate, nitrates, and phosphates. Several of these other non-sodium salts do bioacumulate in humans and wildlife, e.g. Nitrates (that is why there are nitrate standards in drinking water quality). Sodium salts are bioaccumulative in plants and will cause yield loss in commercial crops and mortality and changes in native and wild plant types that will occur based on their salt tolerance. These plant community changes from salt accumulation in turn cause changes in wildlife habitat quality and quantity and species distribution for foraging habitat. These inaccuracies in the EIR must be disclosed in a revised and recirculated public draft.
The CA Water Fix EIR/S determined that the No Project condition, which the SWP contract renewal proposes to perpetuate, results in a significant degradation of water quality conditions. "At the Banks pumping plant, the frequency with which DOC concentration would exceed 3 mg/L 36 would increase from 64% under Existing Conditions to 69% under the No Project Alternative (ELT) for the 16-year period (and increase from 57% to 68% during the drought year period)..." (4.2-35 line 36) This change is over a 10% increase in the frequency of exceedance of an important drinking water quality requirement for the water supply for over 22 million Californian's. This is obviously a significant impact and this glossing over impact calls is a consistent error and deficiency in this EIR. A 10% change in conditions, flows or water quality degradation (regardless of water quality exceedance) is often a threshold utilized for water resource project impact criteria for California environmental EIRs and EISs,

e.g. Lower Yuba River Accord, Lower American River Accord, Oroville Facilities Relicensing. This is impact is significant and DWR must adopt the same significance criteria for impacts analysis as they have used for other similar projects and/or provide rationale for why they have departed from their previous standards, practices and conventions - see related comments. Any degradation of water quality standards related to a beneficial use is a significant impact.
The CA Water Fix EIR/S determined that the No Project condition, which the SWP contract renewal proposes to perpetuate, results in a significant degradation of water quality conditions. "Elevated ambient water temperatures in the Delta, and thus an increase in Microcystis bloom duration and magnitude, are expected under the No Project Alternative (ELT), relative to Existing Conditions." (4.2-44, line 36) The CA Water Fix analysis shows that the SWP contract renewals would result in additional and on-going significant degradation of water quality. The EIR must be revised to provide and complete analysis of impacts of the contract renewal and the analytical level of rigor and approach must be consistent with the CA Water Fix impact analysis. These significant impacts must be identified, evaluated, disclosed, and mitigated.
The 2008 FWS OCAP BiOp RPAs required implementations of habitat restorations, predation management and physical changes to the south delta intakes in addition to the changed water operations to avoid jeopardy of the species from extinction from the continued operation of the CVP/SWP facilities - see related comments. DWR has mostly complied with the altered water operations, but have failed to plan or implement the habitat restorations, predation rate management and intake modifications for increased salvage survival rates that are also required by the OCAP BiOp RPAs. DWR remains in violation of the ESA as defined by the required RPAs in the OCAP BiOp. Since the BiOp concluded that these restoration Projects were required to avoid jepeoardy and these Projects have not been implemented it is logical to conclude from the BiOp analysis that the species may go extinct if the SWP contracts are renewed. In direct contradiction to these other findings, the SWP Contract Renewal EIR concluded it had no significant impacts. One of these analyses is wrong and since the OCAP BO carries the force of law, we must conclude that it is the EIR analysis that is wrong and it must be corrected to be consistent with the OCAP BO analysis and conclusions. DWR must revise their EIR so the analysis approach, methodology and conclusions are consistent with the OCAP BO analysis on this same species for this same time period and assumptions.
The SWP project currently results in frequent and significant violations of water quality standards in the delta. The affected and harmed water rights holders in the delta have senior water rights to the SWP. The SWP has no right to degrade the water quality and beneficial uses of water of these senior water rights holders and the SWP Contract Renewal project proposes to perpetuate those water quality violations and impairment of senior water rights. The SWP operations caused water quality impacts are avoidable by operating the SWP in a manner that does not violate water quality standards. This may result in less water deliveries, but that is what is required in order to avoid significantly impacting the senior water rights of the other delta water diverters. The SWP Contract Renewals must include alternatives that implement reduced contract delivery amounts and reconfigured operations so that it avoids and minimizes this impact. To the extent that these impacts are not reduced below significant levels, the EIR must develop and propose appropriate mitigation measures. Once the reduced water delivery alternatives have been developed and evaluated and the remaining significant impacts have been mitigated, the revised EIR must be recirculated to disclose this material new information.
The SWP Contract Renewal No Project definition is in error as the continuation of the current plans and policies of DWR is to not renew the contracts. If contract renewal was a continuation of an existing plan or policy, there would have been language in the contract that established a mechanism or on-going commitment to contract renewal or the contracts would have been in perpetuity. The original contract does not include any language regarding subsequent contract renewals. The lack of inclusion

of language in the original contract regarding any expectation for the renewal makes it clear that the policy of DWR at the time of the original contract initiation was to allow DWR at the future time (now) of contract expiration to have the opportunity to re-evaluate from scratch without prejudice or pre-decision the terms under which any potential new contract might or might not be issued. Since no expectation for contract renewal was included in the contract, the renewal of these contracts cannot be considered the No-Project. Literally, "No-Project" means if one to do nothing and in the event that nobody did anything, these contracts would expire at their end of term and would not be renewed.
The Proposed Project is for new water supply contracts, not contract renewals - see above comment. The Water Supply Delivery Contracts are for goods and services to be provided by the State. As such, there must be a competitive and open bidding process for the water supply contracts. The State has failed to follow its own laws and procedures for an contract bid process. Bidders must apply and prove their qualifications, including their financial resources to fulfill their portions of the contract responsibilities. Once qualified, the bidders must put forth proposals for the State to evaluate on an unbiased ranking system. The State would then consider awards of contracts based on the proposal evaluations. The current project circumvents these legal requirements of the State contract bidding and award process.
The SWP Contract Renewal incorrectly assumes that the water supply contract renewal will be approved in the same quantities as the existing contracts. This lack of consideration of a fundamental variable in the contract as an alternative is not reasonable. The renewal of the contract at the current contract water supply delivery amounts also does not meet the criteria of reasonably foreseeable for inclusion in the No Project or Cumulative as there are no guarantees in the current contract that the contracts will be renewed or renewed at the existing delivery quantities. It is much more likely that, if the contracts are renewed at all, the contract amounts would be lower than the current amounts as the lower delivery amounts would make the contracts consistent with the requirements of the 2009 Delta Reform Act and of the 2014 California Water Project Plan to reduce reliance on Delta water supplies. If the SWP Water Supply Contact Renewal wants to include continued operations assumptions beyond 2035 when the current contracts expire, DWR must adopt a range of scenarios to analyze from contract renewals with some delivery reduction (to be consistent with current plans and policies such as the Delta Reform Act) to scenarios where they are not renewed at all.

The EIR claims that there are no environmental impacts resulting from the contract renewals. This is an incorrect conclusion of the EIR. The contract renewal will result in the continued violation of water quality standards in the delta including Dissolved Oxygen (DO). There are a number of readily available water quality impact assessment tools. DSM2-QUAL is an existing modeling tool which has been developed and tested for use in dissolved oxygen assessments in the Delta. "The ability of the model to simulate the dissolved oxygen sag on a reach of the San Joaquin River near Stockton was recently demonstrated. DSM2-Qual was capable of capturing diurnal variations of important constituents such as dissolved oxygen, phytoplankton, temperature, and nutrients under the unsteady conditions of the estuary. Variations were realistic, although lack of a large temporal variation in observed data was somewhat of an impediment to testing the model's full capacity to predict field conditions. Tests of the model's capability to distinguish between alternatives in terms of incremental changes in water quality were encouraging (Rajbhandari 1995). The model has great potential for use as a practical tool for analysis of the impacts of water management alternatives." (http://baydeltaoffice.water.ca.gov/modeling/deltamodeling/delta/reports/annrpt/1998/chpt3.html) Take note that the quote on the utility of this model for analyzing DO in the delta is from DWR's Bay Delta Office. The conclusion that this tool was useful in distinguishing incremental changes from alternatives was documented in 1995 which was 21 years ago so the best available science must be well advanced from this fully functional level from over 20 years ago. For the EIR, the model would not be used to predict field conditions, but in a comparative mode from the baseline environmental conditions as compared to alternatives to quantify the relative change due to the alternatives. This tool, even back in 1995, was well capable of being useful for the EIR impact assessment. Modeling is an essential tool for evaluating such an important water quality constituent which is an essential criteria for suitable fish habitat in an area that many listed species share as designated critical habitat. The problem of DO is dynamic, complex and is unevenly distributed geographically which makes spatial modeling of DO an essential component of any environmental impacts analysis which must utilize the best available science as CEQA analysis requires. The EIR fails to utilize best available science and to conduct analyses of the impacts of continued SWP water deliveries resulting from the water supply contract renewal.

Another on-going impact of the SWP Contract Renewals that the ERI failed to identify or disclose is the continuation of off-gassing from Lake Oroville which contributes greenhouse gas emissions to impact Climate Change. This material omission must be addressed in a revised and recirculated public draft EIR.

The SWP Contract Renewals results in an increase in the reliance upon the delta as a water supply as it assumes that there is no improvement in regional water supply independence in the next 50 years (see related comments) which is in direct contradiction to this 23 CCR Section 5003 requirement. As such, the proposed project and other alternatives which include full contract delivery amounts from the original contract are not consistent with current plans, policies and state laws. Alternatives which include reduced delivery quantities must be included in the EIR so that the project is not in conflict with these laws and all alternatives which do not include reductions of water supply deliveries from the delta must be dropped from further consideration in the final EIR.

The SWP Contract Renewal is growth inducing (see related comments) but does not evaluate those impacts or locate urban development wisely as the growth it induces furthers dependence upon delta water supply exports which is in direct contradiction to this 23 CCR Section 5010 requirement. Not all of the current water supply contract amounts are built out, so the unbuilt increment of water supply included in the contract renewal is growth inducing. The EIR is deficient as it does not include this impact analysis, disclosure and mitigation.

CEQA requires (see CEQA Guidelines Section 15125(d)) that a "...EIR shall discuss any inconsistencies between the proposed Project and applicable general plans and regional plans." Contract renewal at current contract water supply delivery amounts conflicts with regional and municipal general plans that include (as they are required to by law) a reduced dependence upon delta water supplies in the future.

The SWP Contract Renewal (incorrectly - see related comments) represents that the renewal of the contract is part of the No Project condition. Therefore, the SWP Contract Renewal should have exactly the same No Project definition as the California Water Fix EIR/S No Project. The California Water Fix EIR/S No Project analysis concluded that the No Project as compared to the existing condition resulted a number of significant (and some unavoidable significant) impacts. The SWP Contract Renewal Project therefore would have the same significant impacts. The SWP Contract Renewal EIR is inconsistent with the California Water Fix project EIR/S findings and the final EIR must be revised to be consistent with [illegible]

CEQA's requires that whenever feasible, agency decision makers must adopt mitigation available to reduce a project's significant impacts to a less-than-significant level. The SWP contract renewal perpetuates significant impacts which were documented in the CA Water Fix EIR/S No Project condition. The SWP contract renewal fails to identify and evaluate these impacts or to mitigate impacts to a less than significant level when it is feasible to do so. The project could reduce significant (and unavoidable according the CA Water Fix) water quality impacts (e.g. salinity, DO, blue' green algae, Se, Pb, Hg, Chloride, Bromide, etc.) to less-than-significant if they reduce the water supply contract delivery amounts or they don't do the project at all (which must be the No Project condition for comparison of impacts - see related comments).

The SWP Contract Renewal is in direct conflict with the legal requirements of the Delta Plan for reduced reliance on delta water supplies. The SWP Contract Renewal increases reliance upon the delta water supplies by making the delta water supplies more reliable farther into the future.

DWR initiated a process to extend the SWP Water Supply Contracts starting in April 16, 2014. Several public meetings were held involving initial negotiations and culminated in the submittal of public scoping comments ending October 14, 2014. Several public meetings were held in early 2015, but then negotiations continued only in private meetings that the public was excluded from. Of the 23 meetings DWR says it held on the development of the Agreement in Principle (NOP pg2) the public was only included in a hand full of those meetings. DWR shut the public out of the process for the development of the Agreement in Principle with the contracting water agencies. This water supply contract renewal process is definitely not a transparent process for the public as required by the Delta Plan and therefore, DWR, and the SWP Contract Renewal project is not compliant with the Delta Plan.

The new contract renewal and alternatives do not include any aspect of management or reduction of invasive species to comply with this important Delta Plan requirement.

Summary of Delta Plan Requirement Compliance by the SWP Contract Renewals - Of the 24 or so criteria for certification of compliance with the Delta Plan, the project complies with exactly none of them. The Delta Stewardship Council must not certify the SWP Contract Renewal as being compliant with the Delta Plan.

Appendix A - Agreement in Principle

The Agreement in Principle (AIP) is used in the EIR as a predecisional document in its entirety. This agreement was utilized as a basis for screening out other alternatives which would have reasonably met the purpose of the project which was to let out new water supply contracts. The process also predecisionally excluded other potential contractors from competing for the water supply contracts -

see related comments. The agreement precluded consideration of alternative reduced water supply contract delivery amounts which should have been considered as reasonable alternatives. It is appropriate for this agreement to be used to define the proposed project, but not as a basis for screening criteria to artificially limit the range of alternatives which could reasonably meet the objectives of the project, which is to renew the water supply contracts. The use of the AIP as the basis for screening other potential project alternatives is in violation of CEQA requirements for consideration of all reasonable alternatives which meet the project objectives.

Objective 3(d) - Proposes the SWP contractors would no longer be responsible for some of the fish and wildlife costs of the SWP. This provision is in conflict with the Davis-Dolwig Act as the SWP contractors are responsible for all operating costs related to their water deliveries, including the costs of mitigation of impacts from the SWP project and operations. The Proposed Project must be modified to remove this aspect of the AIP from the definition as it is in direct conflict with existing law.

Appendix B - NOP

Pg 2,p2 - "The SWP is also operated to improve water quality in the Sacramento-San Joaquin Delta, control floodwaters generate electricity, provide recreation, and enhance fish and wildlife." The SWP Contract Renewal project included extending the contract period for water supplies for the benefit of the water contractors, but did not include any provisions for protecting or enhancing any of the other stated project purposes. The SWP operations frequently and routinely violate water quality standards in the delta. The SWP contract renewal EIR must include alternatives that accomplished the other stated project objectives to renew the water supply contracts but also do so in a manner that protect water quality in the delta rather than only proposing project alternatives that will result in a perpetuation of the SWP water quality violations.

Pg 2, last paragraph - "The AIP does not represent a commitment by DWR or the Contractors to approve a proposed project or to extend the Contracts..." This is an untrue statement as the project EIR did not include any alternatives that did not include extension of the contracts. The AIP was used as a basis to screen out alternatives that did not extend the contracts and therefore was predecisional.

Pg 3, Project Objectives - Of the three project objectives identified, none of them preclude the reasonable consideration of some quantity of reduced water supply delivery contract amounts. Without a reasonable objective that precludes consideration of reduced water supply delivery amounts, DWR has no supporting rationale not to include one or several project alternatives that do address reduced water supply contract amounts. There is ample reason to include a reduced contract amount alternative as this alternative would be the only one that is compliant with current legal requirements to reduce future water supply reliance upon the delta - see related comments.

Pg 3, Project Area - the SWP facilities and service area may be correct for the project area definition, but it is incorrect as a boundary for considering the environmental impacts of the project. The project impact analysis area must include areas that are downstream of the diversion and downstream of the service areas so flow affects and water quality impacts in these areas can be assessed, disclosed and mitigated. The current EIR is deficient for not including these affected geographic areas and impacts.

Pg 3, Proposed Project - "Extend the term of the 29 Water Supply Contracts to December 31 , 2085." This is nearly a 70 year contract extension from current day. This is an unreasonable duration of contract due to the uncertainty of the affects from climate change. The CA Water Fix late long term future analysis only extended 50 years and the long-term analysis was limited in scope due to climate change uncertainty. It is imprudent for the state to make delivery commitments so far in the future with such a significant amount of uncertainty in its ability to fulfill future commitments in conditions that are largely unknown and the impacts of which are currently unquantifiable and in some cases, unknowable.

Pg 3, Environmental Baseline - The California Water Fix just spend millions of $s characterizing and describing the existing condition and No Project condition of the SWP. The SWP Water Contract Renewal is inconsistent with this other contemporary DWR EIR document as it did not rely upon the same definitions or utilize the same materials. The project must be brought into consistency with the California Water Fix EIR or DWR must explain in each instance the supporting rationale for the differences.
Pg 9 - Reviewing agencies should also have included the Sacramento Valley Regional Water Quality Control Board for review of consistency with the Delta Water Quality Control Plan and Delta Flow Standards. It should have also included the SWRCB for discharge permits and water quality.
Pg 16 - 26 - All of the Scoping Comments provided by Central and South Delta Water Agencies are herein incorporated by reference.
Pg 33, p1 - "Scare tactics are currently being used to coerce SWP contractors into supporting the... ...Bay---Delta Conservation Plan (BDCP)." It is not clear from this comment the method of delivery of this coercion, but it clearly implies that contract renewals may be withheld if water contractors do not support or endorse the BDCP project. Any coercion like this, if true, would clearly be illegal and in conflict with DWR's mission statement to deliver water and in violation of its ethical standards and code of conduct. If there is any requirement for a water contractor to support the BDCP (CA Water Fix) in order to execute a SWP Contract Renewal, then this requirement must be included as part of the proposed project description.
EIR Document
7.2 - It is interesting that none of the project objectives include delivery of water. An alternative that delivered no water at all would still meet the stated project objectives. Given that, it is reasonable that the project alternatives should have included an alternative with reduced contract amounts.
7.3.1 - An unstated, but required project objective for all project subject to CEQA is that they must be compliant and consistent with all existing laws, regulations and policies. To not include alternatives which reduce reliance upon delta water supplies is to be inconsistent with and in direct conflict with the Delta Reform Act - see related comments. None of the arguments in the EIR which were put forward to justify not including a reduced contract amount make any sense. We understand that Table A amounts are allocated by the amount of water available. That fact does not make any difference in that the maximum amount of water delivery in Table A for the contracts should be a lesser amount so that it is consistent with the Delta Reform Act. Pg 7-3, p4 "Reducing Table A amounts proportionately for all the Contractors by amendment would not change the amount of water being delivered to the Contractors..." This statement is incorrect as reduced Table A maximum amounts would result in reduced deliveries in which full water supplies were available. This infrequent outcome of reduced deliveries is desirable from two important standpoints. First, it would make the alternative with the reduced maximum contract amounts consistent with the requirement for the water contractors to reduce their dependence on delta water supplies as is currently legally required. Second, the outflows of water from the delta would be increased and the larger flushing flows have environmental benefits. This second benefit would make the reduced contract delivery amount the environmentally superior alternative as compared to the environmental impacts of the other alternatives.
Pg7-5, p3 " The proposed project is separate and independent from the California WaterFix project. The proposed project would need to occur regardless of the outcome of California WaterFix." There are several things wrong with these statements. First, the document is predecisional in representing only the proposed project and not considering that it may be other alternatives which would be approved. Second, the nature of the SWP and water deliveries with or without the CA Water Fix project would be very different. The CA Water Fix EIR/S shows that the amount of water delivered

would change in different water year types as compared to the No Action condition. This would mean that the amount of water that was available through the SWP would be different with and without the CA Water Fix. This difference would impact Table A allocations and actual water deliveries under the SWP contracts with and without the CA Water Fix. Therefore, the SWP contract renewal and the environmental impacts from the water deliveries from the contact agreements are interdependent upon the CA Water Fix. Because the CA Water Fix would make a difference in the water deliveries and environmental impacts of the SWP Contract Renewal, the EIR must include an alternative that represents a scenario where the CA Water Fix and the associated difference in water deliveries is represented, evaluated, and disclosed.

7.4.1 "Upon receipt of Article 4 letters from the Contractors (at least 6 months prior to the existing expiration date for each Contract) the term of the Contracts would be extended beyond their current expiration dates." It is unreasonable for the EIR No Project alternative that the contract would be extended for 50 years beyond their expiration dates. It would be much more reasonable for the EIR to assume that the function of the article 4 provision was to allow a one year period to complete negotiations on the new water supply contracts. Based on the unsupportable assumption that the contract would be extended for 50 years based on the contractor letter, it is much more appropriate to assume that the SWP would stop deliveries (or stop after a year if there is a provision for a contractor letter provision in the current water contracts) when the contracts expired under the No Project condition. The EIR must disclose the materials that support their No Project assumptions of continued water deliveries for 50 years under expired contracts or the EIR analysis must be redone based on a No Project that does not deliver water after the contracts expire (or deliver water for only one year after the contracts expire).

The EIR should have included an alternative in which the Contractors pay off the existing debt of the SWP, DWR divests itself from the SWP and the Water Contractors take over the operations of the SWP. This has been proposed previously for both the SWP and the CVP. DWR has even conducted a study of this SWP divestiture scenario. This SWP turnover to the Water Contractors would obviate the need for the SWP Water Supply Delivery Contracts. This alternative would meet or obviate the need for each of the project objectives. The project objectives as they are addressed by a DWR SWP divesture to the Contractors: 1) DWR would not need to finance SWP expenditures, 2)DWR would not need to maintain financial reserves for the SWP, 3) would obviate the need for simplified accounting with the Contractors, and 4)it would obviate the need for better coordination between DWR and the Contractors.

7-11, p1 "... the extent and nature of such indirect impacts are speculative and not analyzed further in this EIR." True, CEQA does not require in-depth analysis of future events which are unquantifiable, but it does require the disclosure of the likely outcomes of the indirect impacts of the project, or in this case, the No Project. As an example, it would be speculative to estimate the amount of service disruption that might occur in the event of delayed maintenance, but it is not speculative to identify and discuss that delayed maintenance would logically increase the frequency, duration and potential severity of service outages. These are logical and predictable (if unquantifiable) indirect effects of the No Project. The implications of increased frequency of service outages can then be discussed non-speculatively as we know that there are economic, social, environmental and human health and safety impacts from service outages. These implications of the project must be identified, qualitatively discussed and disclosed and just because these impacts cannot be quantified, does not make them speculative to the point that it is an excuse not to discuss or disclose them. The EIR must be revised to address this deficiency and the document recirculated for public comment.

7.4 - The list of alternatives does not identify the Proposed Project. Later in this section all of the alternatives except the Proposed Project are compared to the project objectives in an "Impact Analysis". It is an appropriate discussion to evaluate how well the alternatives meet the project objectives, but it is inappropriate to call this evaluation and "impact analysis". The document is inconsistent in that it does not make or disclose the evaluation of how well the Proposed Project meets the project objectives. This omission and inconsistent treatment of the alternatives must be corrected in a revised and recirculated EIR.

7.1.4.2 - This whole section makes no sense. The No Project does not have to satisfy the project objectives and the impacts of a project are not determined by how they affect the accomplishment of the project objectives. The No Project does have real and significant environmental consequences and they are not discussed at all here. In the absence of the analysis and disclosure of the environmental consequences of the alternatives, this EIR is incomplete and deficient.

7.1.4.2 " While it is uncertain how far beyond 2035 the Contracts would be extended under this alternative, the year 2085 was chosen for the Contract term (which is the same as the proposed project)." There is no supporting rationale provided for the assumption that the contracts would be extended for 50 years and the EIR seems to have chosen the expiration of the extended contract to coincide with the proposed project duration for the convenience of a more simplified EIR analysis rather than a reasoned and supported extension period. It would be much more reasonable to assume the extension would be for one year to allow for contract renewal negotiations to be completed rather than to assume that an expired contract is honored under the same terms for 50 additional years. The No Project definition must be revised to a more reasonable and supportable definition of only being extended one year and the EIR analysis must be revised.

7.1.4.2 Objective2 - The No Project is being compared to the Proposed Project. This is an inappropriate comparison as the required CEQA comparison is of all the alternatives, including the Proposed Project, to the No Project. The comparison provided in the EIR is backwards and must be revised to the required comparisons.

7.4.7.1. " Similar to the proposed project, Alternative 7 would not result in any direct physical environmental impacts because it would not would not create new water management measures or alter the existing authority to build new or modify existing facilities, or change water allocation provisions of the current Contracts." The EIR makes this assertion of no physical environmental impacts for the Proposed Project and the other alternatives many times in this document. In each instance, this assertion is wrong and fundamentally flawed as it ignores the on-going incremental impacts of continued SWP operations and water deliveries. In many comments submitted herein we have detailed many types of physical and environmental impacts of the continued water deliveries and SWP operations. Perhaps the most simple impact of continued operations to understand is that continued operations from the extended contract will continue water diversions that result in take of threatened and endangered species. This take, occurs with each increment of quantity of water that is delivered over time. It does not happen all at once, but it is incremental and is a very real physical consequence of the continued operation of the SWP that the EIR must address. The EIR must be revised to address environmental consequences of all of these on-going and incremental impacts and all of these erroneous claims of no physical impacts from continued operations must be removed from the revised and recirculated EIR.

7.4.7.2 - Although Contractors not signing the contract extension is not necessarily a desirable outcome from DWR's perspective, it is possible that none of the Contractors will agree to the contract extension. This very real possible scenario must be evaluated as an alternative outcome of the project. CEQA does not allow the dismissal of potential alternatives by the project proponent just because they are not desirable outcomes.

Table 7-2 - Again, the comparisons to the Proposed Project are incorrect. CEQA requires all alternatives, including the Proposed Project, to be compared to the No Project, not the other way around as the EIR consistently commits this error. The EIR must be revised and recirculate with the correct CEQA comparisons.
5.1.1 Methods of analysis - This section does not describe or disclose the analytical methods that were used in the EIR. It cites where significance criteria for CEQA come from and provides some financial background but does not give any information on the qualitative approach or quantitative tools utilized. It also fails to describe the process of analytical comparisons of the alternatives to the No Project. Perhaps this is why the EIR has gotten its comparisons backwards in so many places in the document. This section should have defined and justified the geographic area of potential project environmental impacts. This area is larger than the service area as there are upstream and downstream consequences to SWP operations - see related comments. This section must be revised as it is currently incomplete and does not fulfill the function of disclosure of the content that should reside under this section heading.
5.1.1.3 - "...the proposed project was determined to not cause a change in physical conditions; and therefore, no impacts would occur and no mitigation measures are proposed." There are on-going incremental impacts of continuing SWP operations and water deliveries that have real and significant physical environmental consequences - see related comments. This document is incomplete and deficient for not addressing these impacts.
5.1.1.3 - "The proposed project does not change hydrology, regulations, or climate change, all factors that could affect water supply delivery by the SWP." Actually it does in several ways. The irrigation in the SWP service areas changes the local air temperatures and humidity and published scientific papers have identified that these changes in air temperature and humidity from the SWP and CVP affect the amount of snowpack in the Sierras and precipitation as far as the Colorado River Basin. This was discussed in the BDCP EIS/R. The SWP additionally affect hydrology by its highly variable water supply deliveries which causes over-reliance on alternative groundwater supplies which has resulted in a severe subsidence that occurs in the SWP service area. The reduced groundwater table that is a consequence of the SWP deliveries (and inconsistency thereof) have altered the ground and surface water interactions in the service areas. In the 1960s surface flows of tributaries in and downstream of the SWP service areas were frequent and abundant due to the local water tables being close to the surface. Now with the depleted groundwater tables, any surface flows that would have occurred now are quickly absorbed by the lower groundwater tables. This impact on surface water hydrology is an indirect, but real consequence of the SWP water deliveries. The continued operations of the SWP also contribute to climate change from greenhouse gas emissions from Lake Oroville and the SWP other storage and conveyance facilities - see related comments. In a way, the project also changes regulations in that it is not compliant with the Delta Reform Act to reduce reliance upon delta water supplies. By perpetuating the reliance upon the delta water supplies at its current level and not being Delta Reform Act compliant, the project is affectively changing the regulation by ignoring it and perpetuating the non-compliant condition.
5.2 - The EIR discusses the impacts of the Proposed Project, but does not seem to address the other alternatives. It does not discuss the impacts as in a comparison to the No Project.
5.2.1.4 - The aesthetics analysis misses that there will be a visual impact from the degradation of farmland from accumulated salts from SWP water deliveries that will result in some areas during the proposed project period to result in the conversion of aesthetically pleasing farmland into ugly unfarmed and un-irrigated scrub brush. This is a significant impact and it is missing its mitigation.

5.2.2.4 - "Because the proposed project would not result in construction or modification of SWP facilities, it would not affect surrounding land uses or result in development that could conflict with zoning for agricultural or forestry uses or result in the loss or conversion of these resources. Further, because water allocation would not change, there would be no change in land uses associated with SWP deliveries including, conversion of agricultural land uses to urban uses or to nonagricultural use." This analysis is incomplete and flawed in that it ignores the impacts of the on-going salt accumulation in agricultural soils in the SWP service area that are a direct result of salt in water delivered by the SWP under the Water Supply Contracts. These salts affect the quality and yield of the crops grown which have economic and social impacts. In areas where salt accumulation is already a factor in the lands productivity, salt accumulation during the proposed project period will in some cases result in soil quality that is no longer farmable at all. The environmental setting description of farmland failed to identify that some of the farmland conversion that is happening now is due to salt accumulation and the continued deliveries of water supply with salts in them will continue to accelerate this trend. Not only does this impact of land conversion from salt accumulation change the designation of prime farmland to non-farmland which is a significant impact which must be mitigated, but it also affects minority and under-privileged populations of farm workers and county tax revenues and associated social services.

5.2.2.4 - Another consequence of the project to farmland is the overdraft of alternative groundwater supplies that result from the inconsistent water supply deliveries of the SWP. This reliance upon local groundwater when the SWP deliveries are low increases the salt accumulation of the soils as the water quality of the groundwater is almost always worse than the SWP water supplies delivered. The overdraft of the groundwater as a result of the inconsistent SWP deliveries has resulted in significant land subsidence in the SWP service areas. This subsidence has caused impacts to surface flows (another type of hydrology impact of the project that the EIR failed to identify, evaluate or mitigate), damaged infrastructure (roads and canal structures and flow capacity), groundwater pumping costs and well viability, and disrupted municipal groundwater supplies. The groundwater depletion from the inconsistent SWP deliveries also has upset the surface and groundwater hydraulic balance such that surface flows now quickly are depleted to groundwater recharge when before the SWP project was initiated, the surface and groundwater hydraulics were in balance and allowed sustained surface water flows. This causes a significant impact to surface water hydrology, water rights, water quality and habitat quality (i.e. no water equals no fish). The BOR Remand EIS agriculture section addressed the environmental consequences of the variability of the CVP water deliveries in detail and that content is incorporated by reference herein.

5.2.4.4 - The EIR claims there are no biological impacts from continuing operations of the SWP from the contract renewals. This is a very inaccurate conclusion as there are many impacts to fish, wildlife and habitat from the SWP operations and water deliveries. The south delta intakes for the SWP do not have criteria compliant fish screens and there is take of T&E species from the intake operations. The contract renewal continues the incremental take of these listed species. This is a significant impact that the SWP does not even have a legal permit to cover. Water quality violations in the delta from the SWP operations will also continue to adversely modify designated critical habitat for a number of listed species of fish. These adverse designated critical habitat alterations from the continued SWP operations include salinity, dissolved oxygen, water temperature, turbidity, mercury, selenium, toxic algal blooms, etc. These on-going adverse environmental impacts from the continued operations of the SWP from the contract renewals also include continued habitat quality degradation below Oroville dam for sediment and large woody debris depletion from capture of upstream contributions by Lake Oroville. The contract renewal will result in the continued genetic introgression of salmonid runs from continued blockage of upstream passage and from hatchery operations of Lake Oroville. Continued genetic introgression of salmonids between tributaries from straying of adults during immigration from altered water temperatures and flows from the operations of the SWP. The degraded groundwater table from the inconsistent SWP water deliveries affects surface water hydrology - see comments for agricultural resources. The SWP indirectly has eliminated sustained surface flows in and downstream of their service areas and the continuation of the SWP operations from the contract renewal will perpetuate this condition and continue to degrade habitat quality and convert habitat to different, lower value types, e.g. convert warm-water fisheries habitat to no fish habitat, convert riparian habitat to upland and desert habitat. There are other ongoing habitat and wildlife impacts from the contract renewal. The conversion of irrigated farmland to non-irrigated idled non-farmland from salt accumulation in SWP water deliveries - see ag impact comments - also changes terrestrial habitat quality, type and distribution.

5.2.5.4 - There would be ongoing and incremental cultural resource impacts from the contract renewals as the operations of Lake Oroville for the SWP result in water level fluctuations that erode and expose cultural sites in the fluctuation zone of the reservoir. These cultural resources are lost to erosion or theft from by the public visiting the reservoir. This is a significant impact of the contract renewal that was not identified, evaluated, disclosed or mitigated in the EIR.

5.2.6.4 - There may not be additional power requirements from the contract renewal, but the contract renewal results in the continuation of the power demand and grid load from the SWP operations.

5.2.7.4 - The Contract Renewal will result in the degradation of soil quality and erodability from salt accumulation from continued SWP water deliveries with a salt load - see ag section comments. Salt impacted soils defloculate and lose their cohesive properties which make them very susceptible to wind erosion which would be another significant soil resource impact which the EIR failed to identify, evaluate, disclose or mitigate.

5-77, p3 "Water applied in the western part of the San Joaquin Groundwater Basin for crop irrigation and wetland management via federal, State, and local water projects causes salts in the soil to be leached out of the soil (DWR 2013). Salt is purposefully leached below the root zone to maintain salt balance in the root zone, such that most leached salt ends up in the groundwater (Reclamation et al. 2013)." This is all true and correct and will continue to occur as an environmental consequence of continued irrigations from the SWP Contract Renewals. The entire EIR has missed this impact of the project even though it identifies this SWP impact in the environmental settings.

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October 13, 2014

Via Email to ted.alvarez@water.ca.gov
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State Water Project Analysis Office
Dept. of Water Resources
1416 Ninth Street, Room 1620
Sacramento, CA 95814

Re: Comments on the Notice of Preparation of an EIR for the "Water Supply Contract Extension Project."

Dear Mr. Alvarez:

Please see the attached comments submitted on behalf of the Central Delta Water Agency on the above-referenced matter.

Thank you for considering these comments and concerns.

Very truly yours,

Dante John Nomellini, Jr.
Attorney for the CDWA

Enclosure

Attachment to

Central Delta Water Agency's Comments on the Notice of Preparation of an EIR for the "Water Supply Contract Extension Project."

10/13/14

Our public scoping comments are organized into the following categories to address issues related to: contract duration, water supply contract amounts, relationship of the SWP contract renewals to the CVP/SWP Coordinated Operating Agreement (COA), federal nexus with the contract renewal project and need for federal agency involvement in the environmental review and subsequent permitting of the project, water-rights related issues, Notice of Preparation procedural errors, impact topics for the EIR to address, and funding issues.

Contract Duration:

1. **The proposed 70 year duration is extreme and incorporates too much future uncertainty.** Climate change was not anticipated in 1960s original contract development, but consideration of climate change is now a requirement of CEQA and NEPA and DWR has adopted protocols and standards for consideration of climate change for all of their projects. Sea level rise was also not anticipated in 1960s original contract development, but consideration is now a requirement of CEQA and NEPA and DWR has adopted protocols and standards for consideration of sea level rise for all of their projects. Subsidence of canals was anticipated in the original engineering of the SWP, but subsidence-caused loss of conveyance capacity over time and its affect on water supply deliveries was not accounted for in the original SWP water supply contracts, see "Contract Delivery Amounts, comment 10" below. Potential loss of conveyance capacity and system reliability from invasive mussel (e.g. quaga and zebra) colonization of the SWP pumps and canals was also not anticipated or included in the original SWP water supply contracts. There have been profound changes to demographics, industry water use, water demand, ground water depletions, water transfers and water market economics, crop types grown, crop production practices, geographic distribution of crop types grown and population geographic distribution changes that were not anticipated in the original SWP water supply contracts. State Water Project Bulletin 132-06, pg 4, "Some changes have occurred since the long-term water contracts were signed in the 1960s. These changes include population growth variations, differences in local use, local water conservation programs, and conjunctive-use programs." There are potential projects currently under consideration that would fundamentally alter the SWP infrastructure, e.g. BDCP and Sites Reservoir, which may or may not occur. Each of these above factors must be addressed in the SWP water supply contract renewal and each represent a significant amount of uncertainty in the magnitude of water supply impact. A shorter duration contract period, e.g. 30 years, must be evaluated so that the conditions under the contract period are more certain and predictable.
2. **The original contract period of 75 years was to provide a long duration of repayment on the original SWP construction cost.** The original SWP construction cost is scheduled to be repaid by the end of the original contract duration in 2035. Only smaller subsequent projects that extended the SWP after the original construction should be financed by bonds occurring later than 2035. Since the relative costs of these later SWP bond funded projects are much smaller

than the original SWP construction cost, the extreme 75 year duration of contract period is not warranted. The smaller subsequent SWP expansion costs can be funded by bonds of shorter duration, so a 30 year contract period (or shorter) also must be evaluated.

Contract Delivery Quantities:

1. **The SWP water supply delivery contract amounts must address how much water is spilled/leaked/evaporated in the SWP system.** The current SWP water supply delivery contract amounts do not address how much water is spilled/leaked/evaporated in the SWP system from the point of diversion to the point of water delivery in the SWP service area. "The July 1997 Journal American Water Works Association cites examples of more than 45 percent leakage." "DWR estimates that up to 700,000 acre-feet of leakage occurs in California each year from nonvisible leaks." (http://www.water.ca.gov/wateruseefficiency/leak/) Estimates range from 25-50% of the water diverted by the SWP is spilled, leaked and evaporated prior to delivery to service areas. This SWP rate of water loss results in unnecessary environmental impacts from increased quantities of water diversions and other impacts. This current SWP system loss also represents perhaps the largest single water conservation opportunity that exists in the state of California at this time. The structure of how the SWP water supply contracts are renewed must be changed so that the economic opportunities of reducing SWP water system losses are shared with the water contractors and service areas. The EIR must include alternatives which allocate SWP system water losses to the Service Area Contractors proportionate to the amount of water losses associated with their water delivery. As an example, service areas near the SWP water diversions would only share a small portion of the losses that occur from the point of diversion to the point of delivery while service areas at the farthest reaches of the SWP system would share proportionately more in the system losses in their water delivery contract amounts. With the current water contract structure and given the reported rates of SWP conveyance losses above, the environmental impacts from the SWP south delta water diversions for Southern California water contractors is as much as 45% higher per Acre Foot than for water contractors that take delivery near Tracy. In order to compensate for the disproportionate impacts per acre foot of water delivered between the near system and far system SWP water contractors, the water contract amounts must be for the quantity of water diverted by the SWP on behalf of the water contractor, not based on the quantity of water that is actually delivered. By making the water contract based on the amount diverted for each water contractor and on not the amount delivered, there will be motivation for the contractors and SWP to more aggressively address water losses that occur in the SWP. This is similar in concept to the project where Metropolitan Water District of Southern California (MWD) paid for system improvements to reduce water conveyances losses for Imperial Irrigation District and in return, MWD got an equivalent amount of water supply transferred to them for the water that was saved from loss in the IID conveyance system. If the water contractors pay to improve parts

of the SWP system and reduce their proportionate losses, then their effective amount of water supply goes up. This mechanism for water conservation and for equalizing the environmental impacts per acre foot of water delivered for the various water contractors is completely missing from the current water supply contracts and must be included in the EIR alternatives.

2. **Surplus water is not to become permanent demand.** Surplus water that has been delivered to water contractors from interrupted service or other causes must not be allowed to be incorporated into the contract renewal water supply contract delivery amount. Surplus water deliveries are growth inducing and this option must be dropped in the water supply contract renewals or the environmental impacts of this growth inducement must be evaluated, disclosed, and mitigated.
3. **The current contract allows use of excess capacity.** The use of excess capacity is growth inducing and encourages water transfers/sales arbitrage from northern to southern California. Excess capacity usage is growth inducing and this option must be dropped in the water supply contract renewals or the environmental impacts of this growth inducement and other environmental and beneficial use-related impacts must be evaluated, disclosed, and mitigated. Water transfer requirements allow "temporary transfers" of one year of duration or less to be exempt from CEQA. (Bulletin 160-93, The California Water Plan Update, October 1994) The SWP contract renewals must address the repeated use of one year transfers to side-step the CEQA requirements which circumvent the environmental review of impacts that occur from these repeated water transfers. The SWP contract renewal EIR must stipulate that any water transfer that is repeated for more than one year must undergo CEQA review, otherwise the SWP is precipitating impacts which have not been analyzed or disclosed and is in violation of CEQA.
4. **The original water supply contract provides no guarantee of water amounts in subsequent water supply contract renewals.** The DWR Proposed Project sets forth deliveries at the same as the existing contract amounts. Delivery amounts in the original and amended contracts were not guaranteed to be renewed in succeeding contracts. Because water supply amounts were not guaranteed in subsequent SWP contract renewals, the EIR must include alternatives that do not have the same water supply delivery amounts in the water supply contract renewals.
5. **DWR has failed to construct a SWP that ever was capable of meeting the current water supply contract amounts.** MWD Contract Amendment 1/1/2005, Article 1n "This recognition that full Annual Table A amounts will not be deliverable under all conditions does not change the obligations of the State under this contract, including but not limited to, the obligations to make all reasonable efforts to complete the project facilities, to perfect and protect water rights, and to allocate among contractors the supply available in any year, as set forth in Articles 6(b), 6(c), 16(b) and 18, in the manner and subject to the terms and conditions of those articles and this contract." MWD Contract Amendment 1/1/2005, Article 6c "State shall make all reasonable efforts consistent with sound fiscal policies, reasonable construction schedules, and proper operating procedures to complete the project facilities necessary for delivery of project water to the District in such manner and at such times that said delivery can commence in or before the

year specified in subdivision (a) of this article, and continue in the amounts designated in Table A." MWD Contract Amendment Article 16b – "The State shall make all reasonable efforts to perfect and protect water rights necessary for the System and for the satisfaction of water supply commitments under this contract." The reasonable efforts of the State have not resulted in the satisfaction of water supply as the SWP chronically under-delivers the current contract amounts. It is therefore "reasonable" that the delivery amounts committed to in the contract renewal should be an amount that the project can reasonably and consistently deliver. The SWP water supply contract renewal Table A amounts must revised down to levels that the currently constructed SWP system is capable of delivering so DWR is not consistently in violation of the terms of the agreement as it is under the current contracts as it is identified above.

6. **The SWP was never built out as originally authorized, so the original contract water supply delivery amounts cannot be supported.** The SWP plan was by the year 2000 to have developed projects in the North Coast sufficient to supplement flows into the Delta by 5 million acre feet annually. These projects were not constructed. As a result, SWP capacity falls short by an annual amount of at least 5 million acre feet thereby providing no firm yield and less than an adequate supply to meet water supply and water quality obligations in the Delta and other areas of origin. The future system capacity conditions under which the original water supply delivery contract entitlements were set were never fulfilled and this is why the SWP chronically under-delivers on its current water supply deliveries under the current contracts. The EIR must include alternatives that consider water supply delivery amounts less than the current contracts and be based on amounts the current and reasonably foreseeable future system can actually deliver.
7. **SWP Water Supply Contract "over-promising and under-delivering" causes groundwater over-drafting and subsidence.** "...drought conditions during 1976–77 and 1987–92, and drought conditions and regulatory reductions in surface-water deliveries during 2007–10, decreased surface-water availability, causing pumping to increase, water levels to decline, and renewed compaction. Land subsidence from this compaction has reduced freeboard and flow capacity of the Delta-Mendota Canal, the California Aqueduct, and other canals that deliver irrigation water and transport floodwater." (Pg 1, "Land Subsidence along the Delta-Mendota Canal in the Northern Part of the San Joaquin Valley, California, 2003–10", Michelle Sneed, Justin Brandt, and Mike Solt; Scientific Investigations Report 2013–5142.) Agricultural water users develop their water use demand based on more or less average annual water deliveries. In some years the level of water demand and the level of water delivery are not seriously divergent and in conflict and therefore reliance upon groundwater as an alternative water supply is not substantial. In drought years with significantly curtailed SWP water deliveries (like 2014 as an example), farmers are forced to make up SWP water delivery shortfalls with groundwater resources. This all too frequent practice has resulted in an increase in the rate of groundwater resource depletion and subsidence rather than a reduction in groundwater depletion and subsidence which the SWP implementation was supposed to accomplish. The only way the SWP

can avoid this impact from building up a water supply demand (over-promising) that it rarely fulfills (under-delivering) and the resulting groundwater over-draft-related impacts is for DWR to renew the SWP water supply delivery contracts for a substantially reduced amount of water such that the amount of water delivered in a drought year does not result in a groundwater withdrawal that exceeds the effective and sustainable groundwater recharge rate. Any greater water supply delivery promises by the SWP than what would exceed this balanced groundwater alternative water supply demand are inherently unsustainable and will result in significant groundwater and irreversible subsidence-related impacts. This balanced sustainable groundwater alternative water supply SWP delivery quantity must be included as an alternative in the EIR. This "sustainable groundwater alternative" SWP water delivery amount can be calculated for each SWP service area groundwater basin using the following generalized methodology. First, determine the current size (TAF) and annual groundwater recharge for each groundwater basin for the 82 year period of hydrologic record. Second, determine the safe and sustainable annual quantity of groundwater yield (including maximum rate of groundwater withdrawal without collapsing water bearing strata) in each basin. Now add the groundwater basin (with size, recharge rates and maximum sustainable rates of withdrawals) as a "reservoir" for each groundwater basin and SWP service area to CALSIM (or in a post processing module for analyzing CALSIM results). Next, using the 82 year period of record and the CALSIM model, optimize the amount of SWP water deliveries for each groundwater basin/SWP service area. Determine the amount of SWP water delivery that does not accrue into an over-draft of the groundwater basin at any time during the 82 year period of record. The maximum SWP delivery amount that does not result in over-drafting the groundwater in any year in the 82 year hydrologic period of record will be the maximum contract delivery amount for that groundwater basin and SWP service area for use in the "sustainable groundwater" EIR alternative.

8. **Water contract renewal supply amount alternatives must address the over-subscription of surface water supplies.** The EIR alternatives must include an amount of water delivery that reflects the current 5 time oversubscription of mean annual runoff and oversubscription of surface water supplies by 1000% of California's major river basins ("100 years of California's water rights system: patterns, trends and uncertainty", Theodore E Grantham and Joshua H Viers 2014 *Environ. Res. Lett.* 9 084012). DWR is a junior water rights holder and should not perpetuate the oversubscription of surface water rights. Based on this level of surface water right over-subscription and DWR's junior water rights, the EIR alternative must consider a contract amount that cuts back water supply deliveries to 10% or less of the current DWR water right to reflect the proportional amount of surface water supply that actually exist.
9. **The Water contract renewal supply amounts must not exceed what the SWP can "dependably" deliver.** MWD Contract Amendment 1/1/2005, Article 58 – "Determination of Dependable Annual Supply of Project Water to be Made Available by Existing Project Facilities" "This report will set forth, under a range of hydrologic conditions, estimates of overall delivery capability of the existing project facilities and of supply availability to each contractor in

accordance with other provisions of the contractors' contracts. The range of hydrologic conditions shall include the delivery capability in the driest year of record, the average over the historic extended dry cycle and the average over the long-term. The biennial report will also include, for each of the ten years immediately preceding the report, the total amount of project water delivered to all contractors and the amount of project water delivered to each contractor." Dictionary.com defines "dependable" as, "capable of being depended on; worthy of trust; reliable" and defines "reliable" as "able to be trusted; predictable or dependable" SWP water supply delivery quantities have not been predictable or reliable, are not depended or relied upon because the amount of SWP water deliveries chronically fall far short of the current contract amounts and therefore alternative water supplies must be regularly relied upon to compensate for the SWP delivery shortfalls. DWR must include alternatives in the EIR based on these reports for water delivery quantities that were determined to be "dependable". Methods to calculate the water delivery amounts that are dependable should include the bottom quartile of last 10 years of deliveries or 75% probability of exceedance whichever is less (which would be more conservative from a standpoint of water supply dependability). Another method to identify this "dependable" water supply delivery amount is to look at the operational record of the SWP and identify the lowest water delivery which occurred since the start of SWP operations. This SWP historical water delivery operational record for dependable water supply delivery amount must be adjusted to reflect the current OCAP BO, D1641 and Wanger Remand operating criteria. The SWP has not demonstrated that it can dependably deliver even that lowest amount of water, so lower amounts and even no deliveries except in above normal and wet years must also be included as project contract delivery alternatives.

10. **The SWP conveyance capacity has changed since the original water supply contract.** Subsidence from groundwater overdraft (caused by SWP under-deliveries, see Contract Delivery Quantities, comment 1) has reduced the conveyance capacity of large portions of the SWP canal system. "The overall length of the Central Valley portion of the canal is 280 miles (450 km) with 200 miles (320 km) in areas of significant subsidence." "LAND SUBSIDENCE AND THE CALIFORNIA STATE WATER PROJECT" Clifford V. Lucas and Laurence B. James, California Department of Water Resources, Sacramento, California, Publication n°121 of the International Association of Hydrological Sciences Proceedings of the Anaheim Symposium, December 1976. If subsidence continues at its current pace (it is reasonable to assume it will as a continuation of current policies and practices), large sections of the aqueduct will no longer be viable (based on engineering, maintenance, and economics) to be raised to compensate for subsidence. The proposed contract duration and proposed water delivery quantities must take into account the current reduced capacities as compared to the original capacities and contracted water delivery quantities as well as incorporate reductions in future water delivery quantities that match with future reductions in water delivery capacity from further future subsidence impairment of the conveyance capacities.

11. **The Bay Delta Conservation Plan would alter SWP operations and water contract delivery capacities.** The SWP water supply contract renewal EIR must include alternatives for each of the water supply delivery amounts that would result from the implementation of any of the current BDCP alternatives. If this EIR does not include those alternative delivery amounts that would result from the implementation of the BDCP, the environmental impacts of the contract renewals will not be disclosed and would be piece-mealed which is in violation of both NEPA and CEQA legal requirements.

12. **Restoration of Original Standard Contract Provisions.** Restoration of the standard provisions and recovery of the Kern Water Bank should be considered as a separate alternative. Contractors should not be allowed to take Article 21 water unless they have first utilized (not transferred) Table A entitlements. Article 21 water should not be allowed to support permanent demand. Water contractors should not be allowed to profit from sale, transfer, lease or in any other manner from project water.

SWP/CVP Coordinated Operating Agreement (COA):
Coordinated CVP/SWP operations, funding and water deliveries are based on the COA. The COA is grossly out of date and has not been updated since 1986. Since funding and water supply deliveries are dependent upon the COA and water supply and funding are part of the SWP water supply contract renewals, the COA must be updated as part of the scope of the SWP water supply contract renewals project. If the COA is updated independently of this project, then the SWP Contracts would have to be amended and an environmental impact of those changes in water deliveries and operations evaluated. If this EIR does not include the COA update and the resulting adjustments made to SWP delivery amounts the contract renewal impacts will not be fully disclosed and this would result in piece-mealing the environmental impacts of the contract renewals which is in violation of both NEPA and CEQA legal requirements.

Federal Nexus of the SWP Contract Renewals:
There are several federal nexus' for the SWP contract renewal including coordinated SWP water delivery operations with the CVP, joint facilities with the CVP, operational interties and water supply exchanges, and funding through bonds issued under the Central Valley Project Act (CVPA). These federal nexus with the SWP water contract renewal all provide sufficient cause for the environmental review to comply with federal Environmental Impact Statement requirements. The project environmental document must therefore also include an EIS and appropriate federal lead agencies.

1. The COA provides a federal nexus for the SWP water supply contract renewal as any SWP changes in water deliveries will affect CVP operations and water deliveries and visa versa. Because the SWP contract renewal impacts the CVP operations and water deliveries and visa versa, Reclamation must be a lead federal agency on the EIS component of the SWP contract renewal environmental review. The proposed changes to the SWP contracts will likely require a change in the COA necessitating federal action.
2. Changes in SWP water supply deliveries and on-going impacts of continuing current water deliveries have impacts on federal listed species, so USFWS and NMFS should also be federal lead agencies for the EIS.

3. San Luis Reservoir is a joint SWP/CVP facility and is an integral facility of the SWP water contract deliveries. Any changes in SWP operations or deliveries would affect San Luis Reservoir operations, costs, available storage capacity and environmental impacts. Reciprocally, any changes in CVP operations relative to San Luis Reservoir also affect the SWP water deliveries and costs.
4. SWP and CVP current and planned reasonably foreseeable interties and their affects on operations and water supplies also establish a federal nexus for the SWP contract renewal.
5. Some of the water bonds for facilities used in SWP water deliveries were issued under the CVPA. See MWD Contract Amendment 1/1/2005, Article 28e. This SWP funding through a federal project also creates a federal nexus that triggers the requirement for an EIS component to the SWP contract renewal environmental review.
6. The Agreement In Principle (AIP) Concerning Extension of SWP Water Supply Contracts, is DWR's Proposed Project for the SWP water contract renewal. AIP article XIV, dated June 18, 2014 says that, "...Contractor participation in the BDCP and DHCCP will be addressed through a separate public negotiation and environmental review process to develop appropriate SWP water supply contract amendments." (Emphasis added) The BDCP is a joint federal and state project, so this joint federal and state negotiation with SWP water contractors for the SWP water contract renewals is a clear federal nexus for the SWP contract renewal project. The AIP proposed method of addressing these negotiations as an amendment to the SWP water contracts is clearly an attempt to piece-meal the environmental impacts of the water contract renewal. Piece-mealing of environmental impacts by proposing to do a contract amendment concurrently with the contract renewal is against CEQA and NEPA regulations.

SWP Water Rights:
DWR water rights are subordinate to senior rights and conditioned on compliance with statutory requirements as well as permit conditions. The SWP, as a junior water rights holder is not allowed to impair the water quality or quantity of the senior water rights holders from the operational impacts of their diversions.

"Area of Origin Statutes during the years when California's two largest water projects, the Central Valley Project and State Water Project, were being developed, area of origin legislation was enacted to protect local Northern California supplies from being depleted as a result of the projects. County of origin statutes provide for the reservation of water supplies for counties in which the water originates when, in the judgment of the State Water Resources Control Board, an application for the assignment or release from priority of State water right filings will deprive the county of water necessary for its present and future development. Watershed protection statutes are provisions which require that the construction and operation of elements of the Federal Central Valley Project and the State Water Project not deprive the watershed, or area where water originates, or immediately adjacent areas which can be conveniently supplied with water, of the prior right to water reasonably required to supply the present or future beneficial needs of the watershed area or any of its inhabitants or property owners.

The Delta Protection Act of 1959 declares that the maintenance of an adequate water supply in the Delta--to maintain and expand agriculture, industry, urban, and recreational development in the Delta area and provide a common source of fresh water for export to areas of water deficiency--is necessary for the peace, health, safety, and welfare of the people of the State, subject to the County of Origin and Watershed Protection laws. The act requires the State Water Project and the federal CVP to provide an adequate water supply for water users in the Delta through salinity control or through substitute supplies in lieu of salinity control.

In 1984, additional area of origin protections were enacted covering the Sacramento, Mokelumne, Calaveras, and San Joaquin rivers; the combined Truckee, Carson, and Walker rivers; and Mono Lake. The protections prohibit the export of ground water from the combined Sacramento River and Sacramento-San Joaquin Delta basins, unless the export is in compliance with local ground water plans. Also, Water Code Section 1245 holds municipalities liable for economic damages resulting from their diversion of water from a watershed." (http://www.waterplan.water.ca.gov/previous/b160-93/b160-93v1/ifrmwk.cfm)

DWR is not compliant with their junior water rights requirements as the SWP operations frequently impair Delta water quality and take non-surplus water from the Delta in violation of the Delta Protection Act of 1959 (among other laws and regulations). Transfers of water supplies through the SWP from conjunctive use of groundwater substitution for surface water supplies are not consistent with local groundwater plans. Water contractors supplied through the SWP are liable for any direct or indirect damages from diverting water from a watershed. These damages may include injury, damage, destruction or decrease in value of any such property, business, trade, profession or occupation resulting from or caused by the taking of any such lands or waters, or by the taking, diverting or transporting of water from such watershed. (Water Code 1245)

The SWP Water Supply Contract Renewal EIR must consider the water supply, water rights, water quality impairments and other water beneficial use impacts associated with the continuation of SWP diversions of south delta water. The conditions of waters in the delta including direction of flows, water quality and impacts to agriculture, drinking water supplies and fisheries resources are a direct consequence of the SWP south delta facilities water diversions.

Notice of Preparation (NOP) Procedural Errors:

There are several procedural, noticing, timing and availability issues with the NOP.

1. The original NOP link to the proposed project description was broken and unavailable in the original publication. DWR e-mailed out a revised NOP to a few selected recipients, but did not republish the corrected NOP in the newspapers. This means that general public was never given the opportunity to review the proposed project description and only the few members of the public that DWR selected were given the corrected link to the proposed project.
2. By not putting the proposed project description in the NOP and instead relying upon a (broken) link to a website, DWR denied access to review the proposed project description to any member of the public that does not have ready access to a computer. This biases the public participation process against the more disadvantaged public. This is a public participation and environmental justice issue that DWR must address by reissuing a complete NOP that includes the proposed project description.
3. DWR only provided two business days between the revised NOP e-mail and the public scoping meeting. This is an inadequate amount of time for the public (those few who received the corrected NOP e-mail) to review the proposed project prior to the public scoping meeting. Two business days is not adequate public notice to review a project and another more reasonably scheduled public scoping meeting must be held, e.g. one month from the date of revised

newspaper publishing of the NOP would be a reasonable amount of notice to the public to attend the scoping meeting.

4. Thirteen business days (excluding Columbus Day holiday) is an insufficient amount of time from the public scoping meeting to the close of public scoping comment period to complete the review of the proposed project and all the relevant related materials, e.g. current SWP contracts (27 + a hundred or so amendments), climate change and sea-level rise documents related to the SWP water contract deliveries, CVP/SWP Coordinated Operating Agreement, groundwater overdraft and subsidence, original SWP authorizations, SWP phase II plans that were never completed and their system capacity implications, and other projects which could affect the SWP contracts such as the BDCP and intertie projects, etc. The pertinent documents to review to provide informed public scoping comments total in the thousands of pages. The proposed project is for a 75 year duration, so surely the public should be given more than thirteen business days to make scoping comments. After DWR issues the revised NOP (per the preceding comments) and holds a new Public Scoping Meeting(s), DWR should allow at least one full month after the meetings for the development of public scoping comments.

Impact Analysis Topics:
The SWP contract renewal EIR must address the entire scope of impacts from on-going water deliveries, including, but not limited to: salt accumulation, soils productivity, groundwater quality degradation, groundwater saltwater intrusion, groundwater overdraft, groundwater recharge rates, changes in groundwater pumping costs and economic impacts, changes in direction or magnitude of groundwater hydraulic gradient, subsidence, subsidence impacts to infrastructure, discharge water quality, additional raw and discharge water treatment and economic impacts, surface and groundwater beneficial uses of water, surface water quality degradation, growth inducement from use of SWP excess capacity, terrestrial and aquatic species, creation of wetland habitat at locations of canal leaks and loss of this habitat when leaks are fixed, contribution to groundwater recharge from canal leaks, reservoir fisheries and fish populations upstream of terminal dams, reservoir drawdown impacts on warmwater fish reproductive success rates and population sustainability, impacts of carryover water storage drawdown on warmwater fisheries, and on-going degradation of fish population genetic integrity.

Significance Criteria:
The EIR must use a full range of significance criteria which are consistent with DWR's use in other similar environmental documents. These similar environmental documents which DWR should use the superset of significance criteria from include: South Delta Improvement Program, Monterey Accord, Oroville Relicensing, CALFED, and BDCP. To use anything less than the synthesis of the significance criteria from these recent and similar projects would be an inconsistent application of policy, procedure and science.

On-Going Impacts of the SWP Operations and Environmental Compliance:
The SWP contract renewal will result in the continuation of the water delivery operations of the SWP. SWP water delivery operations have current and on-going environmental impacts which must be identified, characterized, evaluated, quantified, mitigated and disclosed in the EIR, see "Impact Analysis Topics" comments above. Current and on-going impacts of the operations of the CVP/SWP are covered by the current FWS and NMFS OCAP Biological Opinions (BO) compliance for on-going impacts of the SWP. As part of the Environmental Setting of the EIR, the document must include an accounting of the SWP and DWR compliance with the Reasonable and Prudent Actions (RPAs) that are legal requirements of the current OCAP BOs. The BO RPAs have many deadlines for submittal of letters of intent and

communications, studies, reports, plans, pilot projects, facilities and operational implementations for and to FWS and NMFS. Most of these deadlines have already past and it is relevant to the renewal of SWP contracts to disclose the status of OCAP BO RPA compliance as this compliance is the basis for DWR being able to continue to operate the SWP without causing jeopardy for several ESA species. If DWR and the SWP are not compliant with the current OCAP BO RPAs, then the contracts must not be renewed for their current contract amounts until compliance has been achieved, because the current level of water operations requires the implementation of the BO RPAs in order to avoid a jeopardy impact call on endangered species from the SWP operations. Alternatively, substantially reduced contract delivery amounts in the SWP contract renewal could contribute considerably to compliance with the BO RPA intent as water operations impacts on endangered species would be significantly reduced. This reduced water delivery contract amount approach to BO compliance would require a new OCAP BO to be issued.

The SWP Over-Estimates Net Delta Outflows:
SWP operations and resulting water delivery amounts are often constrained by net delta outflow requirements. The Net Delta Outflow Index (NDOI) that the SWP and CVP are currently using is grossly over-reporting net delta outflow so water supply deliveries are currently higher than the current operating requirements of the SWP should result in. The EIR must include an evaluation of the accuracy of the Delta Net Outflow Index accuracy and an adjustment for the water supply delivery quantities that would result from correctly adhering to the operational constraints of the SWP from Delta Net Outflow Index requirements. "While the NDOI is, at best, an estimate of Delta outflow, there are stations that accurately measure actual Delta outflow. The United States Geological Survey (USGS) has established a series of stations in the Delta to measure flow and water quality parameters." "Four of the USGS gaging stations... accurately measure Net Delta Outflow (NDO)." (*"The Case of the Missing Delta Outflow"*, California Sportfishing Protection Alliance) DWR's own analysis of NDOI ("Dayflow") estimates vs. the new more accurate USGS gage measurements concludes that the "Dayflow under estimates flow during wet periods and over estimates flow during dry periods." (http://www.water.ca.gov/dayflow/docs/2013_Comments.pdf) This DWR report means that during the majority of the SWP diversion season (spring through fall), DWR systematically over estimates NDOI and systematically diverts more water than regulatory operational constraints would allow if NDO was correctly accounted for. This regular exceedance of regulatory constraints on the SWP operations must be evaluated in the SWP contract renewal EIR and contract water supply delivery amount alternatives must include amounts that would not result in the SWP violation of these operational requirements.

The Bay Delta Conservation Plan (BDCP) is not "reasonably foreseeable":
The BDCP has not even completed the public draft and is not approved or funded, so the BDCP does not meet the test of being reasonably foreseeable and cannot be included in the Existing Condition, the No Project or cumulative alternatives in the EIR.

Project Funding:
In addition to the proposed project, "pay as you go" after 2035, the SWP Contract Renewal EIR must also evaluate continuation of the existing funding methodology. None of the funding from this project or bonds issued related to it should be used to fund any water system improvements or conservation efforts in any way related to the BDCP project and efforts.

Letter 6 California Water Impact Network/California Sportfishing Protection Alliance/AquAlliance

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October 15, 2016

Ted Alvarez
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emailed to: watercontractextension@water.ca.gov

Subject: Comments on DEIR for Water Supply Extension Contract Project

Dear Mr. Alvarez;

We appreciate the opportunity to comment on the proposed SWP contract extension project that includes amending certain provisions of the State Water Resources Development System (SWRDS) Water Supply Contracts (SWP Contracts) to among other things, extend the term of the contracts.

1. CEQA and the Definition of the Project: We believe the entire SWP contract must be included in CEQA analysis.

The Project as defined by DWR is to extend the full SWP contracts for 50 years while conducting an environmental review on only the financial sections of the contract. This is a blatant violation of CEQA as it leaves the bulk of the contract intact but without analysis of the potential consequences to the environment of extending the existing contractual obligations. Thus the proposed Project is not properly defined. This piece-meal approach is a direct violation of CEQA. *The potential consequences can only be evaluated in the context of some proposed project. The urgency for extending the contracts now is not well justified in the DEIR. The only project that would require the extensions at this early date is the Twin Tunnels (BDCP_DHCCP_CWF). That is because the construction is estimated to begin in 2020 and the period of construction is estimated to take at least 15 years; hence, the extended contracts must be in place by 2020 well before the 2035 expiration of the existing contracts. No other project on the horizon requires such early action.*

While implying that the only contract change of consequence is financial, DWR proceeds to propose one significant change to the content of the contract. That is the elimination of Article 1, (hh). This is the section of the original contracts that names the projects authorized for construction. There is no mention of Tunnels in this list. The Contract Extension Project proposes to delete the one clause that limits the extent of Delta Transfer Facilities that could be pursued after 1987. We believe Article 1 (hh) was deleted to allow the Tunnels, and anything else DWR might want to build.

The original contracts were signed beginning in 1965 before the California Environmental

Quality Act became law in 1972. A lot has changed since then. The original contracts begin to expire in 2035. The proposed extension will push the date for the contract's expiration to 2085. *The existing contracts include a take-or-pay requirement that presumably would remain if they were simply extended now. "Take-or-Pay" means that the contractor must pay all the fixed costs whether any water is delivered or not. Without the take-or-pay provision large capital investments in the SWP would be difficult to finance in the bond market. It seems that the necessity of extending the contracts now is to keep intact the take-or-pay provisions.* Examining only the financial sections of the existing contracts cannot possibly responsibly determine what the environmental consequences might be*, especially without any idea of proposed projects*. This runs afoul of CEQA's requirements that the project should encompass the whole of the action.

Change of Circumstance--Changes the Definition of the Project:
The SWP as envision some 54 years ago has changed. Any environmental review of the contracts for this project must recognize these changes. For example, there is no justification for including the original contract amounts for the full Table A. The water for these allocations can never be delivered because they simply do not exist. Climate changes, legal changes including the protection of the North Coast Rivers, under both Federal and State law, and the voters' rejection of the Peripheral Canal all have redefined the SWP and the alleged contract amounts. The Contract Table A Allocations must be refigured to reflect this.

For a major contract extension such as is being proposed, a full analysis of actual water supply available to the SWP must be completed. Prudence requires that the amounts of water assigned reflect what is really available if the SWP were operated on a "safe yield" basis. (Please refer to The Santa Barbara Report Appendix B included as Attachment 1)

This must entail a thorough analysis of how much water is actually in the Delta watershed and is legally available to the SWP taking into consideration both the Public Trust Doctrine and Senior Water Rights law. (See Attached C-WIN Quantification Analysis included as Attachment 2) The SWP was originally premised on promises to protect Areas of Origin and Senior Water Rights holders and to take only "surplus" water that would not affect the rights of those from where the water originated.

Water allocated under existing contracts has already had significant environmental repercussions as we have seen with the Pelagic Organism Decline (POD), the continued decline of the three runs of salmon and the Delta smelt as well as other listed species. Extending the contracts and continuing the full Table A Allocations without any environmental review for 50 years beyond 2035 will have considerable impacts. This is a clear violation of CEQA and the Endangered Species Act.

On its face, this attempt to extend only the financial obligations of the SWP contracts to 2085 appears to be solely for the purpose of being able to finance the proposed Twin Tunnel Project that is now winding its way, with much controversy, through the various permit processes. Ratepayers ought to be allowed to vote on such a major change in their land based charges, property taxes and water rates and to have transparency regarding what projects are included in this 50 year extension and obligation of payments. Full disclosure demands a complete listing of all the projects proposed to be financed by this extension.

2. Extension of the Contracts allows for any large project, including the Twin Tunnels that DWR

wishes to pursue.

Although the DEIR claims that the WaterFix is “separate and independent” from the proposed project, it is clear that the WaterFix could not move forward without the completion of this contract extension. *It is doubtful that the Twin Tunnels with its extremely large capital cost and with little quantified benefit would pass muster in the bond market without the take-or-pay provision.* There is no language in the DEIR that promises a vote to opt out for/by each Contractor on large projects like the Twin Tunnels or to allow each Contractor to decide on the merits of each project as proposed in the future.

The DEIR discusses the Monterey Amendments and at 6.1.2, the Cumulative Impacts Analysis, says, “The proposed project would not affect the provisions of the Monterey Amendments specific to water allocations and water management measures or amendments that may be added to allocate costs for the California WaterFix should it be approved.” What does this mean exactly? On its face, it seems to mean that if the proposed Contract Extension Project was approved, there would be no way for any existing Contractor to get out of paying

The current SWP Contracts are not uniform as both Plumas County FC&WCD and the Empire West Side ID did not sign the Monterey Amendments and DWR honored the original contracts that they signed without a problem.

3. DWR claims that contractors would forfeit their Table A allocation if they refuse to acquiesce to the contract extensions: On what basis is this threat made? SWP Contractors and ratepayers originally anticipated their financial obligations would be met by 2035. Now DWR is suggesting these contractors must encumber their ratepayers and property taxpayers for another 50 years for some "hidden" non disclosed list of projects? How can decision makers possibly know if this is the least environmentally damaging alternative without full disclosure of what they are buying with this 50 year financial obligation?

The Executive Summary and DEIR Alternative 7 looks at what would happen if not all the Contractors sign the Project Extension and goes on to suggest veiled threats that if a Contractor chooses not to sign, they may have their water deliveries cut off at the expiration of their current contract. There is no mention in the Executive Summary or DEIR Alternative 7 about Article 4 of the current contracts, very germane to this issue. So long as a Contractor submits an Article 4 letter 6 months before his contract is to expire, DWR **must honor** the request to extend the Contract. Why is DWR threatening to cut off a Contractor’s water service? The DEIR analysis in Alternative 7 is dishonest and threatening.

Article 4 of the existing contracts states that by written notice to DWR at least 6 months prior to the expiration date of the Contract, **the Contractor can elect to receive continued service after the expiration of the term under the following conditions unless otherwise agreed to:**

(1) service of water in annual amounts up to and including the Contractor’s maximum annual Table A amount;
(2) service of water at no greater cost to the Contractor than would have been the case had the Contract continued in effect;
(3) service of water under the same physical conditions of service, including time, place, amount and rate of delivery;

(4) retention of the same chemical quality objective provision;
(5) retention of the same options to use the SWP transportation facilities as provided in Articles 18© and 55, as applicable.

The Monterey Amendments to the SWP contracts set an important precedent for non-conformity in the Contracts. According to the DEIR, Plumas County FC&WCD and the Empire West Side ID did not sign the Monterey Amendments yet these two SWP Contractors "continue to receive, without threat, SWP water from DWR in accordance with the Contracts in effect before the Monterey Amendments.

4. The financial consequences and environmental impacts to local agencies from the Contract Extension Project have not been disclosed:

Language in the existing Contracts gives DWR the authority to build new facilities or modify existing facilities as stipulated without a financial constraint imposed by the current 2035 term of the contract. *Without the contract extensions any proposed project would face the constraint of the viability of floating a revenue bond without a take-or-pay provision.* According to the DEIR, Article 51 of the current contracts stipulates that, "DWR may submit supplemental bills to the Contractors if necessary to meet unanticipated costs for revenue bond debt service and coverage, which are chargeable to the Contractors." This has already impacted individual contractors, especially the 27 smaller ones. These 27 contractors hold only 25% of the total voting power of the SWP, with the Metropolitan Water District having a 50% share and Kern County Water Agency, 25%. Since the SWP contractors are obligated to pay even if they receive little or no water under Table A, the possibility of financial peril for all smaller contractors is very evident if the Twin Tunnels' price tag, $20 billion to $38 billion is financed. (See the Exhibit 1, the SB Report Appendix A attached). With a large percentage of local budgets earmarked to pay SWP costs, the smaller contractors already have deferred needed maintenance, and abandoned some conservation efforts such wastewater recycling for lack of funds.

Without the Contract Extension proposed here, it is unlikely that the tunnels would be able to obtain the financing needed to move forward. So to extend the existing contracts for 50 years beyond their current term opens up considerably more potential debt risk that could be thrust on the contractors even if they didn't want or need the project being proposed.

Sincerely,

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THE UNAFFORDABLE AND UNSUSTAINABLE TWIN TUNNELS:

WHY THE SANTA BARBARA EXPERIENCE MATTERS

Photo credit: Kenji Photography

Report by:

California Water Impact Network (C-WIN)
http://www.c-win.org

JULY 2016

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The California Water Impact Network's Mission Statement:

The California Water Impact Network is a non-profit, tax exempt California Corporation that advocates for the just and environmentally sustainable use of California's water, including in-stream flows and groundwater reserves, through research, planning, public education, media outreach, and litigation.

PURPOSE OF THIS REPORT

1. Examine the deficiencies and cost impacts of Governor Brown's Twin Tunnels/CA WaterFix, illustrating the untenable financial burden these proposals place on local water agencies and ratepayers;

2. Highlight that the Tunnels/CA WaterFix will not provide more water when needed, i.e., during drought;

3. Explain the unintended consequences of participation in the State Water Project (SWP) utilizing the experience of Santa Barbara County as an example of the statewide problem;

4. Highlight the exorbitant cost and unreliability of importing water from the State Water Project (SWP) to the communities of Santa Barbara's South Coast.

This report was prepared by Carolee Krieger and Arve Sjovold with the assistance of Joan Wells, Beno Budgor and Georgia Strickland. The California Water Impact Network (C-WIN) obtained data on cost, usage, and fiscal indicators to evaluate the performance of the SWP. C-WIN has used public information obtained from the Central Coast Water Authority (the county's manager of SWP water) and its constituent water agencies for its information. Some data was obtained through requests under the California Public Records Act. Much of the data is available through CCWA and its member agency websites.

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EXECUTIVE SUMMARY

I. WHAT IS THE TWIN TUNNELS/CAWATERFIX PROJECT?

Twin Tunnels/CA WaterFix Proposal: Governor Brown has proposed twin trans-Delta tunnels, each 40 feet in diameter, 35 miles long and buried 150 feet deep, running from the lower Sacramento River to Modesto. Bypassing the San Francisco Bay/Delta, they are intended to move water south "more efficiently" to corporate agricultural water districts in the western San Joaquin Valley and urban southern California water agencies who are beneficiaries of and contractors to the State Water Project (SWP) and the Central Valley Project (CVP). This includes the largest SWP contractor, the Metropolitan Water District of Southern California. There is no clear plan for financing the Tunnels. The administration and its supporters intend to build them without a vote of the people who must pay for them, the ratepayers of the State Water Project (SWP) and the Central Valley Project (CVP).

As of the date of this report, DWR has acknowledged that engineering for the project is only 10% complete and that an additional 3 years and $1.2 billion is needed just to complete the planning. On top of what is needed to complete the planning, construction costs are estimated at $20 billion to $38 billion, according to analysis by ECONorthwest (see Appendix A). The annual cost burden to the contractors will reflect the amortization of the construction costs plus annual operations and maintenance, presumably under the terms of the SWP contracts. The project has not defined quantitatively any of the purported benefits in terms of expected additional water deliveries. In fact, if there is to be additional water from the project it is not certain where it is to be delivered.

The water purveyors in Santa Barbara County are concerned about these two aspects of the proposed project: additional costs to SWP contractors and no clear statement as to how they are to be benefited. The microcosm of the Santa Barbara experience serves as a red flag warning for all Southern California SWP contractors and their customers.

Concerning the affordability of the project, the introduction to the section of the Bay Delta Conservation Plan/ CA WaterFix, *Economic Benefits and Financing Strategies, (March 2012)* [for the CA WaterFix Tunnels], it states:

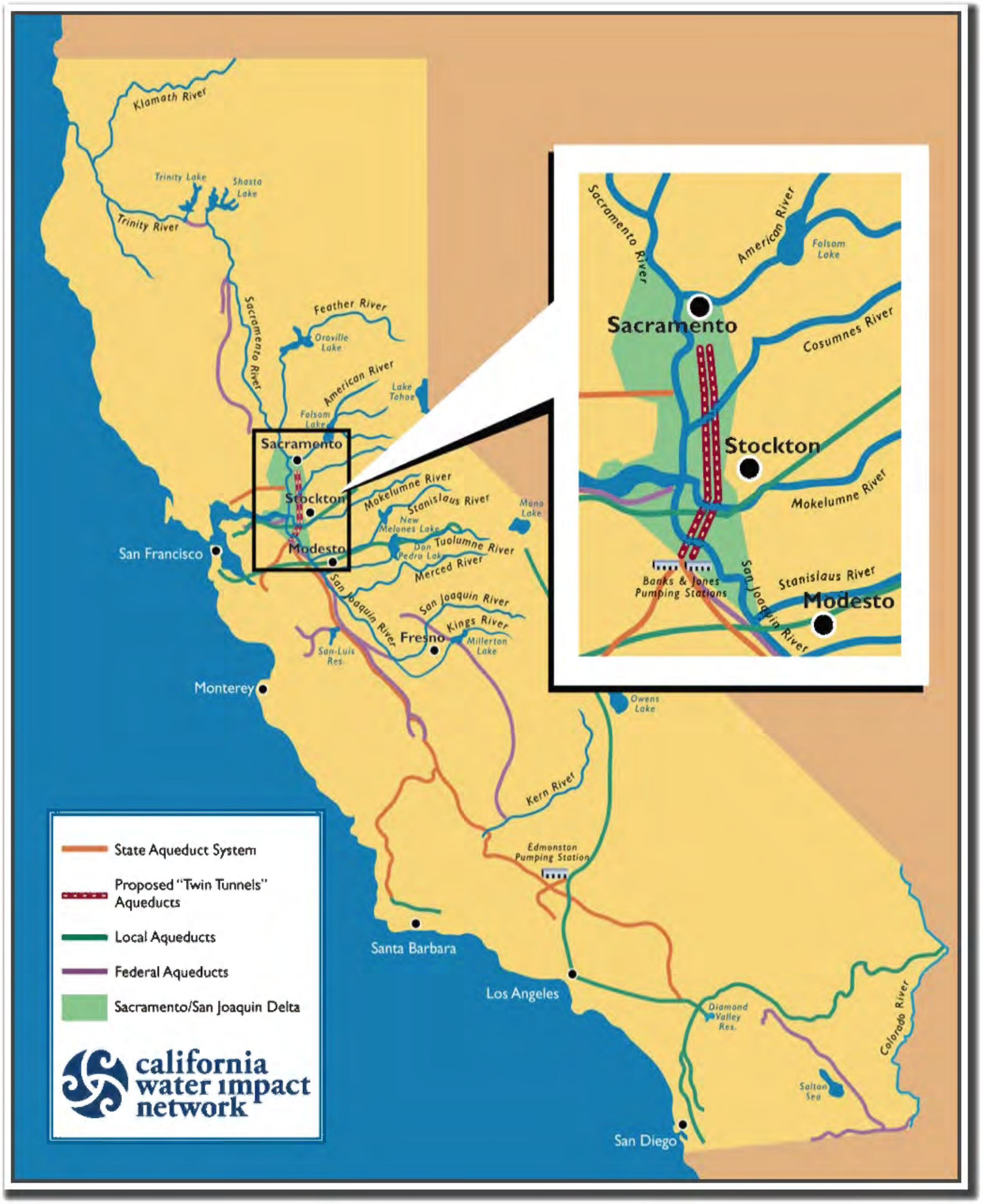
> *"California's investment need is relatively modest compared to the size of the economy. California is the 8th largest economy in the world with an annual Gross Domestic Product of $1.9 trillion. Investments for Ecosystem Restoration and Water Supply Reliability are also relatively small compared to current annual expenditures. Approximately $20 to $30 billion is spent annually for water services and water related programs. Water rates are lower than other household utility costs. Average monthly household water and wastewater rates are less than average costs for other utilities such as electricity, cable/satellite, cell phone... California's investment need is substantial, but well within the capacity of California."*

The situation in Santa Barbara County in general, and the South Coast of Santa Barbara County in particular, do not fit this rosy picture of affordability. In this report we analyze the current problems with affordability of SWP and what the difficulties would be with the addition of the Twin Tunnels project. We have also analyzed the Sacramento River hydrology to assess the likelihood of more reliable deliveries from the SWP due to this project. These are our conclusions.

- **The Twin Tunnels project promises more debt and no additional water to the South Coast districts.**
- **The South Coast districts are already at their limits for absorbing new debt and cannot afford more.**
- **Current South Coast debt burdens are now crowding out budget expenditures for needed infrastructure and maintenance.**
- **SWP water deliveries have never been reliable for the South Coast, especially in droughts and the Twin Tunnels project promises no relief from that circumstance.**

Each of these conclusions follows from the detailed, quantitative analyses in the body of the report. We start with the economic challenges that the water districts presently face with the current SWP debt burdens. We have examined each of the South Coast districts budget details and how they are meeting their financial obligations. We also examined the difficulties of providing water deliveries to their customers with a strong focus on the current drought and the failure of the SWP. The difficulties of the SWP in providing reliable deliveries is revealed in a thorough examination of the Sacramento River hydrology (Appendix B) where it is shown that the droughts are the determining factor in why the SWP demonstrates such poor reliability, while the Bay Delta Conservation Plan/CA WaterFix deals almost entirely with the capability of the Twin Tunnels to capture more water during wet periods. Then we examine the likely cost impacts of the proposed Twin Tunnels project, based on the meager information available on its estimated construction costs, and how those costs when allocated to SWP contractors will affect water district budgets.

We conclude by finding that for Santa Barbara's South Coast purveyors the cost/benefit analysis cannot justify the Tunnels construction. By analysis, the construction of the Tunnels could result in vast economic hardship and financial turmoil for agencies and ratepayers, financial resources that can be applied to construction and delivery of more reliable sources of water such as treated wastewater and desalination.



Map 1: Proposed Twin Tunnels route

THE SANTA BARBARA EXPERIENCE

I. OVERVIEW

History of SWP and South Coast Santa Barbara County

The costs of bringing SWP water to Santa Barbara County were not accurately disclosed in 1991 when voters approved the project. The reliability and delivered amounts of SWP water have been much less than originally promised in 1991. Prior to that election, the state's estimate of the total cost to ratepayers for construction of the Coastal Aqueduct was **$270 million.** SWP contractors located south of the terminus of the Coastal Aqueduct in Santa Maria additionally, must pay for a local aqueduct connection. Based on information provided by the Central Coast Water Authority (CCWA), the total costs of construction for the coastal branch and the local branch was **$670 million**, which is to be contrasted with the $270 million as the estimate given to the voters. Santa Barbara ratepayers will have paid **$1.76 billion** including amortization with interest and operations and maintenance (O & M) for bringing state water to Santa Barbara. The large cost is best illustrated by Montecito, which has only 4,200 meters, but must pay over $5 million a year for SWP related debt whether any water is delivered or not. As will be shown, the much higher than expected construction costs has materially affected the affordability of the SWP for the South Coast districts.

Santa Barbara County has paid and will continue to pay extremely high costs for minimal amounts of the SWP water, largely due to the low reliability of the SWP. **Actual delivery of SWP water between 1998 and 2015 for the four South Coast water agencies (Montecito, the City of Santa Barbara, Goleta and Carpinteria) was only 28% of full contract amounts,** despite the fact that Santa Barbara County voters were told in 1991 ballot information that intimated the State Water Project would deliver 97% of contract amounts to urban water users.

Current Cost/Benefit Analysis

The SWP has failed in delivering water to Santa Barbara's South Coast water districts and cities in a cost-effective and reliable manner. But to fully understand these impacts, they must be viewed from an historical perspective.

Prior to the 1987-1992 drought South Coast water purveyors had relatively small budgets. Water supply costs represented less than 10% of the budgets and local sources provided all the water. The drought changed everything. At the peak of the drought, all South Coast water purveyors, convinced of the reliability of state water delivery system, voted to import state water at enormous construction costs. The South Coast is now living with the consequences of that decision; some very important lessons have been learned.

A. Costs:

Due primarily to the region's connection to the SWP, South Coast water district budgets have increased substantially. By way of example, the budget for the Montecito Water District went from $1 million in the early 90's before deliveries of state water to $14 million today. For the upcoming year, the budget is $21 million, an extraordinary increase of $7 million, as Montecito tries to catch up on needed repairs to old infrastructure. As the 1987-1992 drought unfolded, mandatory conservation and severe use restrictions decreased water demands dramatically. These measures also had the adverse effect of decreasing water sales to the point that water rates had to be raised substantially in order to balance budgets. Upon emerging from the 1987-92 drought, the water districts were immediately faced with increasing cost burdens from the construction of the Coastal Aqueduct and the local aqueduct necessary for the importation of state water. Rates had to be maintained at high levels, and raised in many cases. When the drought ended and mandatory conservation and restrictions were lifted, demand remained depressed due to the high water rates that were still in effect. Before the drought, water use was not necessarily sensitive to water costs, but the higher costs have caused demand to decrease. Increased rates are met with commensurate decreases in demand such that the districts have resorted to large increases in the fixed charges for water service.

B. Benefits:

Because of its inherent unreliability, there have been few benefits redounding from the importation of state water, especially during droughts. Because severe droughts are often statewide phenomena, state water deliveries typically are curtailed at the very time they are needed most on the South Coast. The current drought demonstrates this exceedingly well.

There has been one benefit of the Coastal Branch, the South Coast's tie-in to the SWP: water demand has decreased due to the cost impacts of the project on water agencies and ratepayers. Before the 1987-1992 drought, normal water demand in the City of Santa Barbara was about 16,500 acre-feet per year. The post-drought, new normal, is now 13,500 acre-feet, which is 3,000 acre-feet less than the pre-drought level. This drop in demand can be attributed directly to higher water prices.

The additional cost to agencies and ratepayers from the construction of the Twin Tunnels will have a negative effect on water supply and demand given the unreliability of delivery, lack of new water sources, and higher rates required to cover costs plus more stringent conservation measures.

Twin Tunnels and Additional Debt from the State Water Project

The CCWA's local contractors are paying large amounts of money for the planning and engineering of the tunnels. The State Water Project (SWP) and the Central Valley Project (CVP) contractors have spent **$250 million** on planning to date and estimate it will cost an additional **$1.2 billion** to get the project "shovel ready". These costs are paid proportionately by South Coast Contractors.

C-WIN has documented the estimated cost of construction of the Twin Tunnels. The annual payment with interest and principle on these construction costs, which will be allocated to Santa Barbara County under its contract with the SWP, will range from **$7.7 million/yr.** to **$46.4 million/yr.** The South Coast districts' share will range from **$2 million/yr.** to almost **$15 million/yr.** These estimates are based on a 55/45 division in costs between the State Water Project (SWP) and the Central Valley Project (CVP); **if the CVP doesn't participate, these estimates will roughly double.**

If Santa Barbara County is forced to participate in the construction of the Twin Tunnels, its SWP expenditures will increase significantly at a minimum. The resultant increases in retail water costs will burden Santa Barbara County customers without any assurance that additional water supplies will be forthcoming. This increased cost burden will depress demand even further.

Why would Santa Barbara County want to pay more money for unreliable water it may not need or use?

2) TERMINOLOGY

Water issue terminology may be unfamiliar to some readers. The following are some key terms that will be used throughout the report:

Acre-foot: One acre-foot is equal to an acre of land (or 43,560 square feet) covered to a depth of one foot. An acre-foot is thus 43,560 cubic feet of water or about 325,829 gallons. It is equivalent to the annual consumption of water by two average California families.

Table A Allocations: "Table A Allocations" are the total contractual amount of water that may be delivered under the terms of a State Water Project water service contract. The actual amount of water delivered, depends on how much water is available from nature; this varies widely from year to year. The cost of Table A Allocations is based on the SWP contractors' percentage share of the total Table A Allocations. This cost reflects the percentage of both the original SWP contract and Santa Barbara's share of the Coastal Branch aqueduct constructed after the 1991 SWP election. All costs incurred by each SWP contractor must be paid every year regardless of whether any water is delivered at all.

Table A Deliveries: This amount represents what a water contractor actually receives in deliveries from the State Water Project under the contract in a given year. For Santa Barbara County water districts, Table A deliveries have always been less than the full amounts for a given year because the water is either not available from the State, or is not needed, and is therefore not requested.

Article 21, and other "surplus water": The SWP contracts deal with three types of non-scheduled water deliveries. They are Article 21 or "Surplus Water"; "Turn-back Pool"; and "Carryover Water".

Article 21 or surplus water is non-Table A water that may be declared available in the first three months of the contract year after all current Table A demands are met, reservoir refill requirements are satisfied, and there is fresh water in the Delta.

Turn-back Pool water is Table A water that was requested but not fully delivered in the previous contract year. The contractor who has unused Table A water receives a specified rebate for relinquishing his unused amount; any other contractor may offer to buy water from Turn-back Pool sources at a specified price.

Carryover Water is Table A water for a specific contractor that was available but not fully delivered in the previous contract year and can be claimed during the first three months of a new contract year if there is a demand for it or a place to store it.

The determining factors for exploiting these accounts are adequate capacity in the aqueduct facilities that deliver the water, satisfaction of all demands by the SWP contractors for Table A water, and water availability. The test of water availability is not necessarily constrained by Delta health considerations. Availability can be met simply by certifying that there is fresh water in the Delta as if it were a lake. This has not been healthy for the Delta.

Cachuma Project: The Cachuma Project consists of the Bradbury Dam and Lake Cachuma reservoir. The project stores floodwater runoff from the Santa Ynez River in Santa Barbara County. Completed in 1958, it is managed by the Bureau of Reclamation and provides water for South Coast urban and agricultural use by a series of tunnels that traverse the Santa Ynez mountain range.

Central Coast Water Authority (CCWA): Is a Joint Powers Authority (JPA) that manages Santa Barbara County's water from the SWP. It was created in 1991 when the County Board of Supervisors ceded management of the State Water Project. CCWA's voting membership is comprised of representatives of the eight county water agencies that contract for state water: the City of Santa Barbara, Montecito, Carpinteria, Goleta, Santa Ynez WCID #1, Santa Maria, Buellton, and Guadalupe. However, the legal responsibility for state water obligation payments is with the County of Santa Barbara Board of Supervisors, sitting as the Santa Barbara County Flood Control and Water Conservation District (SBCFCWCD). Thus, Santa Barbara County taxpayers ultimately have the fiscal responsibility for SWP payments. CCWA is acting as the agent for SBCFCWCD, which is the technical entity that holds the contract with the SWP.

Hundred Cubic Feet (HCF): A common measure of water consumption used by retail water agencies to describe how much water their local customers consume in a billing period. 1 HCF equals 748 gallons; 1 acre-foot equals 435.6 HCF.

Safe Yield: The level of water a project can deliver every year, given some small probability of short fall. "Safe Yield" is an operational concept whereby a reservoir is operated on the basis of a steady, firm annual yield calculated at a high probability to extend through the worst drought of record; the droughts extension is determined as the interval between spills or fills.

Twin Tunnels: The Twin Tunnels are a Gov. Brown administration plan to divert water from the Sacramento River under the San Joaquin-Sacramento River Delta to the federal and state pumps in the South Delta. The two proposed tunnels would each be 40 feet in diameter, buried more than 150 feet below the Delta and run for about 35 miles. The project would include three new intakes, each with a flow capacity of 3,000 cubic feet per second. The "Bay-Delta Conservation Plan" (BDCP) is a plan initiated by the State Dept. of Water Resources (DWR) to facilitate approval and construction of the Twin Tunnels. The BDCP has since been subsumed by the CA WaterFix.

Unit Cost: The cost of a given measurement for water. For example, units of measuring water may include cubic feet, gallons, or acre-feet. The *unit cost* of water is the cost per increment of each such designation (i.e., the "cost per acre-foot" or "cost per hundred cubic feet", etc.) consumed or supplied.

Effective Unit Cost: This is the cost of supply divided by the actual water delivered over a given time period, usually a year. It is a measure of the cost-effectiveness of a given source of supply.

Urban Preference: In state water law, urban preference means giving domestic and industrial water rights holders priority in receiving water during droughts, prior to the claims of agricultural water users. The theory in state law is that water for people is a higher social priority than water for farming.

Water Supply Reliability is the likelihood that the requested demand for delivery in a given year by a contractor can be met. It is usually stated as a probability. The prudent level of probability for each contractor depends on the availability to that contractor of other sources of water. For example, a contractor that is totally dependent on SWP water requires a very high level for SWP deliveries because shortfalls for that contractor are not easily tolerated. On the other hand, a contractor that has a year-to-year or longer term storage carryover capability can tolerate lower levels of probability of delivery. The reliability of delivery is also limited by the availability of water to the project and the ability of the project to carry over water year-to-year in storage reservoirs. The probability of availability can be calculated by investigating the probability distributions of runoff from the hydrologic record convolved with the prescribed operations. This differs from CALSIM II modeling done by the State, which utilizes "frequency of return" calculated by CALSIM II as a measure of reliability.

Water Year: October 1 - September 31 of a given year, as opposed to **Calendar Year** which runs from January 1 - December 31 or **fiscal year** which typically runs from July 1- June 30.

Lake Cachuma during current drought

3) GEOGRAPHIC AREA COVERED BY THE REPORT

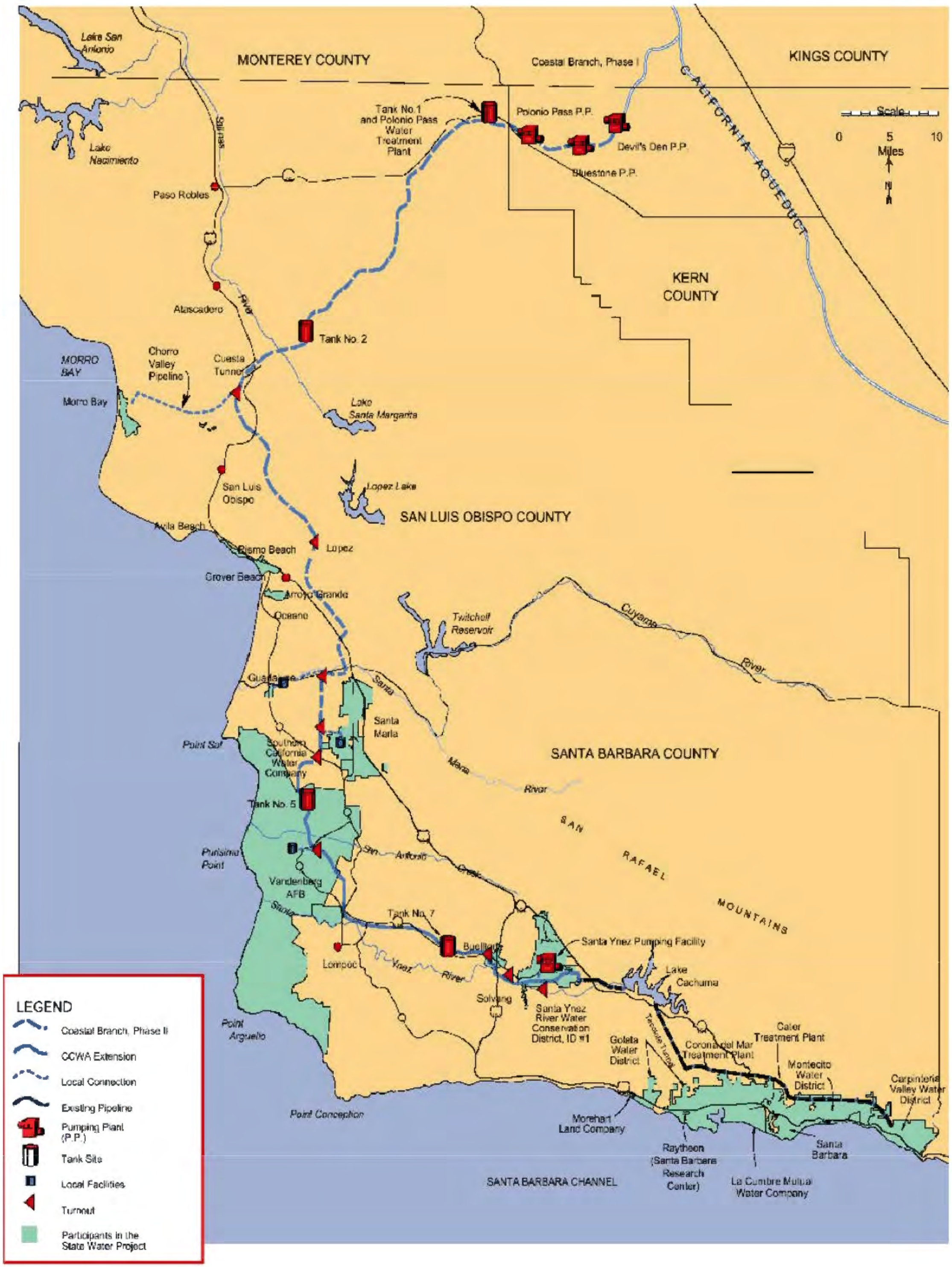
This report clarifies the cost of State Water Project water to four urban and suburban water districts and their customer service areas along the foothills and coastal plain of Santa Barbara County. These water districts include:

- City of Santa Barbara
- Montecito Water District
- Carpinteria Valley Water District
- Goleta Water District

They are located on the littoral plain of the south coast of Santa Barbara County along Highway 101. They are about 330 miles south of Tracy, where State Water Project water is pumped from the Bay-Delta Estuary.

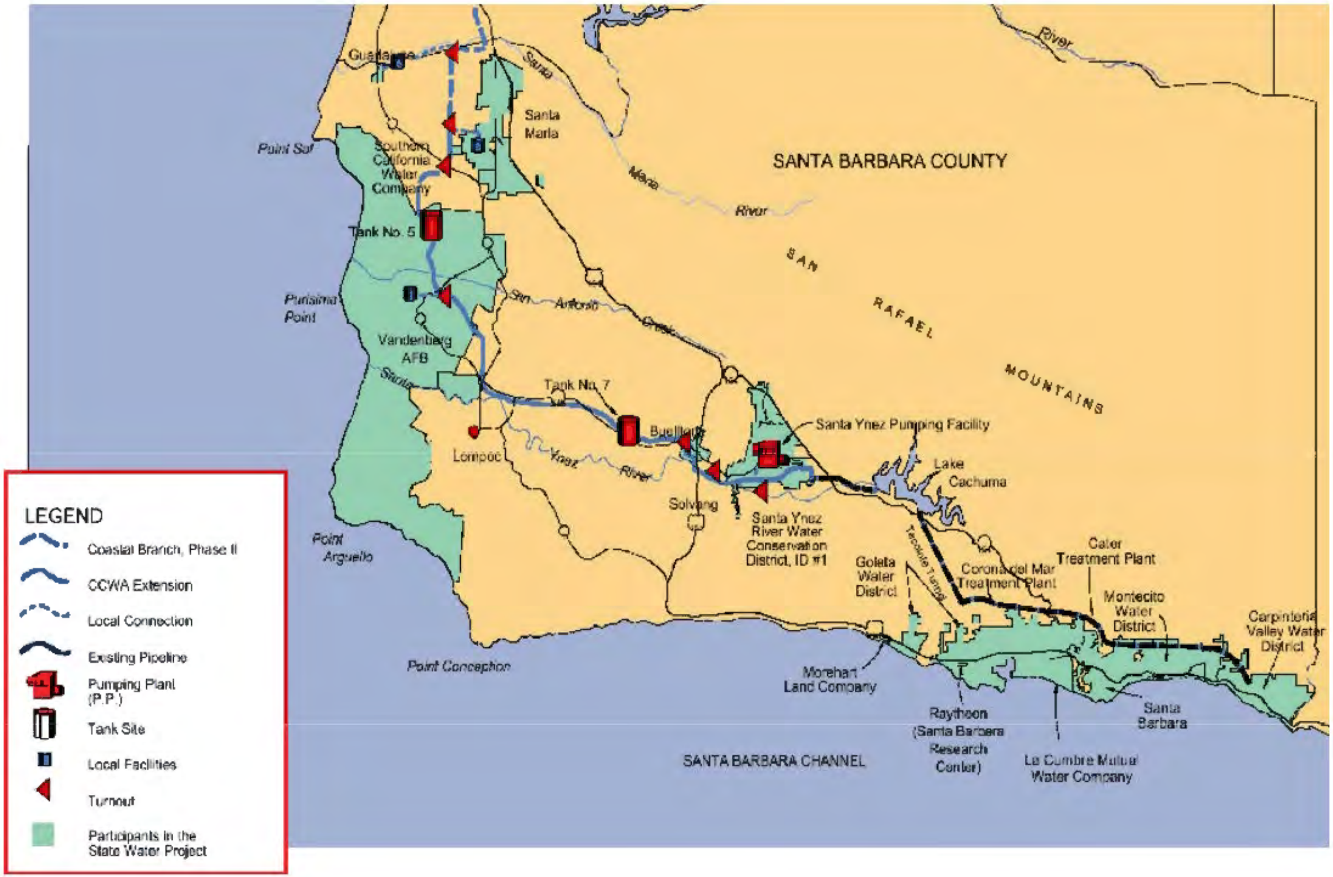
After studying the impacts to date of the SWP, C-WIN then analyzed the costs of the Twin Tunnels project and its likely impacts.

The four water districts and cities are among the major customers in Santa Barbara County for water delivered by the State Water Project's California Aqueduct. SWP water originates at Lake Oroville and travels down the Feather River to the Delta. When water is pumped from the Bay-Delta estuary, it must travel 330 miles south through the California Aqueduct traversing the western San Joaquin Valley to the state-owned Coastal Branch Aqueduct. The Coastal Branch aqueduct terminates at the Santa Maria River. (See Map 2 on following page.)



Map 2: Water Agencies of the Central Coast Water Authority; Coastal Branch Aqueduct, and the Local Aqueduct in Santa Barbara County. Map courtesy of CCWA

From the Santa Maria River, the water enters the Central Coast Water Authority's local pipeline to Lake Cachuma in Santa Barbara County. (Map 3 portrays the route of the local aqueduct, and the location of the districts that receive SWP water.)



Map 3 Central Coast Water Authority pipeline. Map courtesy of CCWA

The transport of state water in Santa Barbara County occurs under the jurisdiction of the Central Coast Water Authority (CCWA).

This report excludes some Santa Barbara County contractors from detailed analysis for several reasons:

- The City of Santa Maria is located close to the terminus of the Coastal Branch Aqueduct and faces none of the costs of financing, construction, operation, and maintenance for delivery of water to Lake Cachuma. Consequently, Santa Maria's water importation burdens are not equivalent to those borne by the South Coast districts. The difference is due to the significant costs of the local aqueduct, which is intended to serve districts downstream from Santa Maria. *However, due to Santa Maria's large allocation of Table A water, it represents a special case when it comes to the assessment of impacts due to the Twin Tunnels. These impacts will be addressed later in this report.*

- Vandenberg Air Force Base is excluded from this analysis because it is a **federal military** installation and is not a voting CCWA member. It will be able to pay the costs of any water supply that is provided in Santa Barbara County.

- Other voting members of the Central Coast Water Authority were excluded from the analysis in this report because they had small Table A Allocations. C-WIN chose a threshold of 1,000 acre-feet of Table A Allocation for determining a voting member exclusion from this report. Voting members excluded under this criterion included the City of Buellton, the City of Guadalupe, Solvang, and the Santa Ynez Water Conservation Improvement District #1.

- Because information from private corporations is not available under the Public Records Act, non-voting members such as Raytheon, Morehart Land Company, Southern California Water Company, and La Cumbre Mutual Water Company are not included here.

The primary reason for focusing on the water agencies analyzed in this report is their location at the terminus of the Coastal Aqueduct and the CCWA local pipeline. The cost burdens faced by the South Coast water districts for their shares of the local aqueduct are nearly equal to the cost of their shares in the SWP Coastal Aqueduct.

Table 1 presents a summary profile of the cities and water agencies that are included in the scope of this report. Readers may wish to refer back to this table from time to time.

Table 1
Summary Profile of Four Santa Barbara County Water Districts

	Goleta Water District	City of Santa Barbara	Montecito Water District	Carpinteria Valley Water District
Population(2010 census)	86,946	91,416	14,000	15,141
Single Family Accounts	13,342	16,920	4,204	3,078
MF Res Accounts	1,578	6,126	74	314
Total Water Budget Fiscal Year 2011	$24,646,996	$34,600,000	$13,545,136	$11,147,539
Residential Deliveries 2010 (AF)	6,115	8,755	3,794	1,354
Table A Allocations (AF)	4,500	3,000	3,000	2,000
2010 SWP Deliveries (AF)	813	541	541	363

As can be seen in Table 1, SWP deliveries are small fractions of Table A Allocations and small fractions of deliveries.

4) COSTS TO SANTA BARBARA COUNTY OF SWP WATER

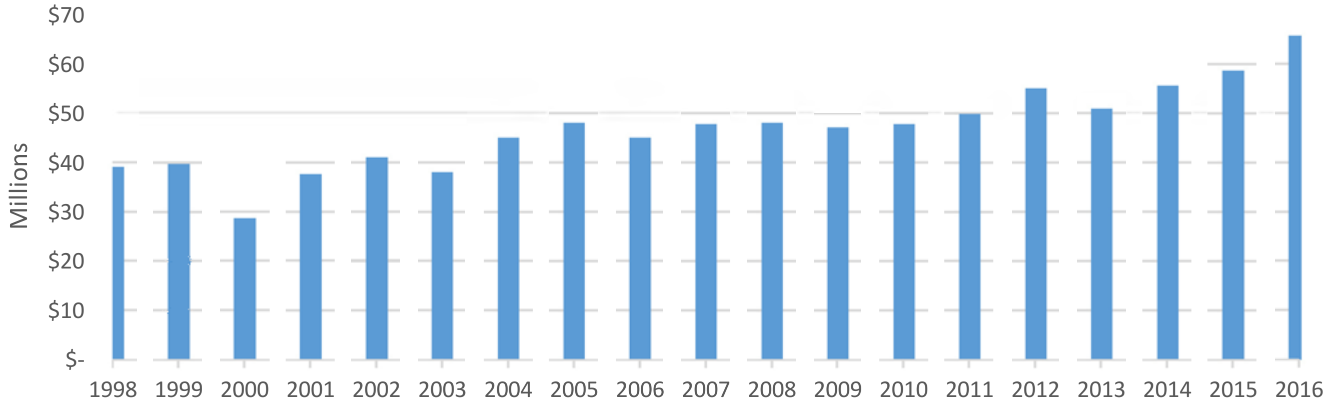
In 1991, the voters of Santa Barbara County approved a ballot measure to construct 144 miles of the Coastal Branch Aqueduct in order to connect Santa Barbara County water districts to the State Water Project. The vote was 66% for and 34% against. Earlier, in 1979, when voters were told the truth about high cost and low reliability in droughts, county voters defeated a similar measure by a vote of 72% to 28%. Before the 1991 election, Santa Barbara County voters were told that the costs for a Santa Barbara hook-up to the SWP would be **$270 million**; the construction costs alone for the Coastal Branch Aqueduct were just under **$500 million**. The addition of the local aqueduct construction costs brought the **total to $670 million.** The local aqueduct construction had to be financed at a much higher interest rate than the Coastal Branch construction. Because the South Coast Districts are at the end of the local pipeline they have much higher shares of the proportionate costs. The consequences of this higher cost, together with the higher interest rate, causes the South Coast water districts payments for the local aqueduct to be nearly equal to that of their Coastal aqueduct costs.

Water agencies face two key challenges as they continue providing SWP water to the suburban and urban communities along the Santa Barbara Coastal Plain: 1) rising State Water Project water costs, and 2) poor reliability for what they pay.

Santa Barbara County water districts cumulatively paid more than $893 million for all project costs (capital, financing, power, operations and maintenance) between July 1, 1997 and June 30, 2016; further, costs continue to escalate annually. Figure 1 shows the trend of total annual costs to all the CCWA water districts receiving state water, (including local aqueduct charges), from completion of construction to the present. This figure shows increasing costs, even though Santa Barbara County water districts have not added any new projects. These recent increases most likely reflect the resources that DWR has dedicated to the ongoing planning for the BDCP/CA WaterFix and the Twin Tunnels. These costs are buried in the invoices for the SWP that are sent to the SWP contractors.

Figure 1

Annual SWP Payment by Santa Barbara County Water Agencies



Source: CCWA Budgets

Based on district budgets and financial information supplied by CCWA, C-WIN has calculated the proportion of CCWA's annual budget for repayment of SWP capital and operating charges, as well as operations and maintenance charges for delivery of SWP water. Figures 2 through 5 present these costs in pie charts showing the percentage of SWP costs of water district budgets for each of the four South Coast districts (City of Santa Barbara, Carpinteria Valley Water District, Montecito Water District and Goleta Water District). These figures represent the averages from 2012 to 2015.

Figure 2
City of Santa Barbara Water Budget

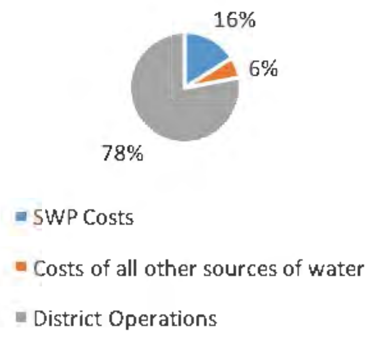


Figure 3
Carpinteria Valley Water District Budget

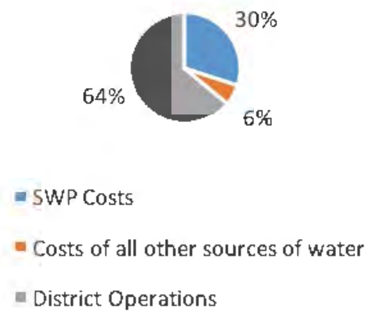


Figure 4
Montecito Water District Water Budget

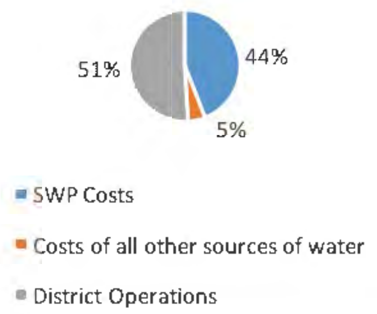
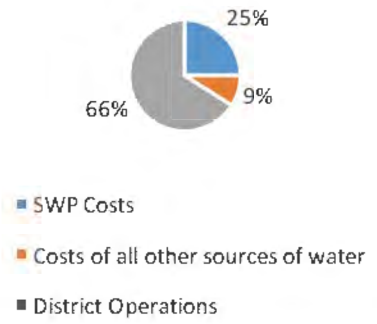


Figure 5
Goleta Water District Water Budget



Impact on Local Water Districts: The high costs imposed by the SWP on the South Coast districts may also cause distortions in district priorities. For example, a report by the Santa Barbara County 2006-07 Grand Jury noted that the Carpinteria Valley Water District is paying half of its $10 million/year budget for non-operational expenses, i.e., those primarily related to purchase and delivery of SWP water (this includes some other non-SWP costs as well).

The opening paragraph of this Grand Jury Report states as follows:

> *"The Carpinteria Valley Water District (CVWD) has delivered an essential product but has experienced the need for an exceptional amount of facility maintenance and upgrades. This*

> *has resulted in outstanding loans of $33.8 million against a total operating budget of less than $5 million per year. Coupled with the expense of a State Water option,* ***which it does not need and uses little,*** *the district is strapped with nonoperational yearly expenses, which exceed $5 million. Total annual expenses therefore exceed $10 million, giving rise to high water rates."*

Montecito's 2012-13 Adopted Budget states that 45% ($4,995,100) of its operating budget and 39% of its total budget is required to pay for its SWP costs. **In 2014 all SWP contractors received only 5% of their Table A allocations of State Water**, but had to pay the full costs of the construction debt.

Many other Santa Barbara County water districts are also suffering from the high cost of SWP water. Repayment of SWP debt, along with SWP ongoing operation and maintenance costs, comprise the dominant costs for each water agency. Yet the volume of water these districts draw from the SWP in normal and wetter years is minimal compared to other available local sources such as the Cachuma Project. The high cost for the SWP debt, combined with reduced water sales strains district budgets, compromises district ability to maintain adequate reserves, perform system upgrades, and needed repairs. As a result, maintenance and upgrades are backlogged or must be paid out of dwindling reserve funds. C-WIN believes districts defaults on SWP payments are a real threat for many of these districts.

Debt Requirements Looming: In some cases, water districts are struggling to maintain the lenders' required bond coverage covenant of 125%. For instance, for fiscal year 2012-2013, Montecito had a bond coverage ratio of only 115%. During fiscal year 2009-2010, Goleta had a bond coverage ratio of only 120%.

Santa Barbara County during current drought

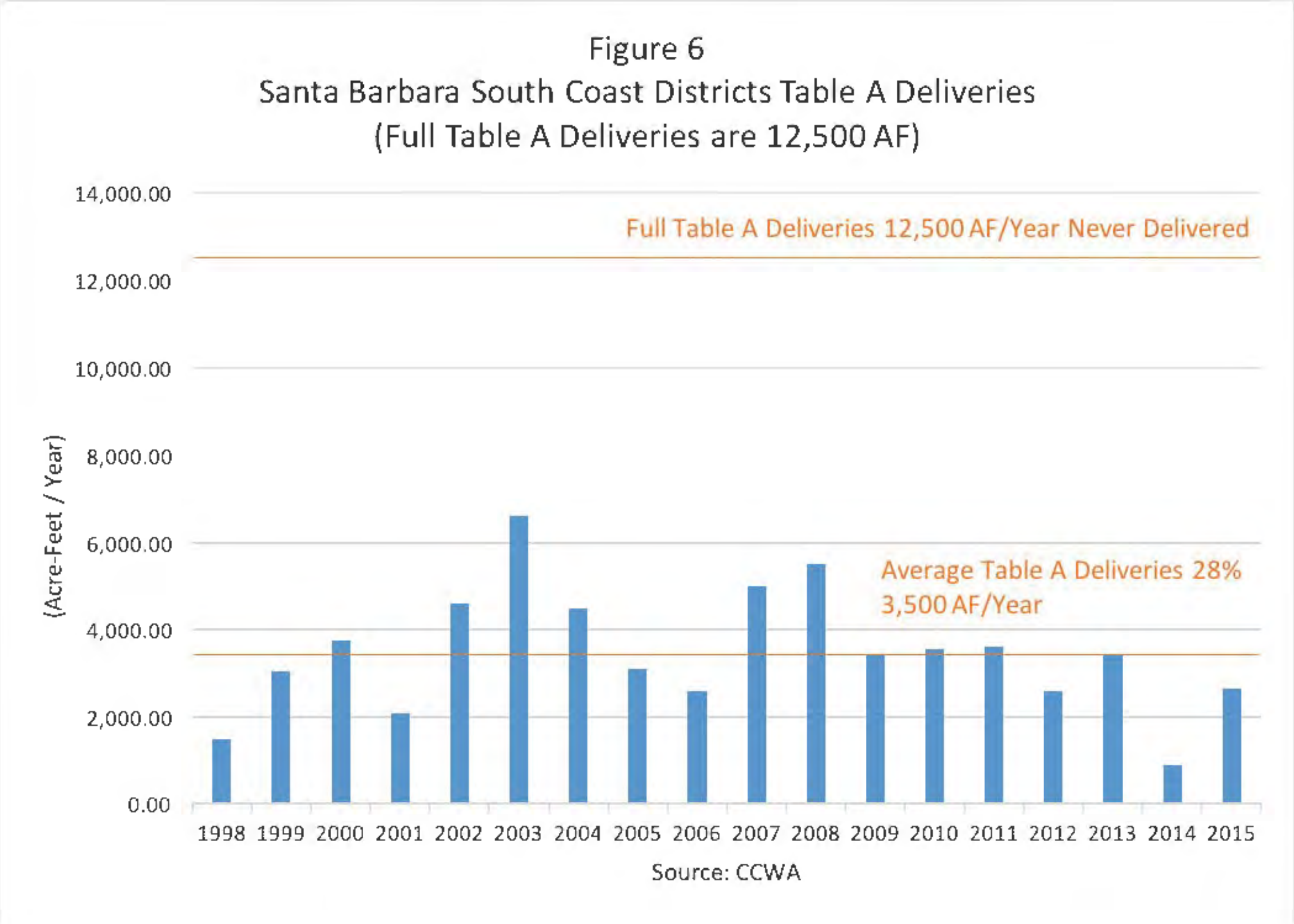
5) SWP RELIABILITY AND EFFECTIVE UNIT COSTS

Reliability

Before the 1991 election, voters were promised that the SWP contracts would be "97% reliable", meaning 97% of Table A water could be delivered. This promise has never been fulfilled.

However, it was made clear by all the supporting districts that SWP water was sought as a supplemental source to existing local sources, a supply that would be utilized during extreme droughts when local sources proved to be insufficient. This established a requirement for reliability quite different than that characterized as average delivery capability over a long period of time. The assurance of state water in time of need constitutes the best measure of reliability. This assurance is probably best met by operating the SWP on the basis of **safe yield**, which is that level the project can deliver every year given some small probability of shortfall. The SWP is not operated on this basis, and can therefore never meet the requirements for a reliable supplemental water source as intended by Santa Barbara County's water districts.

Figure 6 shows that over the past 18 years, the four South Coast districts received approximately 28% of their Table A allocation. **2014 was a very dry year for the entire state. The official SWP allocation of 5% is a clear demonstration the SWP coming up very short in the years it is needed most.**



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The availability of state water under present operational rules is limited year-to-year by the amount of runoff experienced in each year. C-WIN has examined the 98-year hydrologic record of the Sacramento River and found that **it is very likely that present operations can only provide a small fraction of Table A amounts during droughts.** DWR has never performed a proper analysis to determine a truly reliable level of delivery. Without such analysis, it is fruitless to propose structural solutions to the Delta's problems, given that *precipitation is the main limiting factor*. (See Appendix B for details on mischaracterizations of Sacramento River hydrology by DWR.)

The SWP's difficulties in delivering full Table A allocations can be traced to the origin of the project, which dates to the late 1950's. The full statewide Table A amounts were developed in the 1950's and 1960's, and were based on potential new sources anticipated from further damming of California's North Coast rivers. Federal and State Wild and Scenic River designations for most North Coast rivers closed the door on these projections. The State Water Project also planned to build a Peripheral Canal to move water through the Delta. The bond measure to fund the Peripheral Canal was voted down by California voters in 1982, in large part due to the potential environmental devastation to the Bay/Delta. Without the availability of these sources, there is no likelihood of meeting Table A amounts.

Effective Unit Costs

The effective unit (acre-foot) costs of SWP water are highly variable and have led to costs considerably higher than those estimated for the 1991 ballot measure. This is because the water agencies must pay the fixed costs for the amount of water contracted, regardless of the amount delivered annually. Even if no SWP water is delivered these fixed costs must be paid.

C-WIN has determined that CCWA's estimated unit costs for SWP water on a per acre-foot basis are often greatly understated because CCWA bases cost estimates on full delivery of Table A Allocation amounts what has been shown to be a fictitious delivery amount. As shown in Figure 6 on the previous page, full Table A Allocations have **never** been delivered by the SWP and are unlikely to ever be delivered because of limited availability in times of drought and lack of need during wet years when the water is available.

Figure 7, on the following page, shows the **effective unit water cost** per acre foot for SWP water; *the cost of supply divided by the actual water delivered.* This is based on information from the four water agencies. Figure 7 compares the effective unit costs of state water against the effective unit cost of local sources for each of the four South Coast districts. In this figure, average costs over the last 5 years for SWP and local sources are presented. This is another way of showing the impact of a costly and unreliable project. Figure 7 shows that SWP costs significantly outweigh the costs of local water sources.

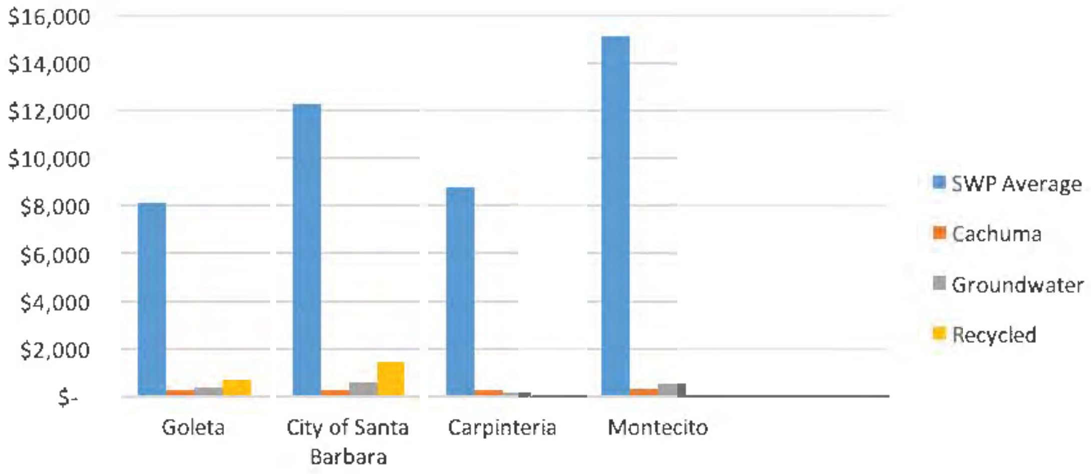


Figure 7
SB County Effective Unit Water Cost
per Acre-Foot

Sources: CCWA, GWD, SB City, CWD, MWD

	SWP Average	Worst year, 2014 SWP Drought	Avg. Cachuma	Avg. Groundwater	Avg. Recycled
Goleta	$8,150AF	$21,500AF	$240AF	$376AF	$707AF
City of Santa Barbara	$12,299AF	$28,200AF	$240AF	$610AF	$1,450AF
Carpinteria	$8,800AF	$19,800AF	$240AF	$144AF	
Montecito	$15,132AF	$30,600AF	$310AF	$516AF	

Table 2 demonstrates the singular effects of SWP costs and deliveries by calculating the *effective unit costs of SWP deliveries* focusing only on those costs that are the fundamental allocations of Table A made by DWR at the beginning of each new contract year. Accordingly, no deliveries associated with the Article 21 surplus water, Turn-back Pool water, or Carryover water are included in delivered Table A allocations. Similarly, all the costs that are included in the CCWA invoices for such deliveries have been deducted from the invoiced costs. Also excluded are deliveries of and costs for supplemental purchased water.

On this basis Table 2 confirms the very high effective unit costs and exposes the extraordinary high costs during droughts when deliveries are curtailed. It is important to note that the costs and deliveries shown in Table 2 are more representative of SWP contract scenarios as they stood in 1991, when votes were taken. Since 1991, the SWP contract has been significantly amended to provide a far more liberal interpretation of non-Table A types of water and the established requirements for buying and selling water among SWP and non-SWP contractors. Further the amended SWP contract eliminated the **urban preference** for Table A deliveries, a primary factor causing lower deliveries during drought years and consequent high unit costs. The urban preference required water for people before agriculture in times of drought. This safe guard was eliminated by the Monterey Amendments to the SWP contracts in 1995. C-WIN is currently contesting these Amendments in court.

Table 2

SWP Effective Unit Cost

	City of SB		
	Delivery	Total Cost	Eff Unit Cost
	(Acre-ft/yr)	$M	$/AF
2010	541	4.31	$7,970
2011	773	4.71	$6,090
2012	703	4.77	$6,735
2013	339	4.24	$12,500
2014	165	4.81	$28,200
2015	0	4.66	(NWD)

	Montecito		
	Delivery	Total Cost	Eff Unit Cost
	(Acre-ft/yr)	$M	$/AF
2010	500	4.91	$9,800
2011	218	4.86	$22,300
2012	0	4.45	(NWD)
2013	1155	5.27	$4,560
2014	165	5.06	$30,600
2015	660	5.56	$8,400

		Goleta	
	Delivery	Total Cost	Eff Unit Cost
	(Acre-ft/yr)	$M	$/AF
2010	1103	3.75	$3,400
2011	1126	6.63	$5,900
2012	972	7.24	$7,400
2013	1433	6.5	$4,500
2014	373	8.03	$21,500
2015	1592	9.83	$6,200

		Carpinteria	
	Delivery	Total Cost	Eff Unit Cost
	(Acre-ft/yr)	$M	$/AF
2010	492	3.22	$6,500
2011	501	3.23	$6,400
2012	433	3.03	$7,000
2013	500	3.66	$6,600
2014	110	3.08	$19,800
2015	450	3.01	$6,500

In the years of no SWP water deliveries, each district is still required to pay millions of dollars for their share of the revenue bonds.

Impact on Ratepayers

Retail water agencies are responsible for delivering water directly to homes and business customers. As nonprofit governmental institutions, they must by law recover their costs through their revenue-generating operations. They typically have two means of doing this: charging customers for the water they directly consume ("water rates") and charging customers for the meters that provide access to water and measures their consumption at the street. The latter is commonly referred to as the "fixed service charge."

Montecito is an example of the severity of the budget shortfalls experienced when water sales drastically decrease. Montecito has not been able to generate enough revenue from water sales or fixed service charges, and in 2014 instituted rationing. Severe penalties were imposed for going over allocation. When even this measure was not enough, Montecito levied an additional drought surcharge. Montecito's revenue from fines, levies and fixed charges is greater than revenue from water sales. This is not a sustainable way to run a water district.

Single Family Residential Rate Structures

C-WIN investigated retail water costs for an average single-family residential customer by obtaining data from updated Urban Water Management Plans (UWMP) and current district fee schedules for the four water agencies of the Santa Barbara coastal plain.

All four water districts have responded similarly in their efforts to increase revenues following high SWP costs. Prior to the 1987-1992 drought, unit rates and service charges were substantially lower as were the consequent water bills of the customers. These rates, however, are not as high as would be indicated by the effective unit costs of SWP deliveries. That is due to the fact that the bulk of delivered retail water is supplied by much lower- cost sources such as Lake Cachuma. Nonetheless, customer bills are several times higher than before the drought. For example, in 1991 (before South Coast districts incurred state water debt), Montecito's Water District's annual budget was $1 million. Today, with SWP debt, it is $14 million. The current drought promises further rate increases due to the need to procure supplemental purchased water because SWP water isn't there. These additional sources must be purchased on the spot market at prevailing prices, which are much higher than the variable costs of SWP water.

Balancing of Water Rates for Large and Small Users

The Santa Barbara County Grand Jury Report on the Carpinteria Valley Water District noted "…a serious imbalance in the monthly service charges between small and large meters … resulting in small water user costs that … are 2 ½ times the going rate in the general area." The subtext here: it is particularly difficult for Carpinteria to increase rates to provide sufficient revenues. Carpinteria has a substantial agricultural sector that constitutes a significant fraction of its retail water deliveries. If rates for agriculture are raised too high many of the farmers will activate private wells that can be operated at lesser cost. This results in lost revenue to the district leaving the residential sector to bear a disproportionately higher load.

In Montecito the district has instituted a parcel fee that is applied to developed and undeveloped parcels alike. This has helped raise needed revenues. Santa Maria has folded its waste water operation into the water department to constitute a single enterprise fund to help meet its obligations. *The need for increased revenues has brought about many creative cost management solutions to balance revenues with obligations, of which the single most important factor is SWP charges.*

6) IMPACTS OF THE PROPOSED TWIN TUNNELS

- Construction of the Twin Tunnels will place a significant burden on ratepayers, especially urban ratepayers, without delivery of any additional water when needed most in drought.
- Public water agencies may find it difficult to maintain fiscal solvency with this added burden.
- Planning costs of the Twin Tunnels already have increased the financial burden for ratepayers. The State already has spent $250 million, and is moving forward in the permitting process with only 10% of the proposed project engineered. The State has announced its need for an additional $1.2 billion to finalize the plans and complete the engineering for the Twin Tunnels.

Estimated Costs and Allocations to SB County Water Districts

In 2012, BDCP/CA WaterFix cost estimates for the Tunnels were $17.2 billion for construction. This is a gross underestimate because cost estimates have not been updated to reflect the construction timeline and do not include the potential for cost overruns. Such overruns are all too common for large construction projects, and can occur for a variety of reasons. The Coastal Branch Phase II Aqueduct, the most recent project built by DWR, which serves Santa Barbara and San Luis Obispo counties, is a classic example of an engineering project with significant cost overruns.

The construction costs for the tunnels range from an estimate of **$20.6 billion** (DWR) to **$38 billion** (ECONorthwest). The $20.6 billion number represents DWR's $17.2 billion estimate escalated to the expected period of construction, while the $38 billion is based on an independent analysis obtained by the consulting firm ECONorthwest, also escalated to the expected period of construction. (See Appendix A).

In order to calculate the annual costs that would accrue from selling bonds to finance these construction costs, several assumptions have been made. First, an interest rate of 6.1% was used as the bond financing rate. How the annual bond financing costs would be paid is still uncertain.

The proposed project would be built under the authority of the SWP contracts. Under those contracts, the Twin Tunnels financing costs likely would be part of Delta water cost. On this basis, each contractor's proportionate share would be equivalent to its proportionate share of Table A allocations.

The tunnel project was conceived to provide for both CVP and SWP deliveries across the Delta, with the CVP responsible for half the costs. Almost all CVP deliveries south of the Delta are for agriculture and about one-fourth of SWP deliveries are for agriculture. Agribusiness contractors are unsure they can sustain such a financial burden. They would prefer that the urban contractors assume a larger share. There is no obvious objective basis within the SWP to make such a shift between agriculture and urban beneficiaries but we have assumed an allocation based on each contractor's proportionate share of SWP construction costs to date. Since urban SWP contractors typically lie at the ends of the various branches of the SWP, they assume proportionately larger shares of construction costs than proportions based on Table A allocations.

Santa Barbara County Water District contractual cost share of Table A Delta water is approximately 1.1 % of the financed total. If the allocation is based on proportionate shares of SWP construction costs, the Santa Barbara County share of financing costs is approximately 3.4 %. These two values were used in estimating the impacts on Santa Barbara County SWP contractors. The costs are further allocated within Santa Barbara to CCWA members (the water districts) on the basis of their proportionate shares of Table A water.

The impact analysis also addresses the possibility that the CVP would decline to participate in the tunnels project which provides a high value limit. In Tables 4 and 5, the designation "55/45" represents shares of the total costs allocated to the SWP and CVP; "100/0" indicates the total burden allocated to the SWP.

Table 4 shows the estimated share that would be allocated to the Santa Barbara County Flood Control and Water Conservation District (SBCFCWCD), the entity that holds Santa Barbara's SWP contract. Table 5 shows the shares further allocated to CCWA participants. Invoices to the SBCFCWCD show only a single additional charge for each share of the Twin Tunnels financing costs. These will be passed on to the CCWA participants based on proportionate shares of Table A amounts.

Table 4
Annual Costs Allocated to SBCFCWCD (CCWA)
$Million/yr.

SB Co. %	SWP/CVP Share			
Allocation	Low (55/45)	Low (100/0)	High (55/45)	High (100/0)
1.1%	7.7	14	15	27.3
3.4%	23.4	43.3	46.4	84.3

In Table 5, "no participation" by the CVP, (100/0), was excluded because the costs are untenable for Santa Barbara County. (See Table 4).

Table 5
Annual Costs to CCWA Participants (Participant Budget Impacts)
$Million/yr.

	SWP/CVP Share			
SB Co. % Allocation	Low (55/45)	High (55/45)	Low (55/45)	High (55/45)
	at 3.4%	*at 3.4%*	*at 1.1%*	*at 1.1%*
Montecito	1.71	3.4	.56	1.1
SB City	1.71	3.4	.56	1.1
Carpinteria	1.14	2.27	.38	.74
Goleta	2.57	5.10	.84	1.65
Santa Maria	9.36	18.5	3.04	6.00

As a state water contractor, Santa Barbara County will be required to make all payments necessary to recover its portion of the state's bond costs for constructing and operating the Twin Tunnels project. Tables 4 and 5 demonstrate these impacts will significantly inpact Santa Barbara County and CCWA participants. Participation will likely result in even greater water rate increases to cover the costs of a project that will not provide additional water supplies.

Steadily increasing water rates already have spurred fierce resistance from local ratepayers. The additional financial burden of the Twin Tunnels may result in ratepayer revolts through local elections or remedies provided by Proposition 218 to challenge fee increases. The statement from the 2006-07 Santa Barbara County Grand Jury Report on the Carpinteria Valley Water District is thus relevant to all County water agencies:

"Coupled with the expense of State Water option, which it does not need and uses little, the district is strapped with non-operational yearly expenses which exceed $5 million... giving rise to high water rates."

Budgetary Impacts

The cost allocations presented in Table 5 are examined from the perspective of water district budgets. This represents the impacts of the proposed Twin Tunnels. The following pie charts, one set for each district plus a set for Santa Maria, show the proportions of budgets that would be allocated to the SWP and the Twin Tunnels for each district under the assumptions of high and low construction costs. The pie charts in figures 8A-12B use the year 2014 as a baseline for all the costs not accounted by the SWP and the Twin Tunnels. These impacts reflect the degree of exposure for each district based on SWP Table A allocation relative to non-SWP sources of supply.

Figure 8A
City of Santa Barbara Estimated Budget Impacts of Proposed Twin Tunnels
(Assumes 2014 as baseline. Considering low costs to build)

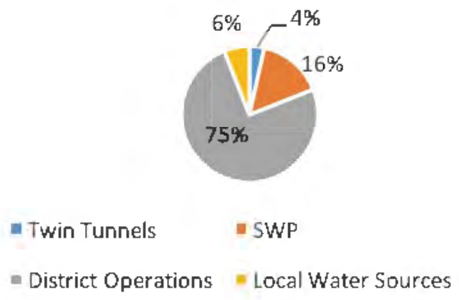


Figure 8B
City of Santa Barbara Estimated Budget Impacts of Proposed Twin Tunnels
(Assumes 2014 as baseline. Considering high costs to build)

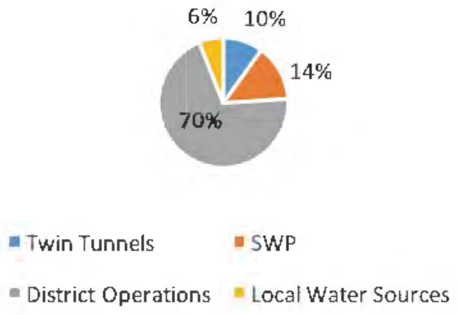


Figure 9A
Carpinteria Estimated Budget Impacts of Proposed Twin Tunnels
(Assumes 2014 as baseline. Considering low costs to build)

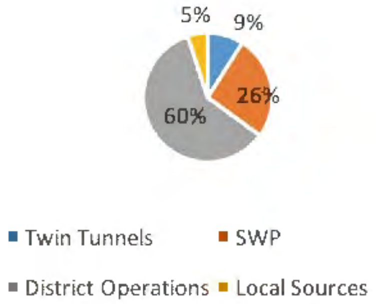


Figure 9B
Carpinteria Estimated Budget Impacts of Proposed Twin Tunnels
(Assumes 2014 as baseline. Considering high costs to build)

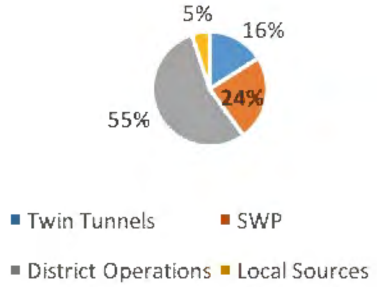


Figure 10A
Montecito Estimated Budget Impacts of Proposed Twin Tunnels
(Assumes 2014 as baseline. Considering low costs to build)

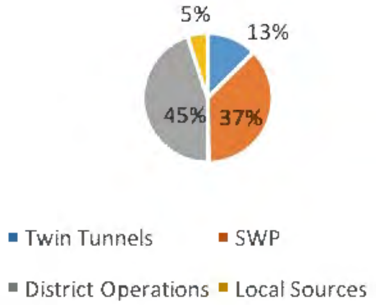


Figure 10B
Montecito Estimated Budget Impacts of Proposed Twin Tunnels
(Assumes 2014 as baseline. Considering high costs to build)

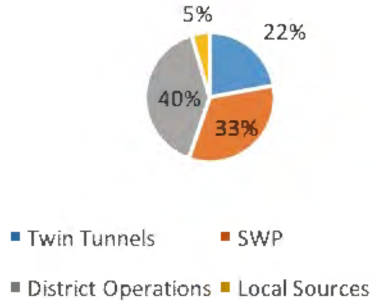


Figure 11A
Goleta Estimated Budget Impacts of Proposed Twin Tunnels
(Assumes 2014 as baseline. Considering low costs to build)

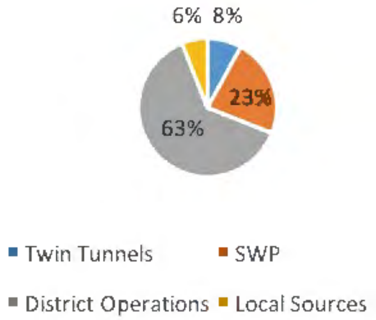
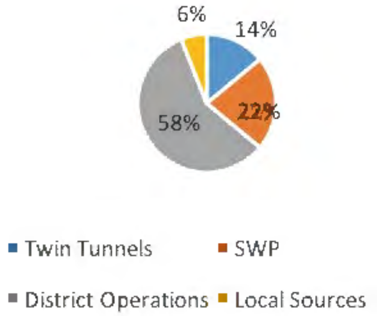


Figure 11B
Goleta Estimated Budget Impacts of Proposed Twin Tunnels
(Assumes 2014 as baseline. Considering high costs to build)



Santa Maria has a large Table A allocation and is thus likely to have a very large allocation of and more significant exposure to Twin Tunnels costs:

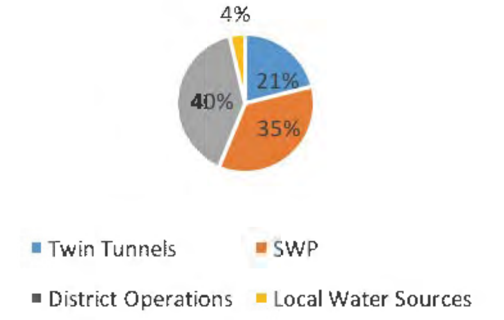


Figure 12A
Santa Maria Estimated Budget Impacts of Proposed Twin Tunnels
(Assumes 2014 as baseline. Considering low costs to build)

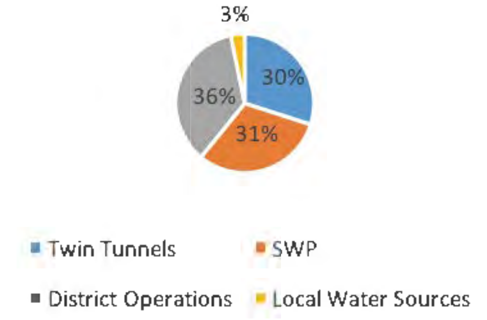


Figure 12B
Santa Maria Estimated Budget Impacts of Proposed Twin Tunnels
(Assumes 2014 as baseline. Considering high costs to build)

Cost Estimating Risk

The estimates provided above are based on the analyses of ECONorthwest as presented in Appendix A. Those analyses in turn are based on the best available information from project proponents: Bay Delta Conservation Plan (BDCP), DWR studies, and input from SWP contractors. That information is meager at best. Detailed investigations of tunneling to support competent engineering designs, which is a first order cost driver for the project, have not yet been completed. Without such designs it in unlikely that initial cost estimates are very accurate. The financing plan originally articulated in the March 12, 2012, BDCP, "Economic Benefits and Financing Strategies" has been used by ECONorthwest to develop the cost impacts of the project (Appendix A).

The BDCP estimated a 10 to 12 year construction period; that means 10 to 12 years of construction costs are accumulated before any tangible water delivery benefits are produced. The financing strategy proposes to capitalize only two years of the bond interest accumulated over the construction period; project participants are expected to cover the major fraction of the bond financing during the construction period. These costs are considerable. According to the spreadsheets prepared by ECONorthwest, these uncapitalized interest costs, when allocated to the SBCFCWCD accumulate to $45 M and $135 M for the low case at 1.1% and 3.4% respectively. Correspondingly, the amounts for the high case are $99 M and $308 M. These amounts equate to 20% to 24% of the estimated project costs without capitalized interest. Accordingly, all the values presented in Tables 4 and 5 would be increased by these percentages if it is determined that construction interest should be fully capitalized. This determination should be made by the project participants, the SWP contractors. It should also be a concern for the bond issuers and the bond buyers.

Twin Tunnels Benefits

The benefits of the Twin Tunnels project must be measured by its likelihood of improving the delivery of SWP and CVP water.

According to the analysis in Appendix B, at least half of the years in the 100-year record of the Sacramento River watershed will be dry. Of those years, half are too dry to confidently allow much, if any, export. In the other half of the dry years, if we account for senior water rights in the Delta and Sacramento Valley and provide for sufficient outflow to maintain Delta health, it is very unlikely that the dry group exports can exceed 2 million acre-feet. During droughts, 4-5 dry years can occur in sequences; therefore the project must be operated to provide a reliable yield under these circumstances; in effect a **safe yield** operation**. Because the Twin Tunnels proposes only to capture excess flows during wet years, it can make no claim to improve reliability.**

Project proponents claim the Twin Tunnels will improve the State's ability to capture and store the excess run-off that occurs in wet years. Wet years comprise 44% of the 100-year run-off record as shown in Appendix B; however, **the Twin Tunnels project involves no new storage**. Project supporters claim ground water basins in the San Joaquin Valley can be used to store significant amounts of water. But these basins are neither SWP nor CVP facilities. **Storing water there would amount to a privatization of project waters. Santa Barbara water districts have just witnessed the monopolistic windfall profits water privateers reap by selling to distressed water districts during drought periods.** These circumstances are at a complete variance with what voters were told in 1991.

The SWP did acquire a large ground water basin in Kern County for the specific purpose of improving SWP deliveries as part of their contractual obligations. But this basin ultimately was transferred to the Kern Water Bank Authority, a quasi-public district controlled by a non-SWP party. Water from this basin has been sold to water districts at monopoly prices though the current drought. If the SWP had continued to own and operate the basin, the costs of the water through the drought would be governed by SWP contractual pricing. It is this aspect of the Twin Tunnels project that is most disquieting**. It potentially allows the privatization of large amounts of project water with no guarantee of price limitations of any sort. Without a complementary SWP storage element south of the Delta, the Twin Tunnels provide no benefit to SWP contractors.**

Potential Benefits

Since there is **no public storage component south of the Delta** as part of the project, it is inconceivable that the Tunnels will deliver any new water. It could provide the capability to continue deliveries of SWP and CVP water south in the event of possible levee failures due to earthquakes, although the integrity of the delivery system itself may be jeopardized by such an event. Its merits as a hedge against climate change and consequent sea level rise are even less certain. **C-WIN sees no benefits for Santa Barbara County water users from the Twin Tunnels.**

7) CONCLUSIONS

C-WIN has documented the fundamental problems associated with the importation and distribution of SWP water. These findings have shown the ominous fiscal consequences for Santa Barbara County generally and for the South Coast water districts specifically: The City of Santa Barbara, Goleta, Carpinteria and Montecito. Costs estimated for construction of Governor Brown's Twin Tunnel/ CA WaterFix would add to the burden, forcing these agencies even closer to insolvency. Meanwhile ratepayers are responding to the price elasticity of supply and demand by using less water, resulting in declining district revenue.

Costs

For Water Districts:

- Presently, significant portions of water district budgets must be dedicated to the fixed costs of State Water Project delivery infrastructure and expenses.
- The four South Coast water districts addressed in this report presently have great difficulty with cost recovery, and the consequent drawdown of cash reserves signals that they are operating at a continuing deficit.
- All the districts in this study experience high effective unit costs for SWP water; this applies to normal years, but spikes during drought years when water supplies decrease.
- The Twin Tunnels will add significantly to these present burdens with no prospect of commensurate benefits.

For Both Ratepayers and Water Districts:

- Agencies have increased water rates substantially and local customers and ratepayers will see continued appreciation in water rates to cover ongoing State Water Project costs especially with Twin Tunnels' burdens added in. To recover all costs and rebuild reserves without going into additional debt, the water agencies would need to continue increasing monthly water service (i.e., fixed access) charges.
- Increased water rates and drought awareness have increased water conservation; this reduces revenue, incentivizing larger water users to turn to private sources, e.g. wells.
- Water districts are paying high fixed and operational costs for state water they either don't take, or take in small amounts. In times of need such as our current drought, state water is either unavailable or available only in deeply reduced allocations. The Twin Tunnels will only make this circumstance worse.

Approval and construction of the Twin Tunnels is not inevitable. This report finds that the extra costs of the project will produce significant budgetary impacts and no benefit.

We fear that it is too late for Santa Barbara County and its water agencies to withdraw from the burdensome financial obligations that they have incurred by connecting to the State Water Project. However, it is not too late to withdraw from the Bay-Delta Conservation Plan/CA WaterFix and any subsequent plan to construct tunnels under or around the Sacramento-San Joaquin Bay Delta. Santa Barbara County needs its financial resources to explore and create alternative water conservation projects and new local water resources such as desalination.

APPENDIX A

California WaterFix:

Potential Costs to Santa Barbara County

July 2016

Prepared for:

California Water Impact Network

FINAL REPORT

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ECONOMICS • FINANCE • PLANNING

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The staff at ECONorthwest prepared this report based on their general knowledge of water resource economics, and on information derived from government agencies, private statistical services, the reports of others, interviews of individuals, or other sources believed to be reliable. ECONorthwest has not independently verified the accuracy of all such information, and makes no representation regarding its accuracy or completeness. Any statements nonfactual in nature constitute the authors' current opinions, which may change as more information becomes available.

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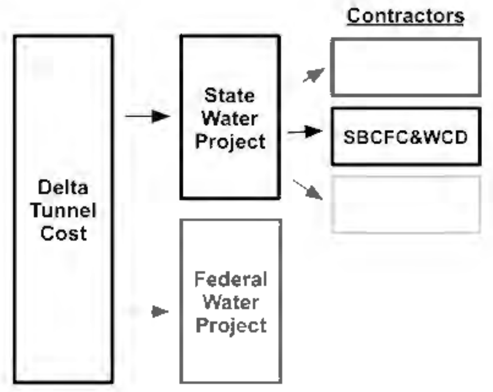
Introduction

In this report we summarize our analysis of the potential costs of the California WaterFix project to Santa Barbara County Flood Control and Water Conservation District (SBCFC&WCD). Our study has two primary scenarios: a low-cost scenario and a high-cost scenario. For each of these scenarios, we conduct several analyses using alternative assumptions about (1) how the costs of the WaterFix project would be allocated between the State and Federal Water Projects and (2) how the costs allocated to the State Water Project would be distributed among the 29 contractors (including SBCFC&WCD) participating in the State Water Project. (See Figure 1 below).

Figure 1. Flow of Costs of the Bay-Delta Conveyance Structure to Santa Barbara County Flood Control and Water Conservation District



Source: ECONorthwest

I. Cost of California WaterFix Project

In this section we describe our calculations of the cost of building and operating the California WaterFix project. We base our calculations on publicly available information about the project's costs.

The costs of the project would be paid, at least in part, by the State Water Project (SWP). The SWP would, in turn, pass the costs along to the 29 contractors that participate in the SWP. Ultimately, ratepayers, including those in Santa Barbara County, would bear the burden of paying for the project.

Given the preliminary nature of the available cost information, we conducted our analysis using two primary scenarios: a low-cost scenario and a high-cost scenario, as we describe below and in Table 1.

A. Low-Cost Scenario (Excluding Finance Charges)

Information from the California Natural Resources Agency (CNR) released in June 2016 identifies the estimated cost of the California WaterFix project. According to CNR, the project's design, construction, O&M, and related mitigation cost is an estimated $17.1 billion (in 2014 dollars).[1] We use this estimated cost in the low-cost scenario. Additional detail about the construction and mitigation costs (but not the O&M costs) is included in a January 2016 agreement between the Department of Water Resources and the Conveyance Project Coordination Agency.[2] We gleaned additional information about the costs by reviewing the cost data, and underlying documentation, for the previous proposals.[3]

We adjusted the costs to account for likely inflation of costs between the time of the cost estimate, 2014, and the estimated year construction would begin. For the design and construction costs, we also account for inflation during the 10-year construction period. For purposes of our analysis, we inflate the $17.1 billion in costs (in 2014 dollars) by applying an annual inflation rate of 2 percent, which is the same inflation rate used in previous analyses of the BDCP.[4] As Table 1 shows, the result is $20.3 billion (in 2017 dollars).

B. High-Cost Scenario (Excluding Finance Charges)

To address the uncertainty associated with the cost estimates, we use a high-cost estimate with double the design and construction costs of the low-cost estimate. As Table 1 shows, we use the same mitigation and O&M costs as in the low-cost estimate. Cost overruns on large construction projects are not uncommon. In its analysis of the costs of the WaterFix project, the San Diego Water Authority also used a high-cost estimate that was twice the size of the low-cost estimate to help capture the uncertainty associated with the cost estimates.[5] For purposes of this analysis, we use a high-cost estimate of $38.2 billion (in 2017 dollars).

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[1] California Natural Resources Agency. 2016. "Fast Facts." June. Accessed at http://www.californiawaterfix.com/.

[2] State of California, Department of Water Resources and Conveyance Project Coordination Agency. 2016. "Agreement Regarding Construction of Conveyance Project Between the Department of Water Resources and the Conveyance Project Coordination Agency." January. Accessed at http://www.californiawaterfix.com/resources/design-and-construction-enterprise/.

[3] *See*, for example, California Department of Water Resources. 2013. *Bay Delta Conservation Plan. Public Draft. November.* Sacramento, CA. Prepared by ICF International (ICF 00343.12). Sacramento, CA; and California Department of Water Resources. 2012. *Bay Delta Conservation Plan. Administrative Draft. November.* Sacramento, CA. Prepared by ICF International. Sacramento, CA.

[4] Ibid.

[5] San Diego County Water Authority. 2015. "Bay Delta Conservation Plan/California WaterFix: Potential Cost Impact to the Water Authority." December.

Table 1. California WaterFix: Low-Cost and High-Cost Scenarios without Financing Costs

		Design & Construction	Mitigation	O&M	Finance Costs	Total
Low-Cost Scenario	2014 $	$14.9 billion	$796 million	$1.4 billion	Not included	$17.1 billion
	2017 $	$17.9 billion	$845 million	$1.49 billion	Not included	$20.3 billion
High-Cost Scenario	2017 $	$35.8 billion	$845 million	$1.49 billion	Not included	$38.2 billion

Source: "Low Cost Scenario" data are from CNR "Fast Facts"
"High Cost Scenario" data are based on calculations by ECONorthwest.
Note: all dollar values are undiscounted.

II. Financing California WaterFix

The most recent publicly available information about the WaterFix project does not include details on how the project would be financed. For purposes of this analysis, we assume the project would be financed similar to the financing plan outlined for the project in the Bay Delta Conservation Plan (BDCP).[6] According to this plan, four revenue bonds would be used to finance the design and construction elements of the project.[7] Each bond would fund a portion of these costs over time. All of the bonds would have a period of capitalized interest and a 40-year pay-back period, with interest rates ranging from 6.132 to 6.135 percent.[8]

---

[6] *See,* for example, California Department of Water Resources. 2013. *Bay Delta Conservation Plan. Public Draft. November.* Sacramento, CA. Prepared by ICF International (ICF 00343.12). Sacramento, CA; California Department of Water Resources. 2012. *Bay Delta Conservation Plan. Administrative Draft. November.* Sacramento, CA. Prepared by ICF International. Sacramento, CA; and Southern California Water Committee and The PFM Group. 2012. *Bay Delta Conservation Plan: Economic Benefits and Financing Strategies*. March.

[7] As we understand, these bonds would be issued by DWR. Financing costs would be different if the contractors had to issue separate bonds for their shares.

[8] These interest rates represent the "all in true interest cost." *See,* for example, California Department of Water Resources. 2013. *Bay Delta Conservation Plan. Public Draft. November.* Sacramento, CA. Prepared by ICF International (ICF 00343.12). Sacramento, CA; and California Department of Water Resources. 2012. *Bay Delta Conservation Plan. Administrative Draft. November.* Sacramento, CA. Prepared by ICF International. Sacramento, CA.

Table 2. Overall Costs of California WaterFix, with Finance Costs Included

	Design & Construction	Mitigation	O&M	Finance Costs	Total	Annual Cost
Low-Cost Scenario	$17.9 billion	$845 million	$1.49 billion	$30.5 billion	**$50.8 billion**	**$1.27 billion**
High-Cost Scenario	$35.8 billion	$845 million	$1.49 billion	$61.1 billion	**$99.2 billion**	**$2.48 billion**

Source: ECONorthwest.

Table 2 shows the financing costs associated with the two cost scenarios. Adding the costs of financing brings the overall cost of the low-cost scenario to $50.8 billion and the high-cost scenario to $99.2 billion. It also shows, for budgeting purposes, the peak annual costs associated with payments on the bonds and the mitigation and O&M costs. See the Appendix for more detailed tables of results.

III. Allocation of Costs Between State and Federal Water Projects

In this section we calculate the share of the overall WaterFix costs that would be allocated to the State Water Project (SWP). This is the first step in identifying the potential costs that the SBCFC&WCD would bear.

Based on the information we have reviewed, we assume that the State and Federal Water Projects would share the costs of California WaterFix.[9] Although the split between the state and federal projects has not been determined, there is precedent for a 55/45 cost share ratio (the SWP would pay 55 percent of the cost, and the federal project would pay 45 percent of the cost).[10] Therefore, for one set of calculations, we assume the SWP would be allocated 55 percent of the overall cost. We also run a second set of calculations using an assumption that the SWP would pay 100 percent of the cost.

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[9] According to the California Natural Resources Agency, "state/federal funding" may also cover an unidentified portion of the $1.4 billion O&M. *See* California Natural Resources Agency. 2016. "Fast Facts." June. Accessed at http://www.californiawaterfix.com/.

[10] California Department of Water Resources. 2013. *Bay Delta Conservation Plan. Public Draft. November.* Sacramento, CA. Prepared by ICF International (ICF 00343.12). Sacramento, CA. *See also,* San Diego County Water Authority. 2015. "Bay Delta Conservation Plan/California WaterFix: Potential Cost Impact to the Water Authority." December.

Table 3. State Water Project Share of California WaterFix Costs

	SWP Share	Total
Low-Cost Scenario	55	$27.9 billion
	100	$50.8 billion
High-Cost Scenario	55	$54.6 billion
	100	$99.2 billion

Source: ECONorthwest.

Table 3 shows that the SWP would bear $27.9 billion to $99.2 billion of costs for the project, depending on how the cost estimates would be allocated between the State and Federal Water Projects.

IV. Allocation of Costs to State Water Contractors

In this section we calculate the potential costs that the Santa Barbara County Flood Control and Water Conservation District (SBCFC&WCD) would bear. We assume that the State Water Project would pass the WaterFix costs onto its 29 contractors, including SBCFC&WCD.

For this part of the analysis, we allocated the costs in two different ways. First, we allocated the costs based on SBCFC&WCD's share of the water allotment from the State Water Project. We used the "Table A" maximum amount. SBCFC&WCD has a maximum volume of 45,486 acre-feet, which is 1.1 percent of the total maximum volume of the State Water Project.[11] Therefore, one set of our calculations is based on allocating 1.1 percent of the SWP's WaterFix costs to SBCFC&WCD.

Second, we used a different allocation of costs, based on SBCFC&WCD's share of total payments to the SWP. According to the latest data available, SBCFC&WCD payments account for 3.4 percent of the total payments to the SWP through 2013.[12] Therefore, a second set of our calculations is based on allocating 3.4 percent of the SWP's WaterFix costs to SBCFC&WCD.

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[11] California Department of Water Resources. 2016. "California State Water Project Contractors: Maximum Table A Amounts." January. Accessed at www.water.ca.gov/swpao.

[12] California Department of Water Resources. 2015. *Management of the California State Water Project.* Bulletin 132-14. November.

Table 4. Allocation of Costs to SBCFC&WCD

		SWP 55/45		SWP 100	
	SBCFC&WCD Share:	1.1%	3.4%	1.1%	3.4%
Low-Cost Scenario		**$304 million**	**$554 million**	**$944 million**	**$1.7 billion**
High-Cost Scenario		**$595 million**	**$1.08 billion**	**$1.84 billion**	**$3.35 billion**

Source: ECONorthwest.

Table 4 shows SBCFC&WCD's shares of the California WaterFix costs. The results range from $304 million to $3.35 billion using the different allocation assumptions for the SWP allocations and, in turn, for the SBCFC&WCD allocations.

Summary

This analysis provides a range of results identifying SBCFC&WCD's potential share of the costs of the California WaterFix project over a 10-year construction period and 40 years of operations.

Based on the low-cost scenario of $50.8 billion in overall costs, SBCFC&WCD would bear costs ranging from $304 million to $1.7 billion depending on how the costs are allocated to the SWP and to SBCFC&WCD.

Based on the high-cost scenario of $99.2 billion in overall costs, SBCFC&WCD would bear costs ranging from $595 million to $3.35 billion depending on how the costs are allocated to the SWP and to SBCFC&WCD.[13]

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[13] See the Appendix for more detailed tables of results.

Appendix: Detailed Tables

Total Payments, Low-Cost Scenario

								SWP Pays	SWP Pays	SB % of SWP (vol)	SB % of SWP (vol)	SB % of SWP ($)	SB % of SWP ($)
								55%	100%	1.1%	1.1%	3.4%	3.4%
Date	**1st Series Payment**	**2nd Series Payment**	**3rd Series Payment**	**4th Series Payment**	**O&M**	**Mitigation**	**Total**	**Cost Paid by SWP (55/45)**	**Cost Paid by SWP (SWP 100)**	**Cost Paid by SB (55/45)**	**Cost Paid by SB (SWP 100)**	**Cost Paid by SB (55/45)**	**Cost Paid by SB (SWP 100)**
6/1/17	-	-	-	-		$68,128,450	$68,128,450	$37,470,648	$68,128,450	$408,454	$742,643	$1,266,256	$2,302,284
6/1/18	$295,065,303	-	-	-		$70,839,023	$365,904,326	$201,247,379	$365,904,326	$2,193,723	$3,988,588	$6,800,811	$12,365,111
6/1/19	$295,065,303	-	-	-		$70,839,023	$365,904,326	$201,247,379	$365,904,326	$2,193,723	$3,988,588	$6,800,811	$12,365,111
6/1/20	$295,065,303	$285,192,400	-	-		$40,621,645	$620,879,348	$341,483,641	$620,879,348	$3,722,387	$6,767,977	$11,539,856	$20,981,556
6/1/21	$295,065,303	$285,192,400	$436,328,085	-		$40,621,645	$1,057,207,433	$581,464,088	$1,057,207,433	$6,338,325	$11,524,228	$19,649,585	$35,726,518
6/1/22	$295,065,303	$285,192,400	$436,328,085	-		$40,621,645	$1,057,207,433	$581,464,088	$1,057,207,433	$6,338,325	$11,524,228	$19,649,585	$35,726,518
6/1/23	$295,065,303	$285,192,400	$436,328,085	$194,767,054		$40,603,737	$1,251,956,580	$688,576,119	$1,251,956,580	$7,505,914	$13,647,117	$23,269,253	$42,307,732
6/1/24	$295,065,303	$285,192,400	$436,328,085	$194,767,054		$39,962,417	$1,251,315,260	$688,223,393	$1,251,315,260	$7,502,069	$13,640,126	$23,257,333	$42,286,060
6/1/25	$295,065,303	$285,192,400	$436,328,085	$194,767,054		$39,962,417	$1,251,315,260	$688,223,393	$1,251,315,260	$7,502,069	$13,640,126	$23,257,333	$42,286,060
6/1/26	$295,065,303	$285,192,400	$436,328,085	$194,767,054		$34,798,759	$1,246,151,602	$685,383,381	$1,246,151,602	$7,471,111	$13,583,839	$23,161,359	$42,111,563
6/1/27	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$25,620,645	$32,088,186	$1,269,061,674	$697,983,921	$1,269,061,674	$7,608,465	$13,833,573	$23,587,173	$42,885,769
6/1/28	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$25,620,645	$32,088,186	$1,269,061,674	$697,983,921	$1,269,061,674	$7,608,465	$13,833,573	$23,587,173	$42,885,769
6/1/29	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$25,620,645	$20,964,010	$1,257,937,498	$691,865,624	$1,257,937,498	$7,541,772	$13,712,312	$23,380,416	$42,509,847
6/1/30	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$25,620,645	$20,964,010	$1,257,937,498	$691,865,624	$1,257,937,498	$7,541,772	$13,712,312	$23,380,416	$42,509,847
6/1/31	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$25,620,645	$20,964,010	$1,257,937,498	$691,865,624	$1,257,937,498	$7,541,772	$13,712,312	$23,380,416	$42,509,847
6/1/32	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228	$20,964,010	$1,271,105,080	$699,107,794	$1,271,105,080	$7,620,716	$13,855,847	$23,625,153	$42,954,823
6/1/33	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228	$20,964,010	$1,271,105,080	$699,107,794	$1,271,105,080	$7,620,716	$13,855,847	$23,625,153	$42,954,823
6/1/34	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228	$20,964,010	$1,271,105,080	$699,107,794	$1,271,105,080	$7,620,716	$13,855,847	$23,625,153	$42,954,823
6/1/35	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228	$20,964,010	$1,271,105,080	$699,107,794	$1,271,105,080	$7,620,716	$13,855,847	$23,625,153	$42,954,823
6/1/36	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228	$20,964,010	$1,271,105,080	$699,107,794	$1,271,105,080	$7,620,716	$13,855,847	$23,625,153	$42,954,823
6/1/37	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228	$20,964,010	$1,271,105,080	$699,107,794	$1,271,105,080	$7,620,716	$13,855,847	$23,625,153	$42,954,823
6/1/38	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228	$20,964,010	$1,271,105,080	$699,107,794	$1,271,105,080	$7,620,716	$13,855,847	$23,625,153	$42,954,823
6/1/39	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228	$20,964,010	$1,271,105,080	$699,107,794	$1,271,105,080	$7,620,716	$13,855,847	$23,625,153	$42,954,823
6/1/40	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228	$20,964,010	$1,271,105,080	$699,107,794	$1,271,105,080	$7,620,716	$13,855,847	$23,625,153	$42,954,823
6/1/41	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228	$20,964,010	$1,271,105,080	$699,107,794	$1,271,105,080	$7,620,716	$13,855,847	$23,625,153	$42,954,823
6/1/42	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228	$20,964,010	$1,271,105,080	$699,107,794	$1,271,105,080	$7,620,716	$13,855,847	$23,625,153	$42,954,823
6/1/43	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228		$1,250,141,070	$687,577,589	$1,250,141,070	$7,495,030	$13,627,326	$23,235,509	$42,246,380
6/1/44	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228		$1,250,141,070	$687,577,589	$1,250,141,070	$7,495,030	$13,627,326	$23,235,509	$42,246,380
6/1/45	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228		$1,250,141,070	$687,577,589	$1,250,141,070	$7,495,030	$13,627,326	$23,235,509	$42,246,380
6/1/46	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228		$1,250,141,070	$687,577,589	$1,250,141,070	$7,495,030	$13,627,326	$23,235,509	$42,246,380
6/1/47	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228		$1,250,141,070	$687,577,589	$1,250,141,070	$7,495,030	$13,627,326	$23,235,509	$42,246,380
6/1/48	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228		$1,250,141,070	$687,577,589	$1,250,141,070	$7,495,030	$13,627,326	$23,235,509	$42,246,380
6/1/49	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228		$1,250,141,070	$687,577,589	$1,250,141,070	$7,495,030	$13,627,326	$23,235,509	$42,246,380
6/1/50	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228		$1,250,141,070	$687,577,589	$1,250,141,070	$7,495,030	$13,627,326	$23,235,509	$42,246,380
6/1/51	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228		$1,250,141,070	$687,577,589	$1,250,141,070	$7,495,030	$13,627,326	$23,235,509	$42,246,380
6/1/52	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228		$1,250,141,070	$687,577,589	$1,250,141,070	$7,495,030	$13,627,326	$23,235,509	$42,246,380
6/1/53	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228		$1,250,141,070	$687,577,589	$1,250,141,070	$7,495,030	$13,627,326	$23,235,509	$42,246,380
6/1/54	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228		$1,250,141,070	$687,577,589	$1,250,141,070	$7,495,030	$13,627,326	$23,235,509	$42,246,380
6/1/55	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228		$1,250,141,070	$687,577,589	$1,250,141,070	$7,495,030	$13,627,326	$23,235,509	$42,246,380
6/1/56	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228		$1,250,141,070	$687,577,589	$1,250,141,070	$7,495,030	$13,627,326	$23,235,509	$42,246,380
6/1/57	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228		$1,250,141,070	$687,577,589	$1,250,141,070	$7,495,030	$13,627,326	$23,235,509	$42,246,380
6/1/58	-	$285,192,400	$436,328,085	$194,767,054	$38,788,228		$955,075,767	$525,291,672	$955,075,767	$5,726,011	$10,410,928	$17,751,334	$32,275,152
6/1/59	-	$285,192,400	$436,328,085	$194,767,054	$38,788,228		$955,075,767	$525,291,672	$955,075,767	$5,726,011	$10,410,928	$17,751,334	$32,275,152
6/1/60	-	-	$436,328,085	$194,767,054	$38,788,228		$669,883,367	$368,435,852	$669,883,367	$4,016,183	$7,302,151	$12,450,660	$22,637,563
6/1/61	-	-	-	$194,767,054	$38,788,228		$233,555,282	$128,455,405	$233,555,282	$1,400,245	$2,545,900	$4,340,931	$7,892,601
6/1/62	-	-	-	$194,767,054	$38,788,228		$233,555,282	$128,455,405	$233,555,282	$1,400,245	$2,545,900	$4,340,931	$7,892,601
6/1/63	-	-	-	-	$38,788,228		$38,788,228	$21,333,525	$38,788,228	$232,549	$422,816	$720,930	$1,310,782
6/1/64	-	-	-	-	$38,788,228		$38,788,228	$21,333,525	$38,788,228	$232,549	$422,816	$720,930	$1,310,782
6/1/65	-	-	-	-	$38,788,228		$38,788,228	$21,333,525	$38,788,228	$232,549	$422,816	$720,930	$1,310,782
6/1/66	-	-	-	-	$38,788,228		$38,788,228	$21,333,525	$38,788,228	$232,549	$422,816	$720,930	$1,310,782
						TOTAL	**$50,784,476,175**	**$27,931,461,896**	**$50,784,476,175**	**$304,470,557**	**$553,582,830**	**$943,895,995**	**$1,716,174,537**

Total Payments, High-Cost Scenario

								SWP Pays	SWP Pays	SB % of SWP (vol)	SB % of SWP (vol)	SB % of SWP ($)	SB % of SWP ($)
								55%	100%	1.1%	1.1%	3.4%	3.4%
Date	1st Series Payment	2nd Series Payment	3rd Series Payment	4th Series Payment	O&M	Mitigation	Total	Cost Paid by SWP (55/45)	Cost Paid by SWP (SWP 100)	Cost Paid by SB (55/45)	Cost Paid by SB (SWP 100)	Cost Paid by SB (55/45)	Cost Paid by SB (SWP 100)
6/1/17	-	-	-	-		$68,128,450	$68,128,450	$37,470,648	$68,128,450	$408,454	$742,643	$1,266,256	$2,302,284
6/1/18	$590,130,606	-	-	-		$70,839,023	$660,969,629	$363,533,296	$660,969,629	$3,962,742	$7,204,986	$12,284,986	$22,336,338
6/1/19	$590,130,606	-	-	-		$70,839,023	$660,969,629	$363,533,296	$660,969,629	$3,962,742	$7,204,986	$12,284,986	$22,336,338
6/1/20	$590,130,606	$570,384,800	-	-		$40,621,645	$1,201,137,051	$660,625,378	$1,201,137,051	$7,201,233	$13,093,152	$22,324,705	$40,590,373
6/1/21	$590,130,606	$570,384,800	$872,656,171	-		$40,621,645	$2,073,793,221	$1,140,586,272	$2,073,793,221	$12,433,110	$22,605,654	$38,544,163	$70,080,296
6/1/22	$590,130,606	$570,384,800	$872,656,171	-		$40,621,645	$2,073,793,221	$1,140,586,272	$2,073,793,221	$12,433,110	$22,605,654	$38,544,163	$70,080,296
6/1/23	$590,130,606	$570,384,800	$872,656,171	$389,534,109		$40,603,737	$2,463,309,422	$1,354,820,182	$2,463,309,422	$14,768,395	$26,851,627	$45,783,831	$83,243,330
6/1/24	$590,130,606	$570,384,800	$872,656,171	$389,534,109		$39,962,417	$2,462,668,102	$1,354,467,456	$2,462,668,102	$14,764,550	$26,844,636	$45,771,912	$83,221,658
6/1/25	$590,130,606	$570,384,800	$872,656,171	$389,534,109		$39,962,417	$2,462,668,102	$1,354,467,456	$2,462,668,102	$14,764,550	$26,844,636	$45,771,912	$83,221,658
6/1/26	$590,130,606	$570,384,800	$872,656,171	$389,534,109		$34,798,759	$2,457,504,444	$1,351,627,444	$2,457,504,444	$14,733,592	$26,788,349	$45,675,938	$83,047,161
6/1/27	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$25,620,645	$32,088,186	$2,480,414,516	$1,364,227,984	$2,480,414,516	$14,870,946	$27,038,083	$46,101,752	$83,821,367
6/1/28	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$25,620,645	$32,088,186	$2,480,414,516	$1,364,227,984	$2,480,414,516	$14,870,946	$27,038,083	$46,101,752	$83,821,367
6/1/29	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$25,620,645	$20,964,010	$2,469,290,340	$1,358,109,687	$2,469,290,340	$14,804,252	$26,916,823	$45,894,995	$83,445,445
6/1/30	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$25,620,645	$20,964,010	$2,469,290,340	$1,358,109,687	$2,469,290,340	$14,804,252	$26,916,823	$45,894,995	$83,445,445
6/1/31	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$25,620,645	$20,964,010	$2,469,290,340	$1,358,109,687	$2,469,290,340	$14,804,252	$26,916,823	$45,894,995	$83,445,445
6/1/32	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228	$20,964,010	$2,482,457,923	$1,365,351,858	$2,482,457,923	$14,883,197	$27,060,358	$46,139,731	$83,890,421
6/1/33	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228	$20,964,010	$2,482,457,923	$1,365,351,858	$2,482,457,923	$14,883,197	$27,060,358	$46,139,731	$83,890,421
6/1/34	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228	$20,964,010	$2,482,457,923	$1,365,351,858	$2,482,457,923	$14,883,197	$27,060,358	$46,139,731	$83,890,421
6/1/35	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228	$20,964,010	$2,482,457,923	$1,365,351,858	$2,482,457,923	$14,883,197	$27,060,358	$46,139,731	$83,890,421
6/1/36	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228	$20,964,010	$2,482,457,923	$1,365,351,858	$2,482,457,923	$14,883,197	$27,060,358	$46,139,731	$83,890,421
6/1/37	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228	$20,964,010	$2,482,457,923	$1,365,351,858	$2,482,457,923	$14,883,197	$27,060,358	$46,139,731	$83,890,421
6/1/38	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228	$20,964,010	$2,482,457,923	$1,365,351,858	$2,482,457,923	$14,883,197	$27,060,358	$46,139,731	$83,890,421
6/1/39	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228	$20,964,010	$2,482,457,923	$1,365,351,858	$2,482,457,923	$14,883,197	$27,060,358	$46,139,731	$83,890,421
6/1/40	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228	$20,964,010	$2,482,457,923	$1,365,351,858	$2,482,457,923	$14,883,197	$27,060,358	$46,139,731	$83,890,421
6/1/41	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228	$20,964,010	$2,482,457,923	$1,365,351,858	$2,482,457,923	$14,883,197	$27,060,358	$46,139,731	$83,890,421
6/1/42	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228	$20,964,010	$2,482,457,923	$1,365,351,858	$2,482,457,923	$14,883,197	$27,060,358	$46,139,731	$83,890,421
6/1/43	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228		$2,461,493,913	$1,353,821,652	$2,461,493,913	$14,757,510	$26,831,837	$45,750,088	$83,181,978
6/1/44	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228		$2,461,493,913	$1,353,821,652	$2,461,493,913	$14,757,510	$26,831,837	$45,750,088	$83,181,978
6/1/45	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228		$2,461,493,913	$1,353,821,652	$2,461,493,913	$14,757,510	$26,831,837	$45,750,088	$83,181,978
6/1/46	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228		$2,461,493,913	$1,353,821,652	$2,461,493,913	$14,757,510	$26,831,837	$45,750,088	$83,181,978
6/1/47	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228		$2,461,493,913	$1,353,821,652	$2,461,493,913	$14,757,510	$26,831,837	$45,750,088	$83,181,978
6/1/48	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228		$2,461,493,913	$1,353,821,652	$2,461,493,913	$14,757,510	$26,831,837	$45,750,088	$83,181,978
6/1/49	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228		$2,461,493,913	$1,353,821,652	$2,461,493,913	$14,757,510	$26,831,837	$45,750,088	$83,181,978
6/1/50	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228		$2,461,493,913	$1,353,821,652	$2,461,493,913	$14,757,510	$26,831,837	$45,750,088	$83,181,978
6/1/51	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228		$2,461,493,913	$1,353,821,652	$2,461,493,913	$14,757,510	$26,831,837	$45,750,088	$83,181,978
6/1/52	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228		$2,461,493,913	$1,353,821,652	$2,461,493,913	$14,757,510	$26,831,837	$45,750,088	$83,181,978
6/1/53	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228		$2,461,493,913	$1,353,821,652	$2,461,493,913	$14,757,510	$26,831,837	$45,750,088	$83,181,978
6/1/54	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228		$2,461,493,913	$1,353,821,652	$2,461,493,913	$14,757,510	$26,831,837	$45,750,088	$83,181,978
6/1/55	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228		$2,461,493,913	$1,353,821,652	$2,461,493,913	$14,757,510	$26,831,837	$45,750,088	$83,181,978
6/1/56	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228		$2,461,493,913	$1,353,821,652	$2,461,493,913	$14,757,510	$26,831,837	$45,750,088	$83,181,978
6/1/57	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228		$2,461,493,913	$1,353,821,652	$2,461,493,913	$14,757,510	$26,831,837	$45,750,088	$83,181,978
6/1/58	-	$570,384,800	$872,656,171	$389,534,109	$38,788,228		$1,871,363,307	$1,029,249,819	$1,871,363,307	$11,219,472	$20,399,041	$34,781,738	$63,239,523
6/1/59	-	$570,384,800	$872,656,171	$389,534,109	$38,788,228		$1,871,363,307	$1,029,249,819	$1,871,363,307	$11,219,472	$20,399,041	$34,781,738	$63,239,523
6/1/60	-	-	$872,656,171	$389,534,109	$38,788,228		$1,300,978,507	$715,538,179	$1,300,978,507	$7,799,818	$14,181,487	$24,180,389	$43,964,344
6/1/61	-	-	-	$389,534,109	$38,788,228		$428,322,336	$235,577,285	$428,322,336	$2,567,941	$4,668,984	$7,960,932	$14,474,421
6/1/62	-	-	-	$389,534,109	$38,788,228		$428,322,336	$235,577,285	$428,322,336	$2,567,941	$4,668,984	$7,960,932	$14,474,421
6/1/63					$38,788,228		$38,788,228	$21,333,525	$38,788,228	$232,549	$422,816	$720,930	$1,310,782
6/1/64					$38,788,228		$38,788,228	$21,333,525	$38,788,228	$232,549	$422,816	$720,930	$1,310,782
6/1/65					$38,788,228		$38,788,228	$21,333,525	$38,788,228	$232,549	$422,816	$720,930	$1,310,782
6/1/66					$38,788,228		$38,788,228	$21,333,525	$38,788,228	$232,549	$422,816	$720,930	$1,310,782
						TOTAL	$99,238,589,870	$54,581,224,429	$99,238,589,870	$594,969,781	$1,081,763,239	$1,844,479,152	$3,353,598,459

Appendix B

SWP AND CVP OPERATIONS, THE INDICES THAT GOVERN THEM AND THEIR VALIDITY

By: Arve R. Sjovold
February 29, 2016

INTRODUCTION

In State Water Resources Control Board Decision 1485, an index was promulgated for the classifying of water year types. This index provides varied tables, and sets of values for a variety of Delta protection standards. No supporting analysis was cited to show how and why this index, and its, water year type derivative were established. The Water Year Index is specified by the following formula:

INDEX = 0.4*X + 0.3*Y + 0.3*Z

Where: X = Current calendar year's April-July Sacramento Valley unimpaired run-off

Y = Current calendar year's October-March Sacramento Valley unimpaired run-off

Z = Previous calendar year's index

Once an index has been calculated, its value is used to determine one of five water year types: Wet, Above Normal, Below Normal, Dry, and Critical. This water year type designation is then used to set a multitude of water quality and flow standards throughout the Delta. Variations on this type of designation (e.g. the Shasta Index, American River Index, and the Trinity River Index) are also used in a multitude of operational and flow release standards for reservoirs throughout the Sacramento Basin. All of these indexes are used as well in the CALSIM II model.

D-1485 also specifies that when it is too early in the water year to have observations in hand for April-July and October-March, run-off forecast values should be based on "normal" precipitation for the unknown parts of the water year. "Normal" precipitation is not precisely defined, nor is it specified how it is to be used to calculate a value for run-off.

It is clear from a careful examination of the requirements of D-1485 that water year type is a very important parameter in managing the water resources of the Delta. Because of that high level of importance, it is fair to question both the reliability of this index and the wisdom of using it to manage the operation of the SWP and CVP.

SACRAMENTO BASIN HYDROLOGY

It is clear that the Water Year Index is profoundly dependent on the characteristics of the Sacramento Basin Hydrology. The three most important derivatives of that hydrology - particularly in regard to forecast reliability - are run-off flows for April-July and October-March, the reliance of the previous year's Water Year Index, and the notion of "normal" precipitation. If we take the statement "normal" precipitation to mean "normal" run-off, then we may perform some analyses to address these important characteristics.

A careful, quantitative examination of Sacramento Basin Hydrology was performed using the 4-river index as a surrogate for total Sacramento Basin run-off. Figure B-1 is a graph of the run-off history based on the 4-river index. A rudimentary look at the distribution of annual run-off from the 98-year record shows that the data divides into distinct groups; a drier year group comprising 56% of the years and a wet year group comprising 44% of the years as shown in figure B-2. Very few years are found near the average or "normal" value, in fact, the average value is at the relative minimum between the drier group and the wet group. Each of these groups does exhibit characteristics of a more normal distribution when taken separately.

Accordingly, each group was analyzed as a separate distribution and a statistical test was performed to determine the likelihood that they might actually be drawn from a single population. Table B-3 presents the characteristics of each of these groups.

Figure B-1
Sacramento 4 River Index
% of Historical Average

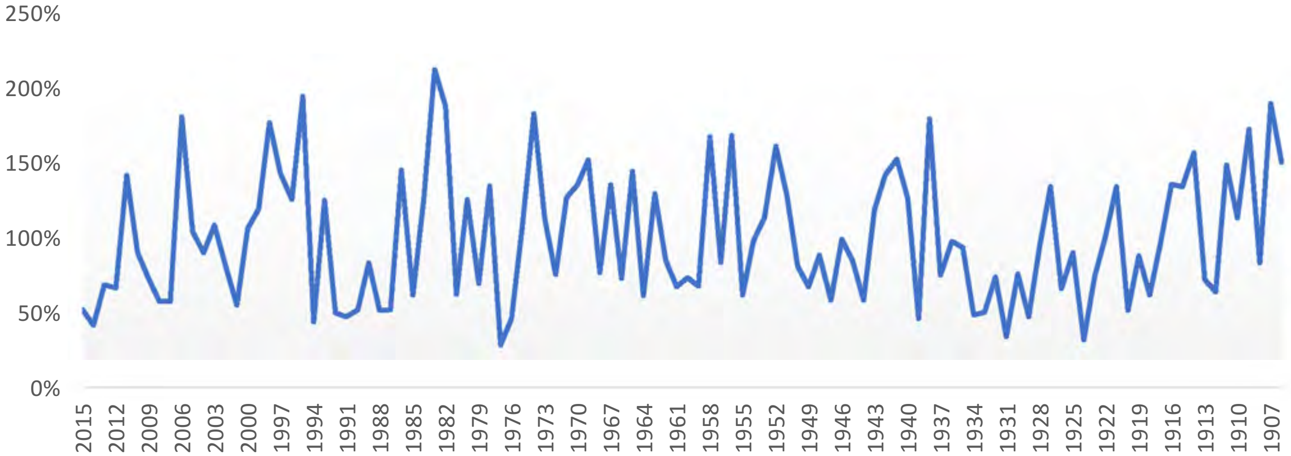

FIGURE B-2
ANNUAL SACRAMENTO 4-RIVER RUN-OFF,
98 YEARS

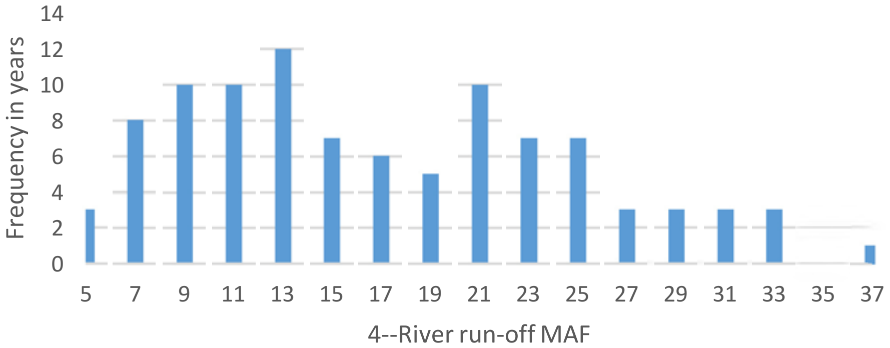

Table B-3
Statistical Characteristics of Wet and Dry Groups
4-River Index (MAF)

Dry	Wet

Mean	12.18	25.55
Standard Deviation	3.27	4.65
Std. Error of Mean	.441	.709

The standard t-test between means showed less than a 1% chance that the means of these two distributions came from a single population.

VALIDITY OF INDEXES

The water year index formula comprises three terms, two dealing with the current water year run-off and the third being a weighted run-off of the previous year's water year index. We investigated the validity and reliability of the three terms as predictors of the current water characteristics.

Influence of Previous Water Year

To test the validity of using the previous year's water year index, we determined if there was any significant serial correlation between successive years within the 98-year record of annual run-off. The serial correlation co-efficient [R] was found to be 0.084, which indicates no significant serial correlation, even though drought sequences of up to 5 years and wet sequences of several years were noted. (The probability that there was a real correlation was much less than 1%). The persistence of wet and dry sequences probably reflects shifts in the jet stream that may be stable for several years before shifting. This, in turn reflects typical Pacific, synoptic weather patterns. With such an insignificant correlation co-efficient we must conclude there is very little chance that a previous year's run-off has any effect on predicting the run-off of a successive year. *This conclusion requires that the last term in the formula for water year index must be eliminated from the equation.* If we eliminate the last term in the equation there is little need to use any weighting coefficients because the remaining two terms comprise all but about 4% of the expected total run-off for the current water year. The remaining task is to estimate run-off for the unknown months to come.

Forecasting Future Months of the Water Year

The ability to forecast run-off accurately for future months depends on the information at hand. Upon entering a new water year, there is very little information available, especially given the fact that data from the previous water year is not relevant. There is potential information in the measurements of snow pack but snow in the Sierra Nevada and southern Cascades only begins to accumulate in late winter and early spring. The only factual information early in the water year is the current measure of run-off, which in the fall is extremely low. Since the distribution of annual run-off really comprises two independent distributions, it is virtually impossible to designate in which domain, dry or wet, the coming water year falls.

Each of these distributions has its own “normal” begging the question: which one should be chosen for forecasting purposes? D-1485 states that when a forecast value is needed for the formulation it should be based on the value for normal precipitation. *We have shown that there is no "grand normal” for run-off.* (Usually the average or mean value is meant by this term); it is therefore very likely that there is no such thing as a "grand normal” for precipitation. Precipitation data exhibits extreme variation, and because the physical relationship between precipitation and run-off is not linear and is dependent on such parameters as antecedent moisture in the soil, precipitation is probably not a good choice for basing a forecast.

The most prudent choice is to assume that the coming water year will be dry until there is sufficient data to state otherwise. Assuming that the coming water year will be wet runs a 56% or higher chance of being wrong, hardly a prudent assumption given the importance of obtaining a reliable supply from the SWP. If the average for the dry group is chosen for the initial forecast there will be roughly a 25% chance of over-estimating the subsequent run-off. Prudence would dictate that perhaps a 5% chance of such a mistake would be tolerable. At a 5% chance the basis for the forecast would produce annual run-off in the range of 7-8 MAF. In terms of the 4-river index; actual run-off would be 20% to 25% higher. In effect, *a forecast* *range this low would likely cause a suspension in SWP and CVP operations for the first few months of the new water year*, though some export might be possible if there is reservoir storage to support it in these early months.

How soon in the water year can it be stated with some confidence how the water year will play out? October and November produce little to no excess run-off. The first month with the potential for large run-off is December followed by an even more likely run-off in January, February, March, April, and May when snow melt really begins in earnest (and possibly June) are the main run-off producers. Therefore, we must look at the earliest run-off months for an indicator.

An investigation was begun to find early indicators to assess the likelihood of a dry or wet future water year. We first examined whether the run-off of December alone would suffice. Our findings were inconclusive. The same DWR data base from which the annual run-off data was used to generate the graph in Figure 1, also contains the record of monthly run-offs which was used in this investigation. That was inconclusive. We then examined the sum of December and January run-off, and *we found that the sum of December and January could reliably predict if the coming water year would be dry*. A maximum threshold of 3.9 MAF for the sum would capture all but 2 of 55 dry years, which indicates a less than 5% chance of error. That same threshold also falsely designated 6 of 43 wet years as dry. However, that error is not critical since the unfolding water year could easily allow positive corrections in operations.

A scatter plot of the map of total annual run-off versus the sum of January and December run - off is presented in Figure B-3 on the following page. Axes are drawn vertically at a value of 3.9 and horizontally at the grand average of total run-off, creating four quadrants labeled dry winter-wet spring, wet winter-wet spring, wet winter-dry spring, and dry winter-dry spring. Most of the data points are found in either the dry winter-dry spring or wet winter-wet spring designations, which effectively constitute the dry and wet groups used in our analysis. The lack of data points in the other two quadrants confirms that these two groups are distinct. The figure also shows the few data points not in the populated quadrants, demonstrating the low likelihood of error in using the 3.9 MAF locus as a decision basis for declaring a dry winter-dry spring in the early part of the water year.

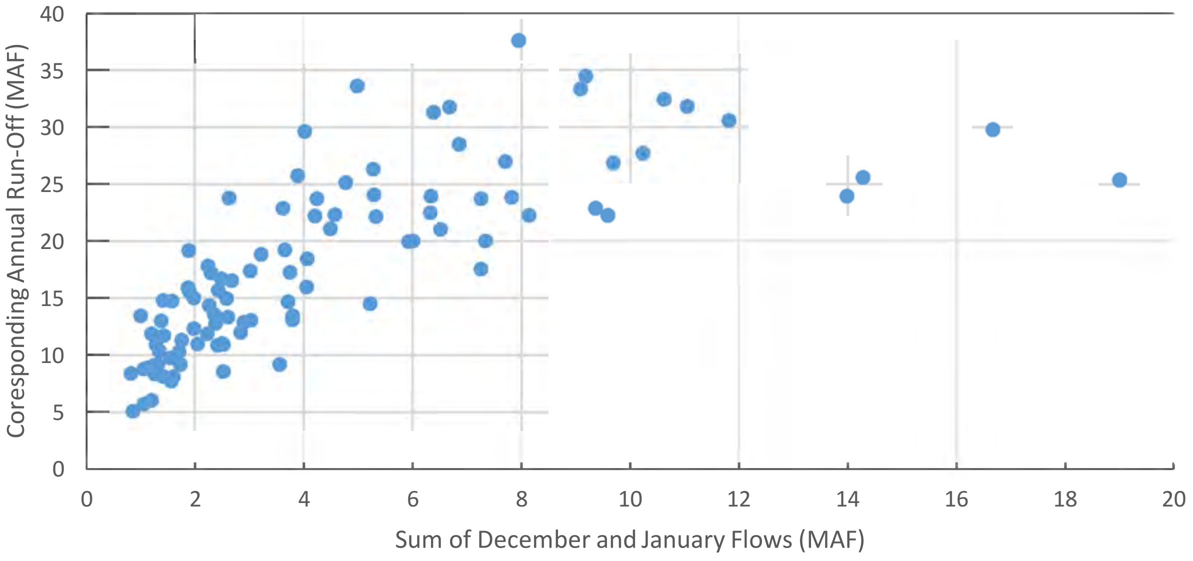

Figure B-3
Annual Run-off
-vs-
Cumulative December & January

With further examination of the dry group distribution, we found a bounding locus that contains the entire dry group set except for two points. The equation of this locus is:

$$\textbf{RUN-OFF} = 2.877 * \textbf{DEC-JAN} + 2.67$$

Where: **RUN-OFF** = minimum annual run-off, MAF

DEC-JAN = sum of December and January run-off, MAF

provided **DEC-JAN** is less than or equal to 3.9 MAF

This equation provides a minimum run-off for the dry group with only about a 5% chance of a lower run-off. With this equation, prudent SWP operations can be devised for the months past January until subsequent run-off data can supersede it. It may be possible to find additional bounding equations to guide SWP operations, assuming December and January data are already known. This process may be repeated for successive months and should converge on the actual run-off by the end of the run-off season.

The analyses above establish several constraints in developing prudent SWP operations:

1) No reliance can be placed on a previous water year's run-off in forecasting run-off for a given water year.

2) If run-off through January for a given water year is low (less that 3.9 MAF) it is very likely that the remainder of the water year will be low.

3) There is no meaningful value in referring to the grand average of the hydrologic record as "normal". The record indicates strongly that there are two distinct groups that cluster below and above the grand average, each with its characteristic average or normal value.

4) The equation for calculating the Water Year Index is without merit; the same applies to its derivative, Water Year Type.

POTENTIAL EFFECTS ON SWP OPERATIONS

Winter Pumping

Because low winter run-off through January indicates the very strong likelihood of a dry year overall, winter pumping through January should be minimal if not altogether suspended until further run-off data shows that pumping can be done without jeopardizing the reliability of future deliveries or threatening Delta health. The prudent level of pumping from the Delta during such low periods of winter run-off remains to be investigated.

Overall Project Yield

Since dry years predominate the record, and no confident statement can be made at the beginning of a water year concerning expected project yield, the project yield should be base-lined on the amount that can be reliably exported given the expectation that the ensuing water year will be dry. *This finding necessarily will lead to an export level that is much lower than the current value of 4.1 MAF.* The project can now be studied to determine the amounts of surplus water that can be safely delivered until winter run-off is sufficient to conclude that the total water year will be wet. This implies that the safe level of export will be continuously evaluated as the water year progresses.

Reservoir Operations

Because the designations of water year type are based on a calculated water year index which has been shown to have no validity, *all reservoir operations must be re-examined to determine prudent levels of release* *and storage.*

SWRCB Regulations and Constraints

Because so many of the regulations and constraints that have been promulgated by the SWRCB are based on the flawed water year type, *all such regulations and constraints must be re-visited.*

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Appendix C

References

Central Coast Water Authority Comprehensive Annual Financial Reports, Fiscal Years 1998-2011. Available at http://www.ccwa.com/archives.html.

Central Coast Water Authority Budgets, Fiscal Years 1998-2011. Available at http://www.ccwa.com/archives.html.

2010 Central Coast Water Authority Urban Water Management Plan Update. Available at: http://www.ccwa.com/Archives/UWMPs/uwmp-2010.pdf.

Goleta Water District 2010 Urban Water Management Plan Update. Available at http://www.goletawater.com/assets/GWD_2010UWMP_Final.pdf.

Goleta Water District Water Rates and Meter Charges. Available at: http://www.goletawater.com/rates-bills-and-budget/water-rates-and-meter-charges/.

Goleta Water District Budgets. Available at: http://www.goletawater.com/rates-bills-and-budget/budget/

Montecito Water District Urban Water Management Plan Update 2005. Available at http://www.montecitowater.com/2005%20UWMP%2010-05.pdf.

Montecito Water District Water Rates and Meter Charges. Available at: http://www.montecitowater.com/fees_charges.htm.

Montecito Water District Budgets and Comprehensive Annual Financial Reports. Available at: http://www.montecitowater.com/public.htm

2010 Carpinteria Valley Water District Urban Water Management Plan Update. Available at http://www.water.ca.gov/urbanwatermanagement/2010uwmps/Carpenteria%20Valley%20Water%20District/CVWD-Final-UWMP-June-2011-all.pdf.

Carpinteria Valley Water District Water Rates and Meter Charges. Available at: http://www.cvwd.net/water_rates.htm.

Carpinteria Valley Water District Water District Budgets. Available at: http://www.cvwd.net/about_budget.htm

City of Santa Barbara Urban Water Management Plan Update 2010. Available at: http://www.santabarbaraca.gov/NR/rdonlyres/B9E0F766-6384-480A-A944-0F87003F8882/0/UWMPCityofSantaBarbara2010UpdateFINAL.pdf.

City of Santa Barbara Water and Sewer Rates. Available at: http://www.santabarbaraca.gov/Resident/Water/Rates/WaterSewer.htm.

City of Santa Barbara Budgets and Comprehensive Annual Financial Reports. Available at: http://www.santabarbaraca.gov/Government/Finance/

California Department of Water Resources Bulletin 132, "Management of the California State Water Project." Available at: http://www.water.ca.gov/swpao/bulletin.cfm.

Madrid, Carlos. 1985. Santa Barbara County State Water Project alternatives. Los Angeles, Calif. Dept. of Water Resources, Southern District and Santa Barbara County Flood Control and Water Conservation District.

Santa Barbara County Grand Jury 2006-07 Report- "Carpinteria Valley Water District- Is Improved Direction Needed?" http://www.sbcgj.org/2007/carpwater.pdf.

California Department of Water Resources, "The State Water Project Delivery Reliability Report 2007", published August 2008. http://www.water.ca.gov/pubs/swp/swp_delivery_reliability_report_2007/swpdrr07.pdf

Edited by Alan Lufkin, "California's Salmon and Steelhead- The Struggle to Restore an Imperiled Resource", Chapter 17- The North Coast Water Wars: An Interview with Peter Behr. UC Press E-books selection. http://publishing.cdlib.org/ucpressebooks/view?docId=ft209nb0qn&chunk.id=d0e4513&toc.id=d0e4513&brand=ucpress.

Carollo Engineers. City of Santa Barbara, California Seawater Desalination Rehabilitation Project. March 2009.

David M. Rosenbaum, "Coastal Aqueduct Lessons to Guide Next Pipeline Project". Engineering News-Record, June 30, 1997. Volume 238, No. 26.

Business Forecasting Center, Eberhardt School of Business, University of the Pacific, 2012. Benefit-Cost Analysis of Delta Water Conveyance Tunnels. http://forecast.pacific.edu/articles/BenefitCostDeltaTunnel_Web.pdf

ECONorthwest. "Analysis of a cost of a Bay-Delta Conveyance structure: Rate Impacts to Santa Barbara County." July 2012. http://www.c-win.org/webfm_send/244

Central Coast Water Authority Comprehensive annual financial report. June 2015. http://www.ccwa.com/Archives/CAFRs/2015CAFR.pdf

Central Coast Water Authority 2010 Urban Water Management Plan. June 2011 http://www.water.ca.gov/urbanwatermanagement/2010uwmps/Central Coast Water Authority/CCWA 2010 Urban Water Management Plan.pdf

california water impact network

Attachment 2

Board of Directors

Carolee Krieger
co-founder
president
executive director

Michael Jackson
co-founder
secretary

Joshua Green
treasurer

Yvon Chouinard
co-founder

Malinda Chouinard

Dan Bacher

Nick Di Croce

Conner Everts

Bill Jennings

Huey Johnson

Tom Stokely
water policy
analyst

Barbara Vlamis

In memoriam
Dorothy Green
co-founding
secretary

Web Site:

www.c-win.org

Staff

Tim Stroshane
senior research
associate

Glen Martin
media consultant

Advisors
Maude Barlow
Gray Brechin
Jim Edmondson
Larry Farwell
Joan Wells

Testimony on Water Availability Analysis for Trinity, Sacramento, and San Joaquin River Basins Tributary to the Bay-Delta Estuary

Submitted by
Tim Stroshane
Senior Research Associate
California Water Impact Network (C-WIN)

and on behalf of
California Sportfishing Protection Alliance
and AquAlliance

October 26, 2012

for

Workshop #3
Analytical Tools for Evaluating the Water Supply, Hydrodynamic, and Hydropower Effects of the Bay-Delta Plan
November 13 and 14, 2012

The State Water Resources Control Board called for workshops to receive information from and discuss with participating parties the scientific and technical bases for considering potential changes to the 2006 Water Quality Control Plan for the San Francisco/Sacramento-San Joaquin Delta Estuary for Phase II of the Board's comprehensive review of this plan.

According to the State Board's public notice for these workshops, the prompts for Workshop 3 testimony are:

1. What types of analyses should be completed to estimate the water supply, hydrodynamic, and hydropower effects of potential changes to the Bay-Delta Plan?

2. What analytical tools should be used to evaluate these effects? What are the advantages, disadvantages and limitations of these tools?

Water Availability Analysis

Workshop 3 Testimony, Bay Delta Plan

Submitted by California Water Impact Network,
California Sportfishing Protection Alliance, and AquAlliance

The California Water Impact Network, the California Sportfishing Protection Alliance, and AquAlliance (hereinafter, C-WIN) are pleased to submit this testimony to the State Water Resources Control Board. This testimony addresses the close linkage between the Board's public trust responsibilities on behalf of the State of California, its water quality control planning function, and its duty to regulate water rights in California. Water quality control planning efforts to date have led the Board to consider proportional tributary contributions needed to meet Delta inflow objectives from the Sacramento and San Joaquin River Basins to improve water quality and protect all beneficial uses, including fish and wildlife, in the Delta. The State Water Resources Control Board has authority over water rights in the Basins that would enable it to reallocate water usage and ensure compliance with the Board's new instream flow objectives.

Water availability analysis is an important method for modeling how the Board would implement new flow objectives. Our testimony illustrates the use of a planning-level water availability analysis for the Trinity River (much of whose flows are diverted to the Central Valley watershed of the Bay-Delta Estuary), and the major tributaries of the Sacramento and San Joaquin River Basins. We incorporate into the analysis the Basins' hydrologic variability, instream flow requirements based on the Board's 2010 public trust Delta flow determinations, and then operate publicly available water rights data and priorities on the divertable flows that remain in the system. We find that under public trust protective flow determinations, the promised water represented in water rights claims far exceed flow conditions available to these claims in most years.

We recommend for the Bay-Delta Plan's implementation program that the State Water Resources Control Board draw on its new flow determinations to increase the seasons during which rivers in the Bay-Delta Estuary's Central Valley watershed are fully appropriated, and push back the water rights priority date on which Term 91 curtailments are now based. Our water availability analysis suggests distinct parameters for both actions.

Finally, we conclude that the Board should use the Bay-Delta Plan process to tighten up its regulation of surplus water usage and export by the State Water Project and Central Valley Project to avoid permanently damaging Sacramento Valley groundwater resources. The Board's Delta flow determinations, coupled with comprehensive enforcement of water rights priorities, can help to protect both groundwater and surface water resources in the Sacramento Valley over the long term.

Government's Public Trust Responsibility

Governments have a permanent fiduciary responsibility and obligation to protect the public trust. In *National Audubon Society v. Superior Court* (1983) 33 Cal 3d 419, 441, the court held that "the public trust is more than an affirmation of state power to use public property for public purposes. It is an affirmation of the duty of the state to protect the people's common heritage of streams, lakes, marshlands and tidelands, surrendering that right of protection only in rare cases when abandonment of that right is consistent with the purposes of the trust." The act of appropriating water is an acquisition of a property right from the waters of the state, an act that is therefore subject to regulation under the state's public trust responsibilities.

The State Water Resources Control Board has invoked its public trust responsibilities in regulating the waters of California and now acknowledges that the public trust is one of its ongoing regulatory responsibilities. Its most publicly prominent instance came in Water Rights Decision 1631 (D-1631) in 1994. In D-1631, the Board balanced the needs of the City of Los Angeles for water supply from the tributaries of Mono Lake with the lake's own needs for water to sustain its ecosystem. It required Los Angeles to make releases from each of its tributaries that would sustain riparian ecosystems and help restore fish populations to the tributaries by prescribing lake level targets in a specified time period. (State Water Resources Control Board 1994) The Board has also adopted regulations governing how it treats the public trust in matters of the appropriation of water in California. (State Water Resources Control Board 2011b: Article 14, Standard Permit Terms and Conditions)

The trial court in *United States v. State Water Resources Control Board* (1986, 182 Cal.App.3d 82) determined that the State Water Resources Control Board had the authority to modify an appropriative water right permit once it had been issued, and that it could reduce the US Bureau of Reclamation's Central Valley Project permits to gain compliance from the Bureau. But the trial court held new fish and wildlife objectives the Board had approved in Water Rights Decision 1485 (D-1485) in 1978 to be invalid because the Board failed to identify the *source* of its authority. Justice John Racanelli, the author of the subsequent appellate court decision cited above, stated that the source of the Board's authority to issue and enforce new fish and wildlife objectives such as those contained in Water Rights Decision 1485 (D-1485) was the Public Trust Doctrine:

> ...the state as trustee of the public trust retains supervisory control of the state's waters such that no party has a vested right to appropriate water in a manner harmful to the interests protected by the public trust. (182 Cal.App.3d 82, 149)

Stevens (2005) summarizes the present range of coverage that American and California law gives the public trust doctrine:

1. It applies to all navigable streams.
2. It applies to ecological preservation.
3. It applies to wetland areas.
4. It applies underground (citing the Waiahole decision from Hawai'i).
5. It applies to artificially enlarged waters.
6. It applies to wild animals, including fish.[1]

The Public Trust and Paper Water

In the next few years, the State Water Resources Control Board is expected to make several crucial decisions on California's water future. These decisions include:

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[1] The California Constitution also provides an absolute right to fish among the fundamental declared rights it accords all California citizens. Article I, Section 25 states:

> ARTICLE 1 DECLARATION OF RIGHTS
>
> Section 25. The people shall have the right to fish upon and from the public lands of the State and in the waters thereof, excepting upon lands set aside for fish hatcheries, and no land owned by the State shall ever be sold or transferred without reserving in the people the absolute right to fish thereupon; and no law shall ever be passed making it a crime for the people to enter upon the public lands within this State for the purpose of fishing in any water containing fish that have been planted therein by the State; provided, that the legislature may by statute, provide for the season when and the conditions under which the different species of fish may be taken.

In combination with California Fish and Game Code Section 5937, which provides that owners of dams must preserve fish populations downstream in "good condition", preservation of this right logically should be construed as an important aspect of the public trust responsibilities of government. It retains meaning as a right only when there exist sufficient fish to catch sustainably.

- Determining how to provide sufficient flows from the Sacramento and San Joaquin River's major tributaries to the Bay-Delta Estuary.
- Updating its 2006 Bay-Delta Water Quality Control Plan to include those new Sacramento and San Joaquin River flow and South Delta salinity objectives.
- Deciding whether to extend the water rights *permits* of the California State Water Project and the federal Central Valley Project, or instead *license* them at levels that represent reasonable and public trust protective water usage.
- Deciding whether and/or how to permit a "north Delta diversion"—a diversion that is now more familiarly known as the Peripheral Tunnels Project.
- Deciding whether and/or how to permit new reservoirs on the San Joaquin River and in the southwestern Sacramento Valley (and/or to raise existing dams to increase storage elsewhere) that would be added to the storage capacities of the Central Valley Project and the State Water Project.

As a regulatory agency, the State Water Resources Control Board is not known for making and holding to courageous or visionary decisions that protect beneficial uses of water throughout California. Their record of delay and incrementalism has contributed to the poor condition of the Bay Delta Estuary and the great rivers of its watershed, the great Sacramento and San Joaquin Rivers.

The State Water Resources Control Board has authority to make bold decisions and hold to them. (Cahill 2008)

The State Water Resources Control Board will need to balance protection of the public trust with other competing beneficial uses of water reliant on the Delta. The Board has already determined the flows that fish and other aquatic species need. (State Water Resources Control Board 2010: 114-123) In completing and implementing the Bay-Delta Plan, the Board's next step is to evaluate the feasibility of measures needed to protect public trust resources fully. (California Supreme Court 1983; Kibel 2011: 6) These steps will need to include: determination of flow needs of public trust resources, water rights reallocation, flow modification, benefit-cost analysis, and habitat restoration. In the process. key questions must be answered:

1. How does the State Water Resources Control Board intend to prioritize water use in terms of coequal goals, of public trust balancing? How does its long-established water rights priority system fit into this policy framework?

2. What does water supply reliability mean in an arid state where we have granted rights to far more water than actually exists? Should water supply reliability be conditioned upon specific requirements to maximize reclamation, reuse, conservation and development of alternative local sources of water?

3. Is the standard by which we measure water supply reliability the same for junior and senior appropriators? Do uses of water that require vast public subsidies have the same priority as uses that don't require subsidy of public funds? Are uses that internalize adverse impacts equal in priority to uses that externalize them?

4. Should the worth of water be confined only to its economic value in use? Or does water supply reliability apply to both public trust resource needs as well as consumptive uses (i.e., is legislation needed for better protection of public resources through water rights)?

5. Are statutory requirements to protect water quality and listed species equivalent to water supply reliability for lawns or surplus, subsidized, and non-food crops? Are food crops more

important than non-food commodities when it comes to allocating water? Does health and safety take precedence over certain agricultural uses of water?

6. Does efficient use of water have higher priority over wasteful and inefficient use? Is protection of the Bay-Delta Estuary as a "national treasure" and one of the world's great estuaries more valuable to society than irrigating impaired soils, that by their nature when irrigated, discharge prodigious quantities of salt and toxic wastes back to our waterways and aquifers?

Answers to these questions are central to resolving California's water problems.

The California Legislature consolidated the State of California's water rights and water quality control responsibilities in the State Water Resources Control Board in 1967. Since that time, the Board has considerable authority to grapple with these questions and arrive at answers and solutions from them. The Board has authority to:

- Plan for water quality control.
- Receive, condition, and approve new water rights applications as permits.
- Regulate and license water rights permits specifying the point of diversion, diversion flows, place of use, and purpose of use for water.
- Investigate pre-1914 and riparian water rights to determine whether such claims to divert and use water are legal, including follow-up enforcement against illegal uses when determined (discussed below).
- Investigate and enforce the state's prohibition of waste and unreasonable use and wasteful and unreasonable method of diversion of water under the California Constitution, Article X, Section 2.
- Protect the public trust. As an agency of the state, the Board is charged with ensuring the state of California carries out its fiduciary responsibility to protect air, running water, the sea, and the seashore, "these things that are common to all," as stated originally in Roman law (the Institutes of Justinian).

California's constitution promises water rights only up to what is a reasonable use. No one has a right in California to use water unreasonably, not even the federal government. (California Constitution, Article X, Section 2) The Public Trust Doctrine provides that no one has a vested right to appropriate water in a manner harmful to the interests protected by the public trust. (*National Audubon Society v. Superior Court*, 33 Cal.3d 419, 189 Cal.Rptr 346, 658 P.2d 709) And the dictionary definition of usufructuary rights, of which both riparian and appropriative water rights are examples, indicates that a fundamental principle of usufruct is that it connotes only a right to *use* a resource like water, not to waste or use it unreasonably. The State Water Resources Control Board, in taking up all of the key questions we outline above, will be deciding whether and how California's abundant legal authorities apply to the Bay-Delta Estuary's Central Valley watershed.

The Public Trust and Proportional Delta Inflows

In mid-2009, the State Water Resources Control Board updated its review of the Water Quality Control Plan which its Water Right Decision 1641 (D-1641) implements. The Board took the position that to change its water quality and flow criteria it needed more scientific information about flows reasonably needed to protect fish and wildlife beneficial uses (State Water Resources Control Board, 2009: 17). Its impetus to consider making changes at that time included pronounced fisheries declines among both open water resident and migratory fish, and the still-unfolding impacts of climate change and its impacts on the Bay-Delta estuarine system (State Water

Resources Control Board, 2009: 9). The California Department of Fish and Game sought to build a salmon survival model to assist the Board's need for additional information. (California Department of Fish and Game 2010)

Later in 2009, the California Legislature directed the State Water Resources Control Board to prepare a report on Delta flow criteria that would "develop new flow criteria for the Delta ecosystem necessary to protect public trust resources" and in so doing "use the best available scientific information." The Legislature directed the Board to gather the information as part of an "informational proceeding" rather than through an evidentiary hearing. And the Legislature charged the Board with including volume, quality and timing of water necessary for the Delta ecosystem under different conditions (California Water Code: Section 85086(c)).

The Board produced its Delta flow criteria report after taking detailed testimony on the best available science for key fish species and ecosystems. The report identified a set of broad flow regimes for upstream tributaries providing inflow to the Bay-Delta Estuary that fish need to survive and recover. They represent the Board's consideration of the best available fishery and hydrologic science it considered during 2010 addressing the question: what flows do fish need? The Board confirms this when it stated in a footnote, "...the flow criteria developed in this proceeding are intended to halt population decline and increase populations of certain species," and acknowledged that, "Recent Delta flows are insufficient to support native Delta fishes for today's habitats....Flow and physical habitat interact in many ways, but they are not interchangeable." (State Water Resources Control Board 2010: 5, 120)

The Board states that the flow criteria "must be considered" in context:

- The flow criteria do not consider any balancing of public trust resource protection with public interest needs for water.
- The State Water Board does not intend that the criteria should supersede requirements for health and safety such as the need to manage water for flood control.
- There is sufficient scientific information to support increased flows to protect public trust resources; ***while there is uncertainty regarding specific numeric criteria, scientific certainty is not the standard for agency decision making.*** (State Water Resources Control Board 2010: 4; emphasis added)

The Board's flow determinations are:

- 75 percent of unimpaired Delta outflow from January through June.
- 75 percent of unimpaired Sacramento River inflow from November through June.
- 60 percent of unimpaired San Joaquin River inflow from February through June.
- Increased fall Delta outflow in wet and above normal years.
- Fall pulse flows on the Sacramento and San Joaquin Rivers to stimulate migrating fish.
- Flow criteria in the Delta interior to help protect fish from mortality in the central and southern Delta caused by operations of the state and federal water export pumps.

In essence, these flow determinations represent the Board's answer to the question, "what flows do fish need in the Central Valley watershed and the Bay-Delta Estuary?" The State Water Resources Control Board's 2010 Delta flow criteria report acknowledged that protective Delta outflows start with protective tributary inflows to the Delta. The Board's Delta inflow criteria rely on a percentage of unimpaired flow measure, which enables the flow criteria on the Sacramento and San Joaquin rivers to more closely mimic their natural hydrographs than now occurs.

For the San Joaquin River, the State Water Resources Control Board approved its determination that 60 percent of unimpaired flow from February through June for the river basin would protect juvenile Chinook salmon during their peak emigration period. For the Sacramento River, the Board adopted the criterion of 75 percent of unimpaired flow from November through June. (This is because numerous runs of migratory salmon use the Sacramento River Basin for more of the year.) These constrained periods would also benefit the rearing period of juvenile salmon in the basin's major tributaries upstream. The Board also adopted in that report (2010) a fall season Delta inflow criterion calling for an average flow of 3,600 cubic feet per second for 10 days sometime during late October.

Nearly all scientists testifying to the Board in March 2010 agreed that mimicking the natural hydrograph (in shape if not in magnitude and volume of flow) is necessary to improve conditions for native fish species, and to counter invasive species in the Delta. Existing Board water quality and flow objectives intended to protect fish and wildlife beneficial uses in the south Delta are not working, as shown in abundant evidence presented to the Board at its hearings for the Delta Flow Criteria report. The Board includes much of that data in its report. (State Water Resources Control Board 2010) C-WIN provide a brief evaluation of the Vernalis Adaptive Management Plan to supplement this record of failure in Appendix A to this testimony.

In August 2010, the State Water Board approved these currently nonbinding Delta inflow determinations for the Sacramento and San Joaquin rivers. (State Water Resources Control Board 2010: 114-123) The State Water Resources Control Board observed that using such flow criteria would mean that "to achieve the attributes of a natural hydrograph, the criteria are advanced as a percentage of unimpaired flow on a 14-day average, *to be achieved on a proportional basis from the tributaries to the San Joaquin River.*" (State Water Resources Control Board, 2010: 120, emphasis added) The Board makes an important point that mimicking natural hydrograph and improving prospects for species recovery depends on achieving proportional flow allocations from all the major tributaries. Proportional tributary contributions would be needed to implement the Board's broader Delta inflow criteria. The Board will need to answer key questions including: what should those proportions be, how should responsibility for them be assigned, and who will be responsible for providing them? And: when will the upper San Joaquin River be included by the Board in making these determinations? (Right now, the Board excludes the upper San Joaquin River from its Bay-Delta Estuary planning deliberations. C-WIN evaluates the Board's stance in Appendix B.)

The question for the Board is how to do proportional flows *legally.* Proportional tributary contributions from Delta inflow are not new. In 1992, the California Department of Fish and Game proposed a method to identify tributary contributions to Delta inflows based on the pro rata share of unimpaired runoff each tributary generates to the Delta, as identified in the California Department of Water Resource's Bulletin 120 each year (California Department of Fish and Game, 1992). Other allocation methods could be devised as well, such as one based on reservoir storage on these same tributaries. The State Water Board in its Draft Water Right Decision 1630 presented such a method, but which excluded contributions from the San Joaquin River above Mendota Pool (State Water Resources Control Board, 1992: Tables IV and V).

Proportional tributary contributions needed to fulfill Delta inflow determinations from the Trinity River, and the major tributaries of the Sacramento and San Joaquin River Basins will require changes to the water rights of major water users in these Basins. The State Water Resources Control Board has authority over water rights to reallocate water usage and ensure compliance with the Board's Delta inflow objectives.

Paper Water Means Boundary Disputes and Clouded Titles

Property is often legally conceived as a bundle of rights representing "investment-backed expectations" of a future stream of benefits accruing to its owner, usually in the form of money. Water rights are a form of property, conveying to their owners rights to use water from a stream. Unlike real property in land, however, we have a situation in which far more in rights to use water have been granted by the state or claimed by right holders than Nature and reality actually provide.

California's modern water code and its body of water rights case law is the result of more than a hundred and sixty years of legislation and legal precedent. Riparian water rights are the most paramount rights, followed by pre-1914 appropriative rights and, lastly, post-1914 appropriative rights, as determined by the seniority requirements of first-in-time-and-use.

But despite this accumulated legal tradition, human promises of water exceed Nature's provisions. A shorthand description of this condition is "paper water." The paper water problem in the area of water and rivers in California has close analogies in concepts like "clouded title," and "boundary dispute" for a piece of real property (say, a house, or a plot of land) that has more than one owner claiming the same piece or portion of ground. Typically, boundary disputes are resolved by one or more disputants engaging the services of a surveyor to establish where the boundary is actually located. From there, the owners have a common set of facts on which they may agree to resolve their boundary dispute.

"Clouded title" has relevance here as well. A clouded title means the ownership of a title in water has some defect or potential defect arising from a competing claim for the same source of water.

One of the earliest recognitions of the problem of paper water in California occurred over a century ago and helps illustrate the clouded condition of paper water. In 1900, Frank Soulé, a professor of civil engineering at the University of California, was retained by the US Department of Agriculture's Office of Irrigation Investigations to study water rights claims in the San Joaquin River basin. Soulé found that the San Joaquin River's average winter and spring months' flows were approximately 5,000 to 6,000 cubic feet per second. In drier late summer and fall months, flows could get as low as 150 cubic feet per second. Soulé researched water rights claims to all tributaries of the San Joaquin River watershed to see how they matched up with flows in the river. Actual flows from the 1895-1909 period averaged about 2.02 million acre-feet, according to state records. (State Water Resources Board 1951: Table 62) He visited the recorders' offices for Stanislaus, Merced, and Fresno counties and itemized 315 claims to San Joaquin River waters totaling 36,571,471 miners inches of flow (there are 50 miners inches to a cubic foot per second). This converts to 731,429 cubic feet per second. Stretched out over a year (Soulé did not specify the seasons for which the claims were made), this translated into an annual claim of water rights of 529.9 million acre-feet of water, over 260 times greater than average flow of the San Joaquin River in that period. For an eight-month irrigation season of about 246 days, such flows would amount to 356.9 million acre-feet, nearly 180 times greater than San Joaquin River flows. These, Soulé contended, were the "definite claims," ones that had well-defined diversion points and amounts claimed. Six separate individuals claimed "all the water flowing in the San Joaquin River," a definite claim, if exaggerated. His summary for the San Joaquin did not include claims to the Fresno and Chowchilla rivers, which are much smaller watersheds, but the grandiosity continued there. On the Fresno River, some 670,799 miner's inches were the subject of 50 claims (about 13,416 cubic feet per second or 9.7 million acre-feet a year), and on the Chowchilla just 14 claims aggregated to 31,008 cubic feet per second (or about 22.5 million acre-feet annually). (Soulé 1901: 222, 232)

Clouded titles in water have been allowed to fester since before Professor Soulé began studying the problem in 1900. Failure by the State of California to quiet titles to water since assuming authority for appropriative water rights in 1914 contributes untold expectations for benefit streams that fuel controversy in California water resources planning and development ever since.

C-WIN is not a lone contemporary voice on the problem of paper water. In September 2008, State Water Resources Control Board staff informed the Delta Vision Blue Ribbon Task Force about water rights, use, and flows in the Delta watershed. It stated in part:

- The "total face value of the approximately 6,300 active water right permits and licenses within the Delta managed by the State Water Board, including the already assigned portion of state filings, is approximately 245 million AFA [acre-feet annually]." Our organizations note that this 245 million acre-feet of face value in water rights was permitted by the Board and its predecessors in the Central Valley watershed (including imports from watersheds like that of the Trinity River). (State Water Resources Control Board 2008)

- Face value "does not include pre-1914 and riparian water rights." Riparian water rights, in the absence of some form of watershed adjudication, are usually unquantified but nonetheless require real, wet water. (State Water Resources Control Board 2008) And,

- That "the total face value of the unassigned portion of state filings for consumptive use (excluding state filings for the beneficial use of power) within the Delta watershed is approximately 60 million [acre-feet annually]." These are claims the State has filed to reserve water for further expansion of the State Water Project. (State Water Resources Control Board 2008; see also Appendix C.)

Other matters exacerbate the paper water problem:

- The SWRCB does not know how much water is actually used (and by whom) since state law has yet to require full accounting of either surface or ground water use.

- The SWRCB does not know the extent of paramount riparian or senior pre-1914 water rights either.

- Climate change is likely to alter the timing and reduce the volume of runoff into California's rim dams and overall state and federal water systems. (Knowles and Cayan 2002) It is also likely to decrease natural groundwater recharge as well, which would further reduce runoff volumes where river reaches benefit from groundwater inflows.

- Increased cold water pools and groundwater support from gaining streams will be needed to maintain water temperatures below rim dams according to estimates by the SWRCB and Department of Fish and Game of the increased inflow and outflow necessary to protect rivers and the Delta public trust resources. (California Department of Fish and Game 2010: 51, Table 5)

Given these constraints, the obligation to achieve a public trust balancing of water supply reliability with fish and ecosystem survival cannot rest on maintenance of existing levels of supply from either Delta exports or the rim dams on all major Central Valley tributaries in the Delta watershed. The State Water Resources Control Board must use its water rights authority in the service of meeting these water quality challenges on behalf of public trust resources.

The Delta Watermaster acknowledges the problem of paper water in a recent report on the State Water Resources Control Board's role in the Delta Stewardship Council's Delta Plan process (Wilson 2011). He expresses concern, however, that "the face value of water rights is not a sufficient measure of water that can be used to determine the over-allocation of water in the [Delta] watershed." He cites four main reasons for his concern:

- The face value of many water rights are for nonconsumptive uses, such as hydropower.
  - **C-WIN Response:** As much as possible, water availability analysis should factor out water rights claims that are primarily devoted to nonconsumptive uses and hydropower generation in particular. C-WIN's analysis factors out all single-purpose hydropower generation water rights claims, whether pre- or post-1914. Where multiple purpose of use claims include hydropower generation, we assume these rights are still primarily consumptive use claims, especially when irrigation is one of the other purposes of use for which claims are made. Hydropower generation is considered incidental to the other consumptive uses.

- The face value represents a maximum possible water diversion, which is far greater than what is actually used;
  - **C-WIN Response:** We agree that face value often represents a maximum possible diversion (and/or storage amount). We also agree that it may be far greater than what is actually used in many cases. But C-WIN's review of water right claims shows that some rivers' claims far exceed maximum unimpaired flows and even reservoir capacity on that river. (The Trinity River is a good example of this.) This is less a criticism of face value than an acknowledgement of paper water by the Delta Watermaster. Nor does it justify continuation of the practice by the State Water Resources Control Board. Since the maximum possible flow (and use) can occur only relatively rarely in California's hydrology, C-WIN suggests that this extra increment of claims be eliminated because it will occur in the future with even less frequency than now occurs. Reliable rights are only meaningful when they can be exercised with relative frequency.

- Permit/license terms, such as those for protection of instream uses, further reduce below the face value the amount of water that can be diverted;
  - **C-WIN Response:** The State Water Resources Control Board needs to continue having some standard method for quantifying the value of water rights as property. This is the only way that increments of title to water as property can be described and titles cleared or quieted in the event of dispute. Moreover, quantified water rights are the only way to conduct reality-based water resources planning and development. This extends to employing a standard method for quantifying and measuring instream flows that benefit public trust resources. If the Board and Delta Watermaster are to enforce instream flows, they must quantify instream flow commitments and ensure that they are fulfilled *prior* to the exercise of permitted or licensed water rights claims.

- Water, when applied, is typically not consumed up to the full face value and the same water (return flow) is often used multiple times as it runs downstream.
  - **C-WIN Response:** While C-WIN acknowledges the reality of return flow in diversion of water for consumptive irrigation uses, there is no consistently available data that measures the volume and occurrence of return flow to rivers. Some estimates, both recent (California Department of Water Resources 2005: water balances for Sacramento and San Joaquin River Basins) and historical (Wiel 1928: 259) put return flow at between 60 and 65 percent of originally diverted volumes. Of course, the reality of return flow, however, means that river flow can decrease by as much as a third of diversion quantities each time it is applied; the more frequently water is diverted to consumptive use, the sooner surface flows are depleted in the immediate

> river reach downstream. Return flows do not reach the river from which they were diverted instantaneously. Once diverted there occurs a time lag between the diversion and its application, and when water actually returns to the river, and even then, it may only reach the river in small increments, depending on the surface return flow and/or subsurface transmissivity getting back to the river. Meanwhile, the diverted water is gone from the river, thereby depleting its flow until some later time and lower location. If return flow is truly important to determining water availability and avoiding boundary disputes and clouded water titles, then California needs to invest in getting data from each watershed that quantifies the volume, timing, and duration of return flow, instead of ignoring it. (State Water Resources Control Board 1983: 9-10)

C-WIN's methodology recognizes each of these facets of "face value" or face amount of water rights. Unfortunately, the Delta Watermaster's remarks do not clarify whatever else it is that face value quantities in water rights are supposed to positively describe. If the quantities in water rights are not relevant to face value, then on what basis can separable, stable, and reliable rights to water use be analyzed and judged? The Watermaster acknowledges that "while actual water use may be only a fraction of the face value of water rights, the state's water supplies have been over-allocated in many areas."[2] (Delta Watermaster 2011b: 5) C-WIN shows in this testimony that it is possible to use the "data" of water rights in combination with data on flows and diversions to generate a consistent and meaningful picture of the problem of overallocation of water supplies and rights in the San Joaquin River Basin. Our water availability analysis illustrates the usefulness of having *some idea* of the magnitude of the paper water problem as compared with having *no idea*. All of California needs better data on all facets of the problem of paper water.

Tables 1 and 2 provide static (snapshot) views of total water rights in the Trinity, San Joaquin River and Sacramento River Basins. Total water rights reported in these two tables are for consumptive uses. Hydropower generation water rights have been excluded from this analysis.

In Table 1, average annual unimpaired flow for the San Joaquin River Basin is about 6.2 million acre-feet compared with 32.7 million acre-feet of consumptive water rights claims. The ratio of total claims to average unimpaired flow for the San Joaquin Basin is 5.3 acre-feet of consumptive use claims to every acre-foot of unimpaired flow in the Basin. About 49 percent of total consumptive water claims are by riparian and pre-1914 claimants, while 51 percent is by post-1914 claimants (that is, permits and licenses) regulated by the State Water Resources Control Board.

Specifically on the major tributaries of the San Joaquin River Basin, the ratio of total consumptive use claims to unimpaired flow ranges from about 5.6 on the Stanislaus to 6.3 acre-feet of claims to every unimpaired acre-foot of flow on the San Joaquin River (including valley floor and upper watershed claims).

In Table 2, average annual unimpaired flow in the Sacramento Valley (essentially, average Sacramento River inflow to the Delta) is about 21.6 million acre-feet. Consumptive water rights claims are estimated at about 120.6 million acre-feet. The ratio of total consumptive use claims to averge unimpaired flow in the Sacramento River Basin is about 5.6 acre-feet of claims per acre-foot of unimpaired flow. Ratios of claims to unimpaired flow to range from 2.2 on the Yuba River to 6.8 on the Trinity River.

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[2] The Delta Watermaster suggests that for the Delta the process for determination of fully appropriated streams from the Water Code Sections 1205 through 1207 be used (p. 5).

Table 1
Consumptive (Irrigation) Water Rights Summary for San Joaquin River Basin

Flows and Consumptive Water Rights	Thousands of Acre-Feet				
	Stanislaus River	Tuolumne River	Merced River	San Joaquin	Basin Total
Average Annual Unimpaired Flow	957	1,851	956	1,728	6,181
Total Consumptive Water Right Claims	5,318	11,015	5,495	10,828	32,656
Ratio of Total Claims to Unimpaired Flow	5.56	5.95	5.75	6.27	5.28
Total Riparian & Pre-1914 Claims	1,401	8,185	4,525	2,014	16,125
Ratio of Riparian & Pre-1914 Claims to Unimpaired Flow	1.46	4.42	4.73	1.17	2.61
Total Post-1914 Claims	3,917	2,831	970	8,814	16,532
Ratio of Post-1914 Claims to Unimpaired Flow	4.09	1.53	1.01	5.10	2.67

Sources: State Water Resources Control Board (e-WRIMS); Public Record Act responses from various public water and irrigation districts; California Water Impact Network. Sum of major tributaries' unimpaired flow does not equal Valley total due to omission of other watersheds from the table.

Table 2
Consumptive (Irrigation) Water Rights Summary for Trinity and Sacramento River Basins

Flows and Consumptive Water Rights	Thousands of Acre-Feet				
	Trinity River	Feather River	Yuba River	American River	Sacramento Valley Total
Average Annual Unimpaired Flow	1,283	4,370	2,287	2,621	21,619
Total Consumptive Water Right Claims	8,725	15,717	5,093	9,847	120,571
Ratio of Total Claims to Unimpaired Flow	6.80	3.60	2.23	3.76	5.58
Total Riparian & Pre-1914 Claims	134	3,855	92	286	47,883
Ratio of Riparian & Pre-1914 Claims to Unimpaired Flow	0.10	0.88	0.04	0.11	2.21
Total Post-1914 Claims	8,591	11,863	3,596	9,561	72,688
Ratio of Post-1914 Claims to Unimpaired Flow	6.70	2.71	1.57	3.65	3.36

Sources: California Department of Water Resources, 2007; State Water Resources Control Board (e-WRIMS); Public Record Act responses from various public water and irrigation districts; California Water Impact Network. Sum of major tributaries' unimpaired flow does not equal Valley total due to omission of other watersheds from the table. Trinity River is included because a large portion of its runoff is exported to the Sacramento River via federal Central Valley Project facilities.

On a basin-wide basis, riparian and pre-1914 water claims account for about 40 percent of total consumptive use claims of 120.7 million acre-feet, and post-1914 claims (permits and licenses) in the Sacramento River Basin amount to about 60 percent of total consumptive use claims.

The largest water claims on Sacramento River Basin tributaries belong to the Feather River and the American River. The mainstem Sacramento (which is incorporated into the total for the Valley) includes the Pit and McCloud rivers and numerous small creeks that enter it from the east and west. C-WIN estimate that the largest component of pre-1914 water rights claims is held by the Glenn-Colusa Irrigation District. This District claims 26 million acre-feet in rights to divert directly from the Sacramento, as well as another 12 million acre-feet in rights from west side creeks.

On the Trinity River, the US Bureau of Reclamation is a significant claimant of post-1914 water rights, and given the small amount of riparian and pre-1914 water rights claims on the Trinity, the Bureau's Trinity River rights are reliable, as conditioned and limited by the Trinity River Record of Decision. (US Department of the Interior 2000) The Trinity's ratio of total consumptive claims to average unimpaired flow is 6.8 acre-feet of claims to every acre-foot of unimpaired flow.

There is another, more dynamic approach that we also include in this testimony to characterize excess claims to water use relative to flows. This planning-level analysis of water availability incorporates into the model hydrologic variability, instream flow requirements and publicly available water rights priorities on the divertable flows that remain in the system.

Applying Water Availability Analysis

In Tables 3A and 3B and accompanying charts, we present results of applying both a diversion cap (derived from the State Board's 2010 Delta flow determinations) and the water rights priority system in the manner that the State Water Resources Control Board is legally authorized to proceed. The unimpaired flow hydrology for this analysis was obtained from the California Department of Water Resources (2007). This analysis proceeds from the basic water rights premises that:

1) Instream flows needed to meet water quality and flow objectives have top priority.
2) When applying water rights, riparian rights are paramount, followed by—
3) Pre-1914 water rights claim water based on seniority date, followed by—
4) Any water left over is provided to junior water rights holders, in order of priority date (whether pre-1914 rights or post-1914 permits and licenses).

Detailed model results, water rights, and flow data employed in the analysis are found in Appendix D. Assumptions embedded in the method are itemized in Appendix E of this report.

To apply the water rights priority system in the context of providing new Delta inflows from the major tributaries, C-WIN's analysis builds in a range of flows from the 10th through 90th percentiles of the 82-year unimpaired flow hydrology available from the California Department of Water Resources (2007). 25th, 50th (median), and 75th percentile (quartile) flows are also considered. C-WIN's analysis summarizes total regulated period unimpaired flow, the Delta inflow contribution, and calculates a "diversion cap." (See Appendices D.1, D.2, and E.)

Water rights priorities are then assigned to allocate the diversion cap flows for the regulation period to paramount riparian and senior water right holders first. Detailed tables of our model results are provided in Appendix D.1 for the Trinity and the major Sacramento and San Joaquin River Basin tributaries. On the major tributaries, there are generally few significant water rights holders, and relatively small blocs of riparians may be known and allocated flows prior to pre-1914

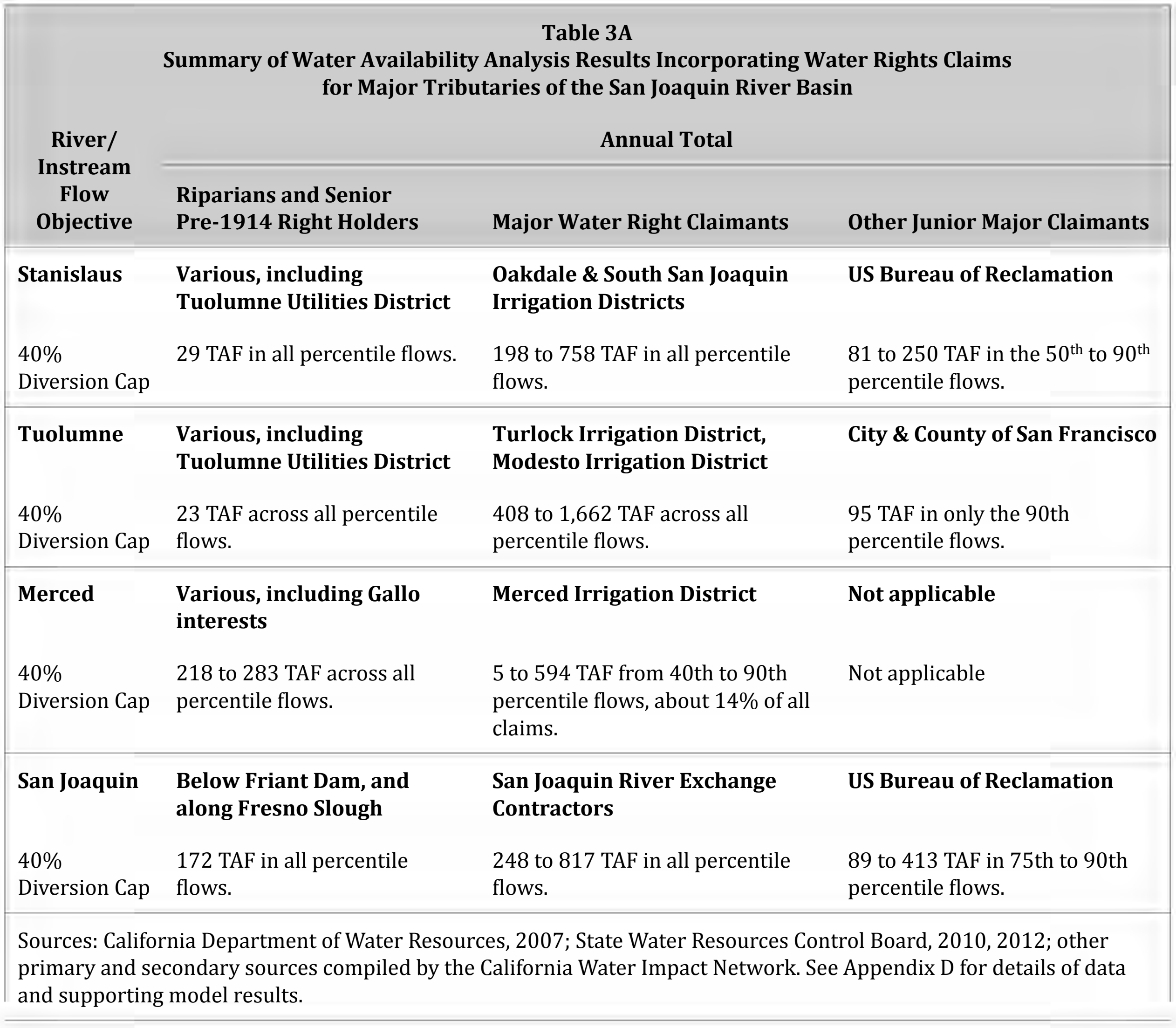


Table 3A
Summary of Water Availability Analysis Results Incorporating Water Rights Claims for Major Tributaries of the San Joaquin River Basin

River/ Instream Flow Objective	**Annual Total**		
	Riparians and Senior Pre-1914 Right Holders	**Major Water Right Claimants**	**Other Junior Major Claimants**
Stanislaus	**Various, including Tuolumne Utilities District**	**Oakdale & South San Joaquin Irrigation Districts**	**US Bureau of Reclamation**
40% Diversion Cap	29 TAF in all percentile flows.	198 to 758 TAF in all percentile flows.	81 to 250 TAF in the 50th to 90th percentile flows.
Tuolumne	**Various, including Tuolumne Utilities District**	**Turlock Irrigation District, Modesto Irrigation District**	**City & County of San Francisco**
40% Diversion Cap	23 TAF across all percentile flows.	408 to 1,662 TAF across all percentile flows.	95 TAF in only the 90th percentile flows.
Merced	**Various, including Gallo interests**	**Merced Irrigation District**	**Not applicable**
40% Diversion Cap	218 to 283 TAF across all percentile flows.	5 to 594 TAF from 40th to 90th percentile flows, about 14% of all claims.	Not applicable
San Joaquin	**Below Friant Dam, and along Fresno Slough**	**San Joaquin River Exchange Contractors**	**US Bureau of Reclamation**
40% Diversion Cap	172 TAF in all percentile flows.	248 to 817 TAF in all percentile flows.	89 to 413 TAF in 75th to 90th percentile flows.

Sources: California Department of Water Resources, 2007; State Water Resources Control Board, 2010, 2012; other primary and secondary sources compiled by the California Water Impact Network. See Appendix D for details of data and supporting model results.

right holders. Pre-1914 water right claims tend to comprise the majority, or in most cases exceed the unimpaired flows in most (and in some cases, all) decile flows reported in the analysis.

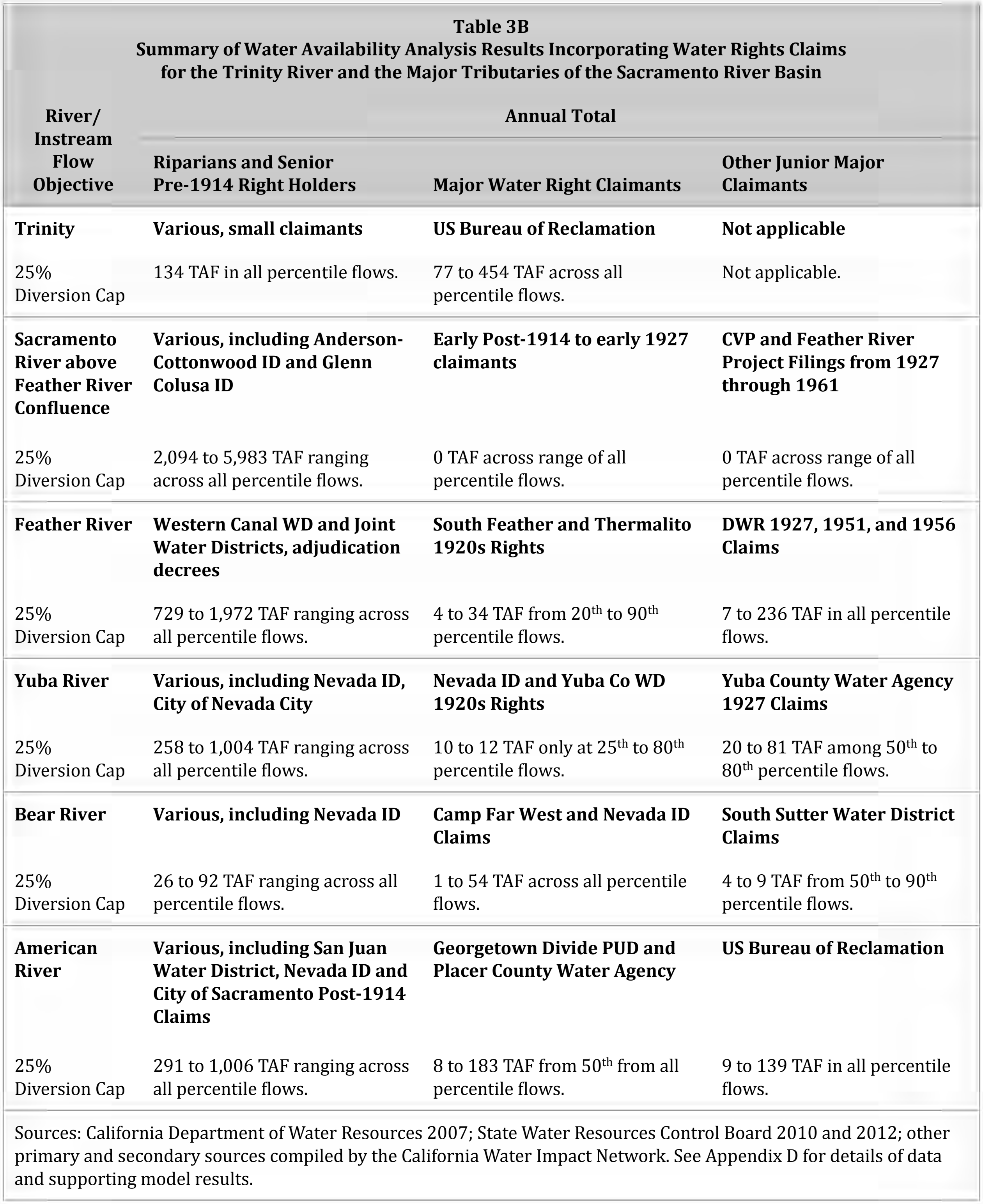
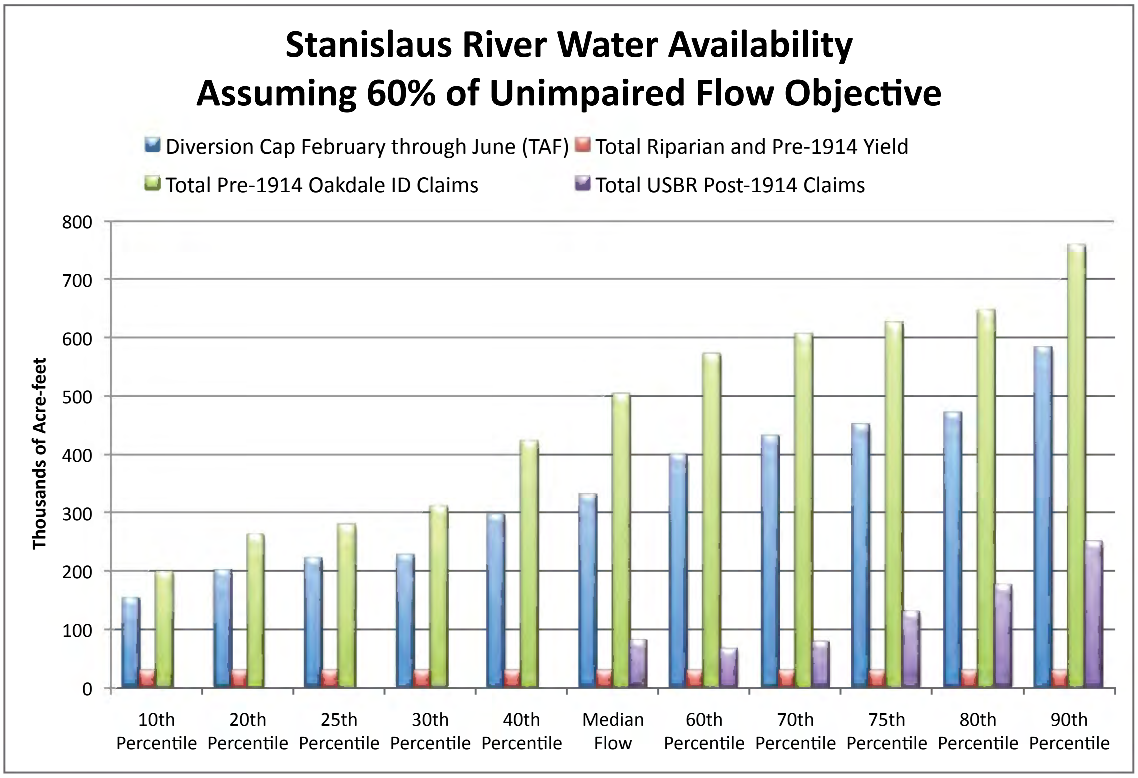


Table 3B
Summary of Water Availability Analysis Results Incorporating Water Rights Claims for the Trinity River and the Major Tributaries of the Sacramento River Basin

River/ Instream Flow Objective	Annual Total		
	Riparians and Senior Pre-1914 Right Holders	**Major Water Right Claimants**	**Other Junior Major Claimants**
Trinity	**Various, small claimants**	**US Bureau of Reclamation**	**Not applicable**
25% Diversion Cap	134 TAF in all percentile flows.	77 to 454 TAF across all percentile flows.	Not applicable.
Sacramento River above Feather River Confluence	**Various, including Anderson-Cottonwood ID and Glenn Colusa ID**	**Early Post-1914 to early 1927 claimants**	**CVP and Feather River Project Filings from 1927 through 1961**
25% Diversion Cap	2,094 to 5,983 TAF ranging across all percentile flows.	0 TAF across range of all percentile flows.	0 TAF across range of all percentile flows.
Feather River	**Western Canal WD and Joint Water Districts, adjudication decrees**	**South Feather and Thermalito 1920s Rights**	**DWR 1927, 1951, and 1956 Claims**
25% Diversion Cap	729 to 1,972 TAF ranging across all percentile flows.	4 to 34 TAF from 20th to 90th percentile flows.	7 to 236 TAF in all percentile flows.
Yuba River	**Various, including Nevada ID, City of Nevada City**	**Nevada ID and Yuba Co WD 1920s Rights**	**Yuba County Water Agency 1927 Claims**
25% Diversion Cap	258 to 1,004 TAF ranging across all percentile flows.	10 to 12 TAF only at 25th to 80th percentile flows.	20 to 81 TAF among 50th to 80th percentile flows.
Bear River	**Various, including Nevada ID**	**Camp Far West and Nevada ID Claims**	**South Sutter Water District Claims**
25% Diversion Cap	26 to 92 TAF ranging across all percentile flows.	1 to 54 TAF across all percentile flows.	4 to 9 TAF from 50th to 90th percentile flows.
American River	**Various, including San Juan Water District, Nevada ID and City of Sacramento Post-1914 Claims**	**Georgetown Divide PUD and Placer County Water Agency**	**US Bureau of Reclamation**
25% Diversion Cap	291 to 1,006 TAF ranging across all percentile flows.	8 to 183 TAF from 50th from all percentile flows.	9 to 139 TAF in all percentile flows.

Sources: California Department of Water Resources 2007; State Water Resources Control Board 2010 and 2012; other primary and secondary sources compiled by the California Water Impact Network. See Appendix D for details of data and supporting model results.



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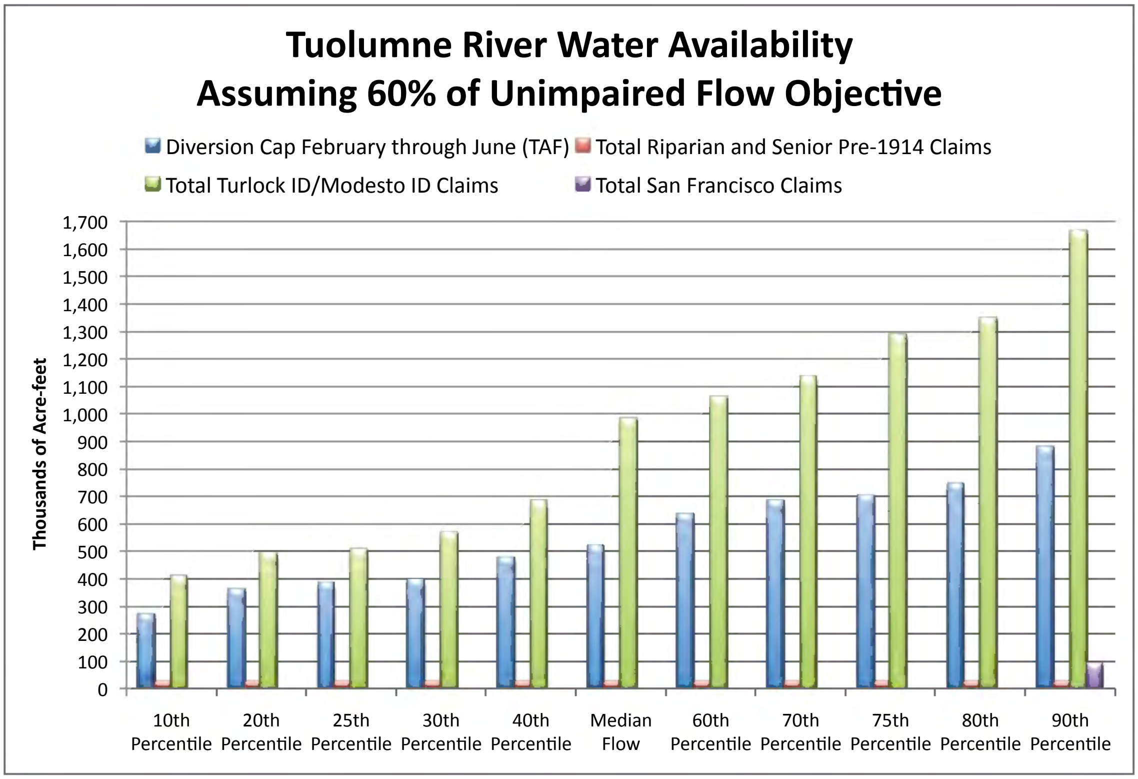

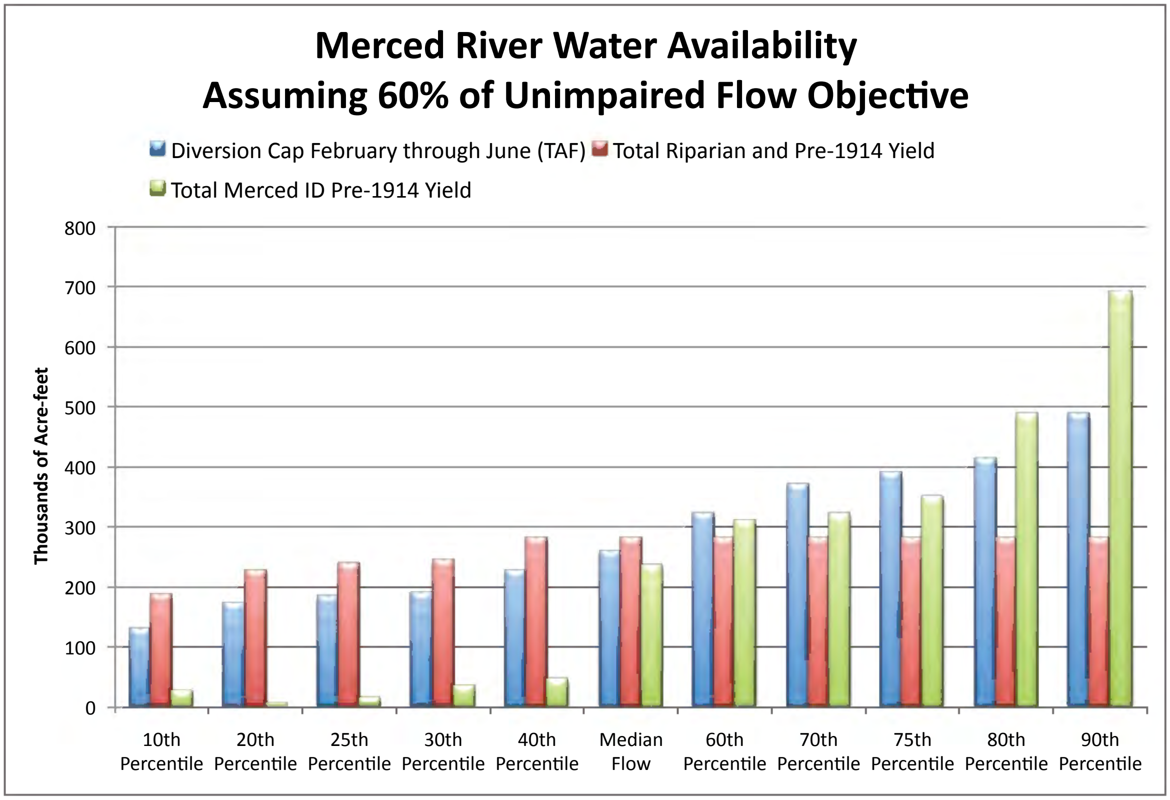

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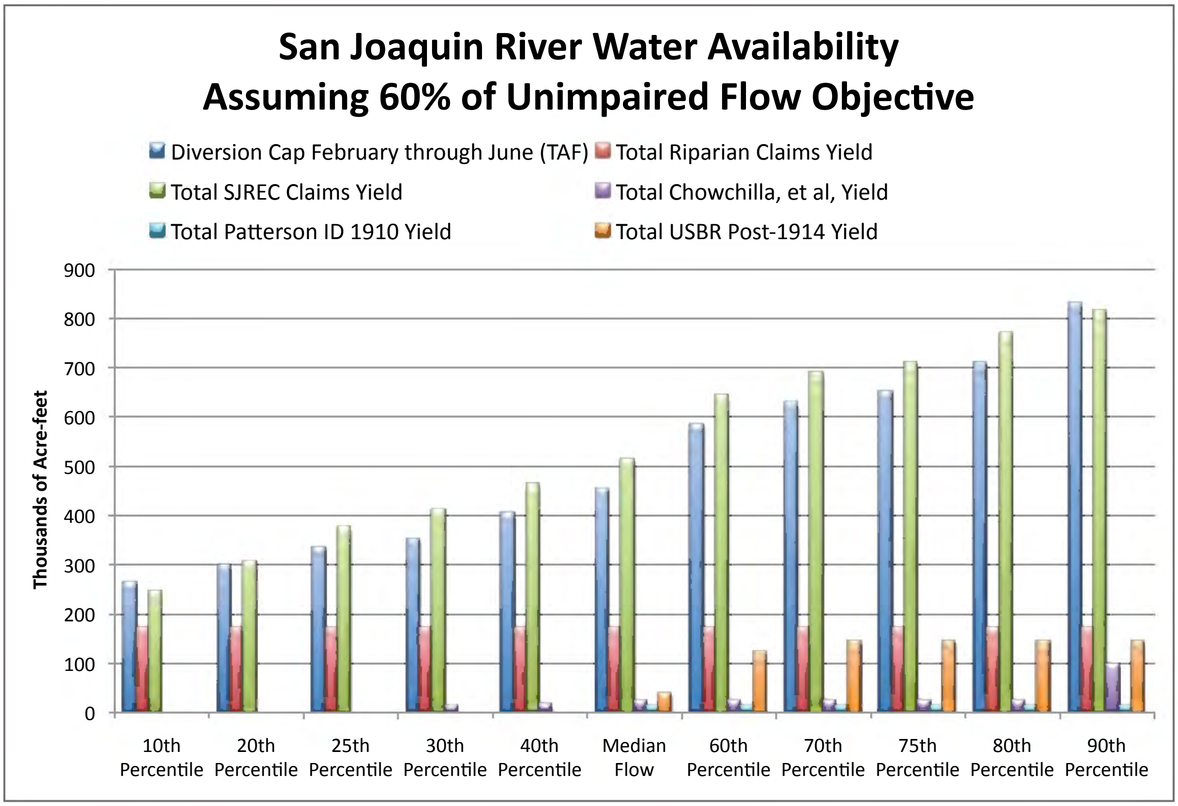

Stanislaus River (Figure 1)

Implications: Under strict application of both the 40 percent diversion cap and the water rights priority system in the Stanislaus River watershed, the US Bureau of Reclamation's water rights for New Melones Reservoir yields only a small fraction of Bureau claims in actual supplies.

Tuolumne River (Figure 2)

Implications: Under strict application of both the 40 percent diversion cap and the water rights priority system, the City and County of San Francisco would have reliable rights to water only in the wettest 10 percent of flows.

Merced River (Figure 3)

Implications: Under strict application of the water rights priority system to the 40 percent diversion cap, Merced Irrigation District's pre-1914 water rights exceed its post-1914 claims significantly, but are junior to a large amount of riparian and senior pre-1914 right holders.

San Joaquin River (Figure 4)

Implications: Only the small riparian allocations along the upper San Joaquin River would have fully reliable flows. The Exchange Contractors would have full claims on flows about 30 percent of the time (at the 70th percentile flows and above). The Bureau of Reclamation would not receive allocations except in the wettest 30 percent of years at all, and would receive its full allocation no more than about 10 percent of the time.

Trinity River (Figure 5)

Implications: Riparian and pre-1914 water right holders on this river system are few. The Bureau's post-1914 water rights to develop Trinity Reservoir and Lewiston Dam, and the hydropower complex linked to Keswick Dam along Clear Creek are the dominant water rights on the Trinity River. As noted in Table 2, however, the consumptive use rights alone appear to be quite excessive relative to Trinity River's unimpaired flow hydrology.[3]

Sacramento River Above Feather River Confluence (Figure 6)

Implications: Because of large pre-1914 water rights claims by Glenn-Colusa Irrigation District along the Sacramento River, no water would be available to the US Bureau of Reclamation, except from Trinity River exports. Strict application of this pattern of water rights claims would dramatically reduce water available for export from the Sacramento River Basin and potentially undermine the San Joaquin River Exchange Contract.

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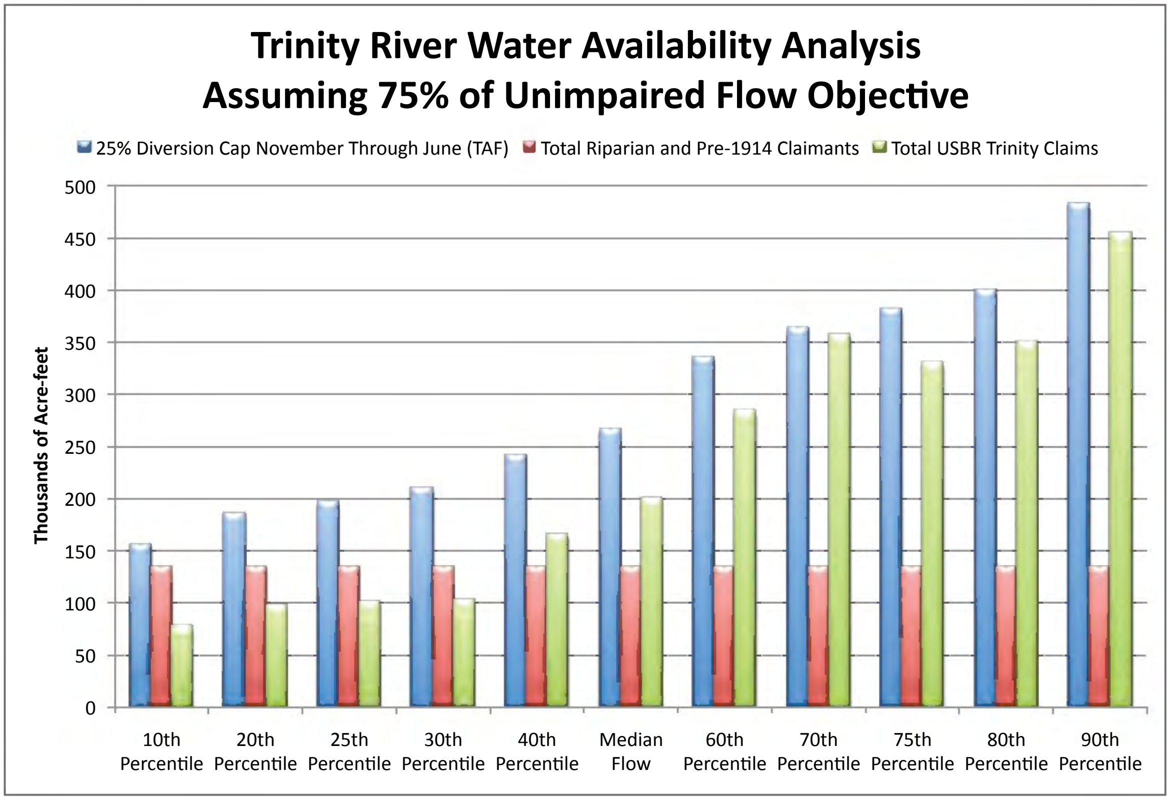
[3] Our analysis applies to the Trinity the Board's 75 percent of unimpaired flow determination for November through June. This flow determination exceeds those of the 2000 Trinity Restoration Record of Decision. (US Department of the Interior 2000)



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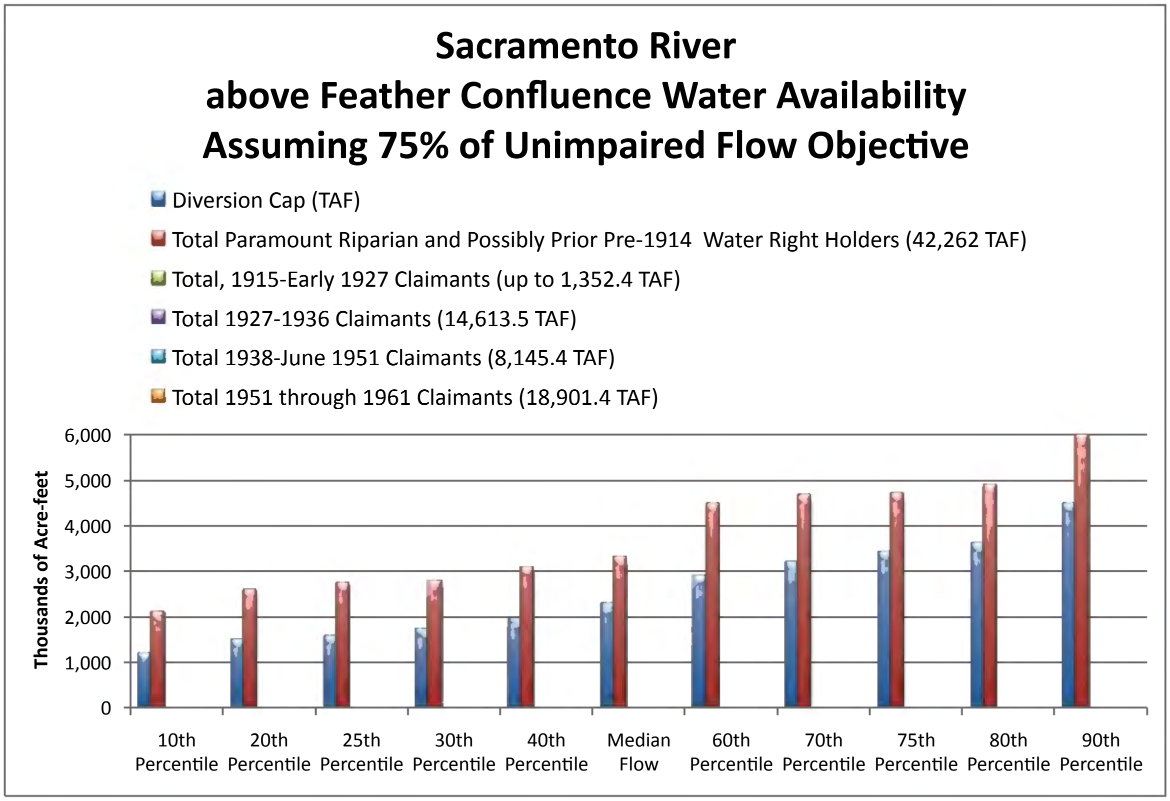

Feather River (Figure 7)

Implications: The Department of Water Resources' 1927, 1951, and 1956 water rights claims for the Feather River Project (now the State Water Project) would receive almost no water under a 25 percent diversion cap scenario. In drier years, even at relaxed diversion cap scenarios, DWR would receive only very small amounts. This is due to senior pre-1914 water rights claimants such as the Joint Water Districts[4] and Western Canal Water District, whose rights predate the cultivation of rice in the Butte County region, and were adjudicated in 1923. DWR's claims amount to about 10.4 million acre-feet (MAF) on the Feather River alone for consumptive uses.

Yuba River (Figure 8)

Implications: Nevada Irrigation District and Yuba County Water District, through their pre-1914 claims and 1920s water rights claims, would have senior claims to Yuba River flows. Full operation of these claims would nearly eliminate Yuba County Water Agency diversions under a 25 percent diversion cap scenario.

Bear River (Figure 9)

Implications: Because of senior water rights claims by Nevada Irrigation District and Camp Far West Irrigation District, South Sutter Water District would see its supplies reduced significantly relative to its claimed rights under a 25 percent diversion cap scenario.

American River (Figure 10)

Implications: The US Bureau of Reclamation's Central Valley Project facilities along the American River would receive very little water supplies from operation of the water rights priority system under a 25 percent diversion cap, despite having claimed up to 5.35 million acre-feet.

Discussion

Assuming that the State Water Board adopts the 75 percent unimpaired flow determination for the upstream tributaries of the Sacramento River Basin, the 60 percent of unimpaired flow determination for the San Joaquin River Basin, and that the water rights priority system is applied, it becomes evident that several significant water rights claimants that are junior in priority contribute dramatically to the problem of paper water: They have been promised water far in excess of flow conditions available to them in most years.

Table 4 summarizes the major water rights claimants whose titles to water in the Central Valley watershed tributaries should be considered clouded, whose property "boundaries" are in dispute.

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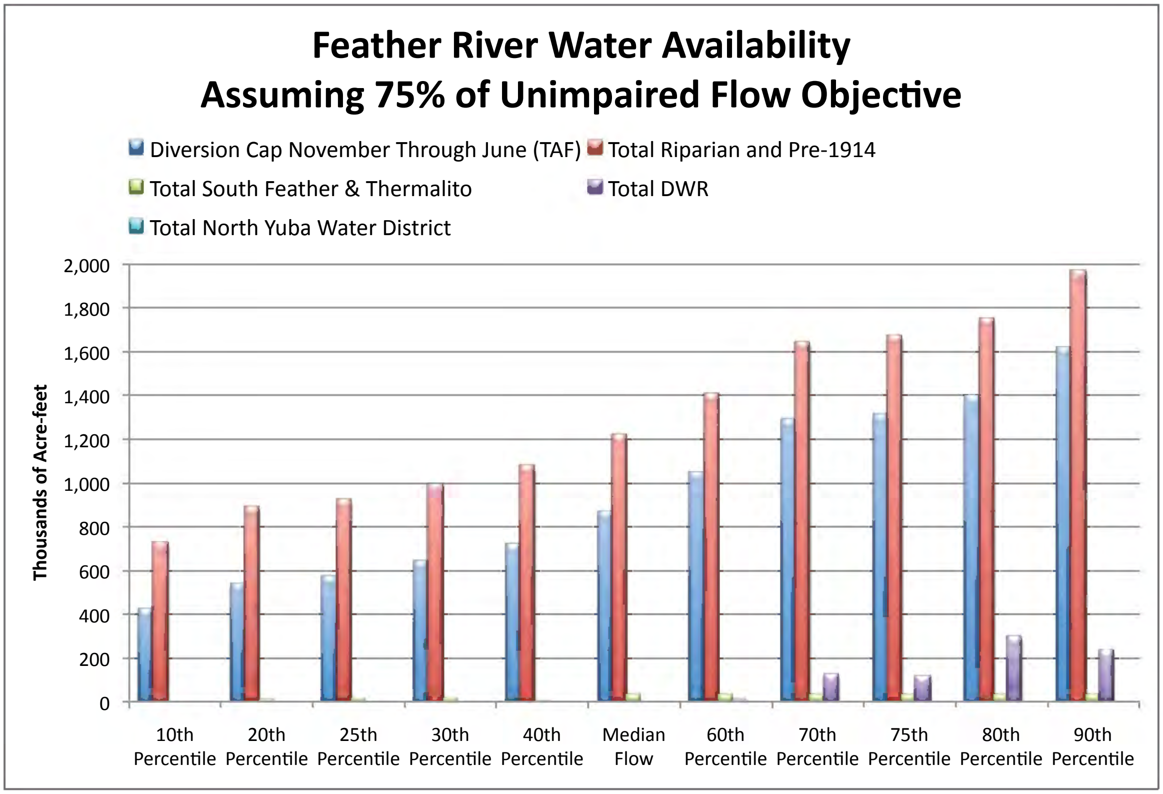
[4] The Joint Water Districts include Butte Water District, Biggs-West Gridley Water District, Richvale Irrigation District, and Sutter Extension Water District, the successors to pre-1914 water rights accumulated by the Sutter Butte Canal Company.



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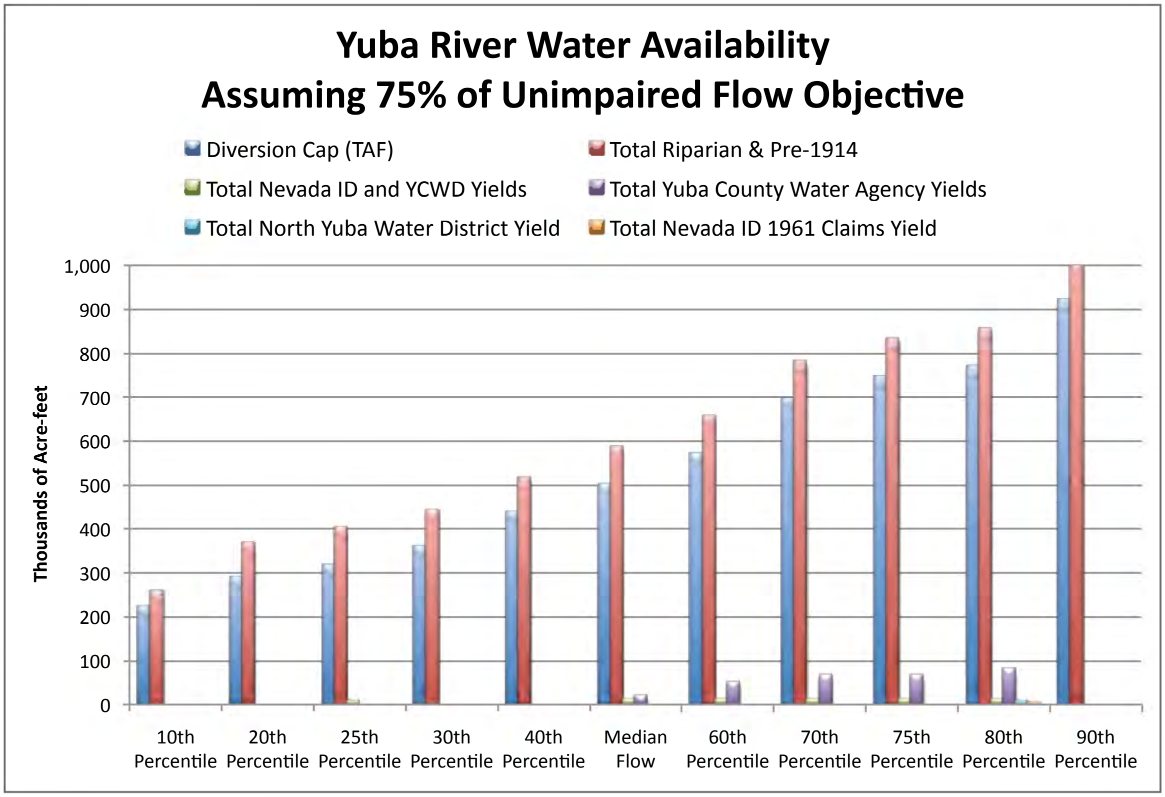

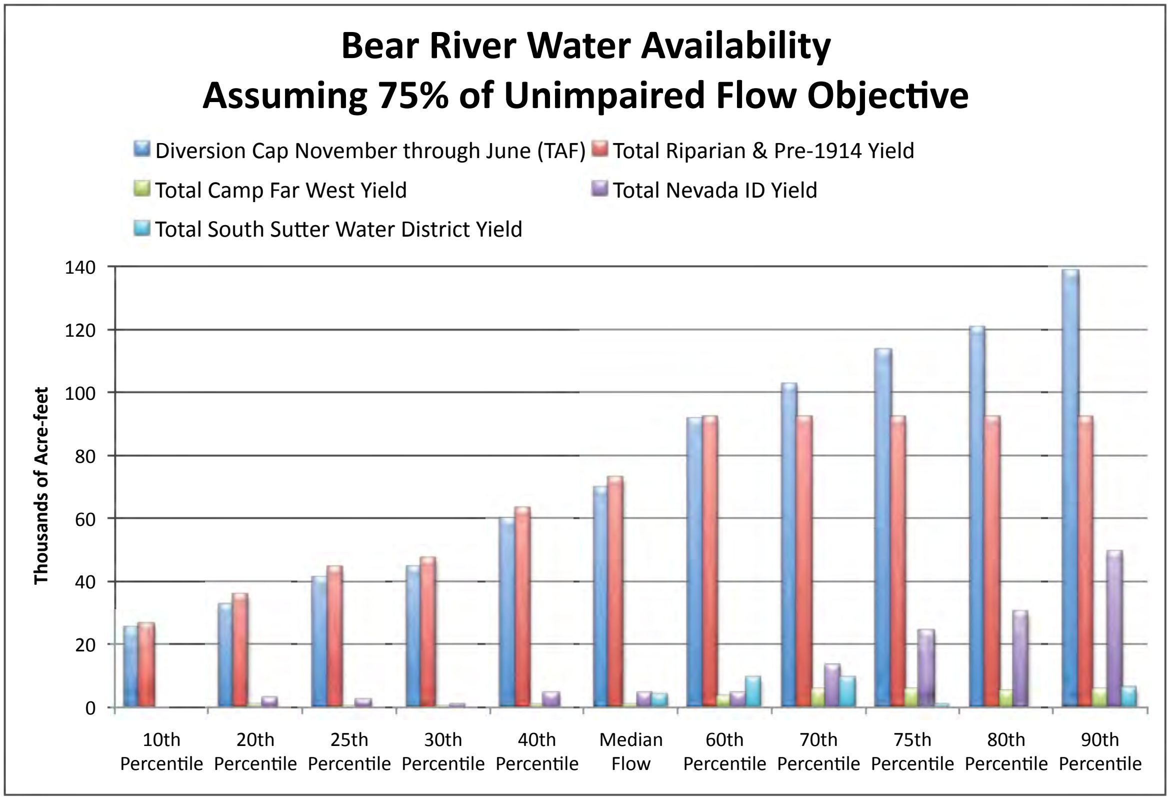

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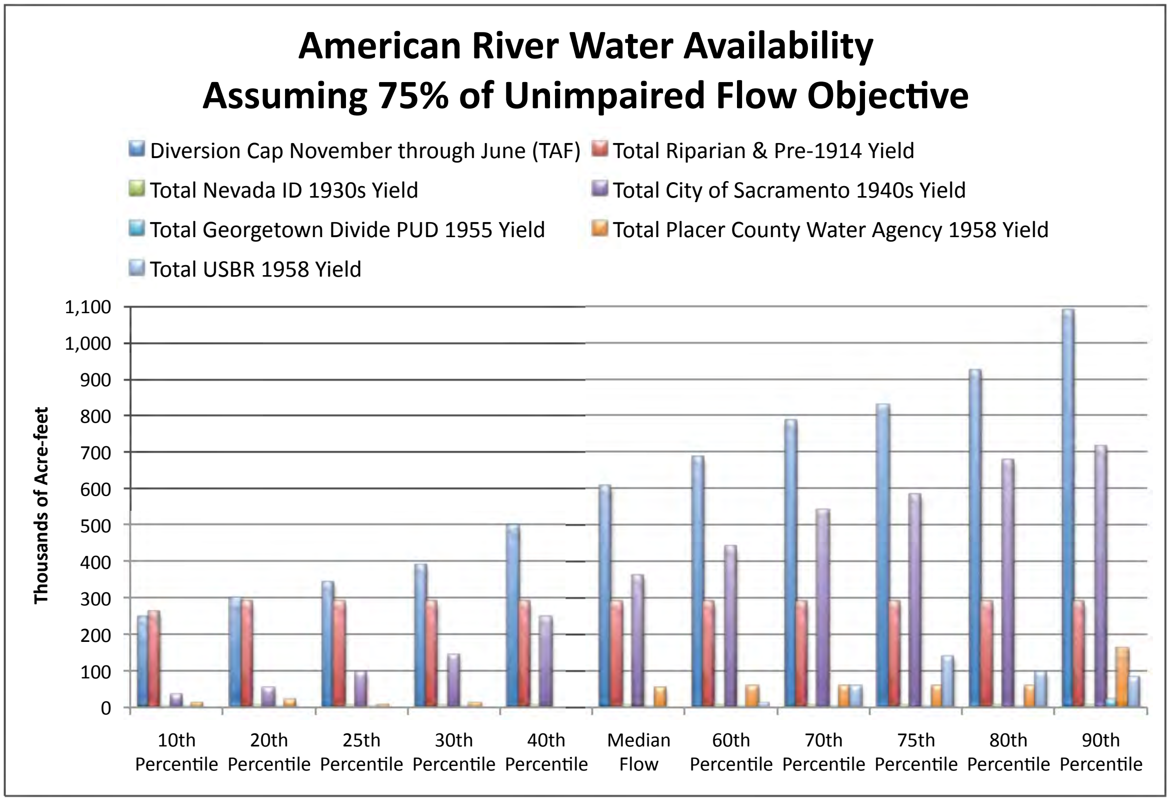

Table 4
Summary of Watershed Consumptive Water Rights Claimants by Reliability (Based on Legal Priority) of Claims

Watershed	Claimants with Highly Reliable Rights	Claimants with Potentially Clouded Titles to Water
Stanislaus River	Various claimants covered by Stanislaus River decree of 1929; Oakdale ID, South San Joaquin ID	US Bureau of Reclamation (New Melones)
Tuolumne River	Tuolumne Utilities District, Turlock Irrigation District, Modesto Irrigation District	City and County of San Francisco (1901 through 1911 rights)
Merced River	Gallo, various riparian and pre-1914 parties to early Merced River decrees	Merced Irrigation District (post-1914 rights)
San Joaquin River	Paramount riparian claimants, San Joaquin River Exchange Contractors, Chowcilla WD, Tranquillity & James IDs, Patterson ID	US Bureau of Reclamation (post-1916 rights)
Trinity River	Various small riparian and pre-1914 claimants, US Bureau of Reclamation	US Bureau of Reclamation (has overstated water claims compared with actual basin hydrology)
Sacramento River (including west and east creeks, Pit and McCloud Rivers)	Various small riparian and pre-1914 claimants, claimants among adjudicated watersheds in Pit River region, Anderson-Cottonwood Irrigation District, Glenn-Colusa Irrigation District	US Bureau of Reclamation (Shasta Lake)
Feather River	Upper watershed adjudicated claimants, Joint Water Districts, Western Canal WD	California Department of Water Resources (Lake Oroville)
Yuba River	Browns Valley ID, Nevada ID, Yuba County WD	Yuba County Water Agency (1927 rights), Nevada ID (1930s rights), and North Yuba Water District (1958 rights)
Bear River	Nevada ID, Camp Far West ID	South Sutter Water District (1952 and 1981 rights)
American River	City of Folsom, San Juan WD, Georgetown Divide PUD, El Dorado ID, Nevada ID, Placer County Water Agency, City of Sacramento	US Bureau of Reclamation (Folsom Lake), Foresthill PUD

Sources: California Department of Water Resources; State Water Resources Control Board; California Water Impact Network.

By adopting its public trust Delta inflow determinations as flow objectives in the Bay-Delta Plan for each major tributary, and applying water rights priorities—in that order—the State Water Resources Control Board can use its authority to eliminate paper water (water claims that do not have a basis in water rights law) in the Bay-Delta Estuary's Central Valley watershed. The California Constitution reminds us that no one in California has a right to use or divert water wastefully or unreasonably. The state's public trust responsibility requires protection of the waters of the state for the benefit of all beneficial users, not just water rights holders. The state's water quality control planning obligations carry out this responsibility. It also helps the state meet its public trust obligations as well. The doctrine of prior appropriation requires that senior water right holders be served before junior water right holders. The water quality control planning process and the water rights priority system on the major tributaries of the Sacramento and San Joaquin River Basins should be used as tools for eliminating paper water—that is, for quieting water titles, and ending trespasses and boundary disputes that compromise public trust resources—from the Bay-Delta Estuary's Central Valley watershed.

Paths for Aligning Water Rights with All Other Beneficial Uses and River Flows

We see three primary paths by which the State Water Resources Control Board can align water rights with all other beneficial uses and river flows:

- Water quality control plan implementation,
- Fully-appropriated streams declaration and Term 91, and
- Court adjudication.

Water Quality Control Plan Implementation. The State Water Resources Control Board has approved a Delta inflow determination for the San Joaquin River at Vernalis of 60 percent of unimpaired flow during the February through June period. For the Sacramento the Board approved a 75 percent of unimpaired flow determination for the November through June period. In doing so, the Board would implicitly place a cap on total diversions for each major tributary of 40 percent of unimpaired flow for the San Joaquin River and 25 percent of unimpaired flow for the Sacramento River Basin. These objectives would result in instream flows that are substantially greater in most years than current instream flow requirements now provide. In our water availability analysis, we also apply the Sacramento River Basin 75 percent objective rather than the Trinity Record of Decision flow objectives to the water availability analysis for the Trinity River. (US Department of the Interior 2000: 12)

Key water rights holders in these basins possess riparian and pre-1914 water rights that exist prior to the regulatory powers of the State Water Resources Control Board. On the question of implementing water quality control plans and adhering to state water rights law, the issue has arisen of the Board's jurisdiction over those water rights that the Board did not originally consent to.

Attorney Tim O'Laughlin, representing the San Joaquin River Group Authority (SJRGA), has asked the State Water Resources Control Board to "identify the legal theory or approach it will use at the implementation proceeding in order to obtain the necessary flows to meet the additional flow requirements identified" in the Board's flow studies. Without that legal theory or approach, O'Laughlin argues, the State Water Resources Control Board will be unable to complete economic or other impacts analysis in its Substitute Environmental Document on the San Joaquin River Flow and South Delta salinity objectives. He further contended in February 2011 that the Board is operating according to *some* kind of theory since it

> blatantly **suggests** that additional flows will come from the Stanislaus, Tuolumne, and Merced Rivers. [State Water Resources Control Board 2011c, pp. 78, 81, and 85-89] This foreshadowing demonstrates that the SWRCB not only believes that, regardless of the Vernalis flow alternative eventually adopted, it will be able to obtain flow from all the tributaries, but that it intends to do so. That approach, however, completely ignores the existence of the water right priority system. (See, e.g., *Pleasant Valley Canal Company v. Borror* (1998) 61 Cal.App.4th 742, 770; *City of*

> *Barstow v. Mojave Water Agency* (2000) 23 Cal. 4th 1224, 1243; see also *El Dorado Irrigation District v. State Water Resources Control Board* (2006) 142 Cal. App.4th 937, 961). As the SJRGA has pointed out to the SWRCB on numerous occasions, any approach to allocating responsibility for new Vernalis flow requirements must incorporate the water rights priority system. That said, the SJRGA recognizes that strict application of the water right priority system does not produce straightforward results such that the water required to meet the selected Vernalis flow alternative would come from a particular waterway or tributary, or that such water would roughly be divided equally or proportionally among such waterways and tributaries. (O'Laughlin 2011a: 1-2; emphasis in original)

O'Laughlin, on behalf of SJRGA, asserts that the Board has no jurisdiction to regulate pre-1914 appropriative water rights or riparian rights, regardless of any legal theory the Board intends to use in the implementation phase. If responsibility for new Vernalis flow requirements is determined solely based on the water rights priority system, writes O'Laughlin, "junior water right holders will be required to reduce or completely cease their water use before senior appropriators will be required to reduce theirs" as required in California's doctrine of prior appropriation. (O'Laughlin 2011a)

He wrote to the Board subsequently in June 2011 about its jurisdiction in the Bay-Delta proceedings. There he stated, "It now appears that the [Substitute Environmental Document] is being prepared solely on the basis of percentage of natural flow, without regard to the nature or priority of the water rights affected, and will therefore be the subject of immediate litigation." (He is here apparently referring to the Board's proposed use of a percentage of unimpaired flow as the basis for limiting diversions.) O'Laughlin also reiterated in this letter to the Board that it

> does not have jurisdiction over pre-1914 appropriative water rights for any reason, including the implementation of water quality objectives adopted pursuant to the State Water Resources Control Board's authority under Porter-Cologne. Given the prevalence of pre-1914 appropriative rights held in the San Joaquin River Basin, and the scope of the percentage of natural flow that the [Board] is considering, it is almost certain that there will be times and conditions where the [Board] will not be able to implement a percentage of natural flow. It is arbitrary and capricious for the [Board] to continue to consider a percentage of natural flow as one of its objectives without knowing how often, if ever, it will be able to require such percentages be met. (O'Laughlin 2011b)

O'Laughlin argues that the Board's flow objective results may not be achievable if, for example, flow is 100 cfs and the Board applies a 60 percent instream flow criterion to this waterway while pre-1914 water right holders may claim 80 percent of the flow in the stream. In that case, the Board, contends O'Laughlin, "would not be able to obtain the full 60 percent flow it desired." O'Laughlin contends that this not only renders the Delta flow criterion infeasible, it means that evaluation of criterion alternatives under the California Environmental Quality Act in the Substitute Environmental Document will also be infeasible and the SED thus inadequate.

Of course, contrary to the Racanelli decision, O'Laughlin elevates the water rights priority system to paramount status in California water and environmental law. It is plain from a review of state water case law that water rights priorities, while important, are not paramount considerations when the Board takes up the protection of beneficial uses of water. As Justice Racanelli stated, water quality control planning must concern itself with the regulation of *beneficial uses*, not water rights strictly speaking. Beneficial uses include, and go well beyond, water rights and their relative priorities. (See sidebar, page 26.) The Racanelli decision made clear that the State Water Resources Control Board has authority to implement its water quality control plan by regulating all beneficial uses. Adjusting quantities in water rights is within its authority.

Moreover, the Board retains authority to regulate pre-1914 water rights under its constitutional authority to prohibit waste and unreasonable use of water. The Legislature provided in the California Water Code key sections that do not limit the Board's authority to investigate rivers and streams in the service of the state's constitutional provisions (emphases added).

Beneficial Uses Served in the Bay-Delta Water Quality Control Plan:

- **Municipal and Domestic Supply**
- **Industrial Service Supply**
- **Industrial Process Supply**
- **Agricultural Supply**
- **Ground Water Recharge**
- **Navigation**
- **Water Contact Recreation**
- **Non-Contact Water Recreation**
- **Shellfish Harvesting**
- **Commercial and Sport Fishing**
- **Warm Freshwater Habitat**
- **Cold Freshwater Habitat**
- **Migration of Aquatic Organisms**
- **Spawning, Reproduction, and/or Early Development**
- **Estuarine Habitat**
- **Wildlife Habitat**
- **Rare, Threatened, or Endangered Species**

Source: State Water Resources Control Board 2006: 8-9.

> 275. *The department and board shall take all appropriate proceedings or actions* before executive, legislative, or judicial agencies *to prevent waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of water in this state*.
> ...
> 1050. This division is hereby declared to be in furtherance of the policy contained in Section 2 of Article X of the California Constitution and in all respects for the welfare and benefit of the people of the state, for the improvement of their prosperity and their living conditions, and *the board and the department shall be regarded as performing a governmental function in carrying out the provisions of this division*.
>
> 1051. The board for the purpose of this division may:
> (a) *Investigate all streams, stream systems, portions of stream systems, lakes, or other bodies of water*.
> (b) Take testimony in regard to the rights to water or the use of water thereon or therein.
> (c) *Ascertain whether or not water heretofore filed upon or attempted to be appropriated is appropriated under the laws of this State*.
> ...
> 1052. (a) The *diversion or use of water subject to this division other than as authorized in this division is a trespass*.
> (b) Civil liability may be administratively imposed by the board pursuant to Section 1055 for a trespass as defined in this section in an amount not to exceed five hundred dollars ($500) for each day in which the trespass occurs.
> (c) The Attorney General, upon request of the board, shall institute in the superior court in and for any county wherein the diversion or use is threatened, is occurring, or has occurred appropriate action for the issuance of injunctive relief as may be warranted by way of temporary restraining order, preliminary injunction, or permanent injunction.
> (d) Any person or entity committing a trespass as defined in this section may be liable for a sum not to exceed five hundred dollars ($500) for each day in which the trespass occurs. The Attorney General, upon request of the board, shall petition the superior court to impose, assess, and recover any sums pursuant to this subdivision. In determining the appropriate amount, the court shall take into consideration all relevant circumstances, including, but not limited to, the

> extent of harm caused by the violation, the nature and persistence of the violation, the length of time over which the violation occurs, and the corrective action, if any, taken by the violator.
>
> (e) All funds recovered pursuant to this section shall be deposited in the Water Rights Fund established pursuant to Section 1550.
>
> (f) The remedies prescribed in this section are cumulative and not alternative.
>
> ...
>
> 1825. It is the intent of the Legislature that *the state should take vigorous action* to enforce the terms and conditions of permits licenses, certifications, and registrations to appropriate water, to enforce state board orders and decisions, and *to prevent the unlawful diversion of water.*
>
> ...
>
> 2501. The board may determine, in the proceedings provided for in this chapter, all rights to water of a stream system whether based upon appropriation, riparian right, or other basis of right.

Nothing in these sections of the Water Code prevents the Board from investigating pre-1914 water rights and eliminating illegal diversions should they be found. Water Code Section 275, appears to extend this authority of the Board to determining whether any water use is wasteful or unreasonable, or any method of use, or method of diversion is wasteful or unreasonable.

These sections provided authority for the Board to investigate pre-1914 and riparian water rights in the Delta recently. In these investigations, the Board has issued water rights orders that in at least one instance adjusted the rights of a riparian water right holder. (Wilson 2012) Mr. O'Laughlin is surely aware of this authority. On behalf of the San Joaquin River Group Authority, his comments on the Board's 2008-2012 strategic work plan helped initiate the Delta water rights investigations in 2008. He cited California Water Code Section 1825 to support the San Joaquin River Group Authority's recommendation that the Board investigate Delta riparian and pre-1914 water rights. (San Joaquin River Group Authority 2008: 64)

When the Board moves to adjust diversion amounts in the Delta's major tributaries. The Board should apply a diversion cap during the regulated period applicable to each tributary (including the Upper San Joaquin River; see Appendix B) and then allocate diversions according to water rights priority. C-WIN analyzes operation of the water rights priority system in the following river profiles.

Our testimony analyzes water availability using water rights priorities as a way of identifying the legal method for allocating responsibility for Delta inflows that are fully protective of public trust resources in the Delta.

The Board announced in two notices (dated February 13, 2009, and April 1, 2011, the latter containing revisions to the earlier Notice) its intent to revise the Bay Delta Water Quality Control Plan of 2006. This plan traces its lineage to the 1995 Bay Delta Water Quality Control Plan and the Bay-Delta Accord. The San Joaquin River flow and South Delta salinity objective process is likely to be a step in the right direction away from these failed plans. The well-documented failures of this misguided loyalty include:

- Anadromous fishery declines throughout the Central Valley watershed of the Delta estuary.
- Declines of pelagic (open water) aquatic ecosystem regimes throughout the Delta
- Continued listing of endangered species, including salmon, steelhead, Delta smelt, longfin smelt, Sacramento splittail, and green sturgeon.
- Chronic violations from 2005 through 2009 of south Delta salinity objectives in both the Bay-Delta Water Quality Control Plan and Water Rights Decision 1641 that are intended to protect agricultural beneficial uses in this part of the Delta.

- Historic record Delta pumped exports between 2000 and 2006, peaking at nearly 6.4 million acre-feet. (More recently, 2011 exports reached 6.7 million acre-feet.)

From the two NOPs, it appears the Board prepares to incorporate flow objectives for major tributaries of the San Joaquin River: the Stanislaus, the Tuolumne, and the Merced rivers. It appears to us the Board intends to require fair share flow contributions from each of these important rivers to flows of the mainstem San Joaquin as inflow to the Delta as measured at Vernalis. Our organizations welcome this prospect in concept, and support the Board's efforts toward this goal, despite legal, ecological, and engineering challenges ahead.

The 1986 Delta Water Cases decision (also named as the "Racanelli decision" for its author, presiding Justice John Racanelli of the Third District Court of Appeals in California) bears review because it defines the Board's water quality planning duties for the Delta and its watershed. (California Appeals Court, Third District 1986) When it comes to the Board's role in undertaking its duty to fulfill its water quality planning function, the Racanelli court stated:

> In its *water quality* role of setting the level of water quality protection, the Board's task is not to protect water rights, but to protect 'beneficial uses.' The Board is obligated to adopt a water quality control plan consistent with the overall statewide interest in water quality [citation to California Water Code §13240] which will ensure 'the reasonable protection of *beneficial uses*' (§13241, emphasis added). Its legislated mission is to protect the 'quality of all the waters of the state...for use and enjoyment by the people of the state." (§ 13000, 1st para., emphasis added.) (California Appeals Court, Third District 1986: 178)

Thus, protection of beneficial uses must be the Board's paramount goal in this process. Beneficial uses make up "all competing demands for water" which must receive Board attention during public trust balancing and analysis. Water rights are among the Board's implementation tools for achieving the protection of beneficial uses in California's Central Valley watershed and Delta estuary, not strictly ends in themselves in this context.

Justice Racanelli wrote that the State Water Resources Control Board has a dual role of regulating both water quality and adjudicating water rights. The Racanelli court stated:

> In performing its dual role, including development of water quality objectives, the Board is directed to consider not only the availability of unappropriated water...but also *all* competing demands for water in determining what is a reasonable level of water quality protection. (California Appeals Court, Third District 1986: 179-180)

The Delta Water Cases came about because the Board construed its scope for water quality planning too narrowly, focusing on the major stakeholders in the Delta: the Bureau, the Department of Water Resources, and their respective contractors. The Board erred in doing so, the Racanelli court stated.

> ...the Board must consider 'past, present, and probable future beneficial uses of water'...as well as 'water quality conditions that could reasonably be achieved through the coordinated control of *all* factors which affect water quality in the area'. Unfortunately, the Board neglected to do so. (California Appeals Court, Third District 1986: 180)

That was 26 years ago. As we will indicate below, C-WIN is deeply concerned that the Board may still neglect significant, realistic alternatives that will be essential to fulfilling its water quality planning role for solving problems in the Bay-Delta estuary and the larger Central Valley watershed.

Fortunately, the Board can avoid such neglect. Justice Racanelli wrote that the Board "need only take *the larger view of the water resources* in arriving at a reasonable estimate of all water uses, an activity well within its water rights function to determine the availability of unappropriated water." And he added, "We think a similar *global perspective* is essential to fulfill the Board's water quality planning obligations." (California Appeals Court, Third District 1986, emphasis added) Justice Racanelli stated later that the Board compromised its role in previous water quality control plans when it defined its scope for action too narrowly "in terms of enforceable water rights. In fact," the judge wrote, "the Board's water quality obligations are not so limited."

> ...in order to fulfill adequately its water quality planning obligations, we believe the Board cannot ignore other actions which could be taken to achieve Delta water quality, such as remedial actions to curtail excess diversions and pollution by other water users. (California Appeals Court, Third District 1986: 182)

The Board's "paramount duty" remains to "provide 'reasonable protection' to beneficial uses, considering all the demands made upon the water." Finally, Justice Racanelli concludes about the Board's water quality planning powers:

> Thus, we do not believe that difficulty in enforcement justifies a bypass of the legislative imperative to establish water quality objectives which in the judgment of the Board will ensure reasonable protection of beneficial uses. (California Appeals Court, Third District 1986: 182)

C-WIN believes that a credible water quality control plan for the Bay Delta estuary must take what Racanelli deemed the "global perspective" in order to redress the ecological collapse and cumulative salinization and pollution resulting from the Board's water quality planning efforts to date. The 1994 Bay-Delta Accord's water quality control planning pendulum swung too far in favor of water right holders and water contractors, and their respective beneficial uses. The Board's duty now is to credibly balance all of the beneficial uses of water in the estuary so that public trust resources are protected, and so that reasonable uses and methods of diversion of water are employed by all water users.

In addition to the water quality planning obligations that Justice Racanelli eloquently addressed, recent state legislation provides additional authority to the State Water Resources Control Board. Using this added authority, the Board can better protect water quality and beneficial uses in the Bay-Delta Estuary and the Central Valley watershed. We point to two new laws enacted in 2009.

The State Water Resources Control Board has already fulfilled its obligation under California Water Code Section 85086(c) and (e) to prepare a public trust assessment of the Bay-Delta flow criteria needed to protect fish and wildlife beneficial uses. While not a "balancing" analysis required under public trust doctrine, the Board's *Delta Flow Criteria Report* provides valuable scientific analysis and findings that must be used to help the Board fulfill its water quality planning responsibilities and achieve protective public trust resource outcomes in the Bay-Delta estuary. The report employed the best available science in arriving at its findings. (State Water Resources Control Board 2010b)

The same legislative package also changed the California Water Code to recognize the need to reduce reliance on the Delta as a source of water for California:

> 85021. The policy of the State of California is to reduce reliance on the Delta in meeting California's future water supply needs through a statewide strategy of investing in improved regional supplies, conservation, and water use efficiency. Each region that depends on water from the Delta watershed shall improve its regional self-reliance for water through investment

> in water use efficiency, water recycling, advanced water technologies, local and regional water supply projects, and improved regional coordination of local and regional water supply efforts.[5]

These new laws provide the Board with additional legal and political tools aiding the protection of all beneficial uses, particularly fish and wildlife beneficial uses whose protection has been neglected for decades.

The Water Code's Fully Appropriated Stream Provisions and Term 91. The Board will need to revise its 1998 water rights order concerning fully appropriated streams, and revisit its application of Term 91 curtailment of post-1978 water rights permittees. Our water availability analysis helps show where key seasonal and priority thresholds may occur under the Board's new Delta inflow objectives.

California's Water Code implicitly acknowledges the potential for over-appropriation to occur and provides a process by which the State Water Resources Control Board may take steps to avoid or prevent excessive water promises. The Board can declare streams to be fully-appropriated on a month by month basis in every watershed of California under Sections 1205 through 1207. Its statutory language is reproduced in Appendix F to this testimony.

Section 1205(b) provides that a declaration that a stream system is fully appropriated shall contain a finding that the supply of water in the stream system is fully applied to beneficial uses where the Board finds that previous water rights decisions have determined that no water remains available for appropriation. According to Section 1206(a) once a stream system is declared fully appropriated by the Board, the Board shall not accept for filing any application for a permit to appropriate water from the stream system described in the declaration, and may cancel an application pending on that date. Section 1206(b) states that the the Board may provide for exceptions to application filings under specified conditions, which may limit the purpose of use, the instantaneous rate of diversion, the season of diversion or the amount of water diverted annually.

Past State Water Resources Control Boards have declared fully-appropriated streams in California. (State Water Resources Control Board 1989; 1991; and 1998) The Board's most recent 1998 declaration included major reaches of all tributaries to the Sacramento and San Joaquin River Basins as fully appropriated, including the Trinity River. (State Water Resources Control Board 1998: Exhibit A)

The Board has also designated as fully appropriated some rivers and streams that are adjudicated or have reaches designated for protection under state and federal wild and scenic river legislation. Major portions of the Trinity, Middle Fork of the Feather, the Tuolumne, and the Merced are designated as wild and scenic rivers. Wild and scenic rivers are off-limits to appropriations year-round. Other rivers and streams are fully-appropriated primarily during irrigation season. Appendix G summarizes selected critical reaches of the Bay-Delta Estuary's Central Valley Watershed that are designated as fully-appropriated by the State Water Resources Control Board.

The Board's Full Appropriation Declaration blurs the distinction between water rights claims and water usage by claimants. Commendably, the Board has identified reaches of streams that are off-limits to new permanent applications to appropriate water. C-WIN identified several streams where it appears that the Board has excluded riparian and pre-1914 water rights in formulating its declaration. This appears to be the case on the Sacramento mainstem, the Tuolumne, the Merced, and the Yuba. On these rivers, substantial periods of the year are still officially open under the

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[5] California Water Code §85021, passed November 2009.

Board's declaration to applications to appropriate. Substantial amounts of pre-1914 water rights do not appear to be considered in the Board's determination that a stream is fully appropriated.

Section 1205(b) does require that the Board's declaration "shall contain a finding that the supply of water in the stream system is being fully applied to *beneficial uses* where the board finds that previous water rights decisions have determined that no water remains available for appropriation." (For a list of all Bay-Delta beneficial uses, see sidebar, page 26, above.) Note that the full-appropriation declaration legislation states that the supply of water is "being fully applied to beneficial uses" and not merely to the claims of water right holders.

There is no explicit analysis in the 1998 declaration by the State Water Resources Control Board of full application of water to beneficial uses as a direct consequence of citing its water rights decisions. This means that the full appropriation declarations are likely incomplete, albeit from a different standpoint. The Board may have construed Water Code Section 1205(b) as requiring the Board to rely on its archive of water rights decision, appropriately enough. But Water Code Section 1205(b) does not expressly limit the Board to use only water rights decisions, adjudications, and other determinative documents to justify these findings as evidenced by the Board's additional reliance on wild and scenic river designations. Its approved 2010 flow objectives for the Sacramento and San Joaquin River basin (while legislated to be informational and predecisional in Water Code Section 85086(c)(1)), could also be used to support findings of full appropriation for the Sacramento River, the San Joaquin River, and their other major tributaries. Instream flows serve natural beneficial uses as surely as water rights claims serve economic uses. Accounting for these instream flows as part of full appropriation declarations would increase the periods of full appropriation to include November through June throughout the Sacramento Basin, and February through June in the San Joaquin Basin, given the magnitude of water rights claims we have identified.

Moreover, Board decisions like Water Rights Decision 1594 (D-1594) acknowledge the Board's duty to account for all beneficial uses, such as those protected by the Board's Delta water quality and flow objectives.

C-WIN's planning-level water availability analysis allocates unimpaired flow hydrology, among instream flow objectives first, followed by water rights in order of priority status for the Sacramento and San Joaquin River basins. This planning-level method of water availability analysis demonstrates that the waters of the Sacramento and San Joaquin River Basin, from a planning standpoint, should indeed be declared fully appropriated. The full spectrum of beneficial uses is fully accounted for in allocating the Basins' flows to full protection of instream beneficial uses as well as those of all water rights claimants in California's water rights priority system. Moreover, this water availability analysis uses instream flow determinations that the Board itself endorsed in 2010 as Delta protective of public trust resources. It also indicates which major claimants have either poorly reliable or no water rights once all beneficial uses are accounted for.

A problem with the State Water Resources Control Board's fully-appropriated declaration involves its reliance on Water Right Decision 1594 (D-1594) from 1984. D-1594 authorizes the Board to place into permits (whose priority dates come after August 16, 1978) a new permit condition (called Term 91) notifying all permittees of its intent to curtail diversions of water right permittees. Curtailment occurs when flow and water quality conditions in the Delta demand that reservoir releases are needed to enable the California Department of Water Resources and the US Bureau of Reclamation to meet Delta water quality standards established by the Board. August 16, 1978, is significant as the date on which the Board adopted Water Right Decision 1485. This decision made the Bureau and the Department responsible for meeting water quality objectives in the Delta.

D-1594 expressly addresses water availability for appropriation (diversion) in the Bay-Delta Estuary's Central Valley watershed by subordinating junior appropriative water rights to adherence to Delta water quality objectives. D-1594 is cited by the State Water Board as the water right decision authority for including the Sacramento-San Joaquin Delta in the 1998 fully-appropriated streams water right order. This decision reaffirms the Board's reserved jurisdiction to revisit the season of diversion of water right permittees in the Bay-Delta Estuary watershed, and it establishes with standard permit Term 91 its authority to curtail diversions by post-1978 diverters so that storage releases by the Bureau and the Department can meet Delta water quality objectives.

In this decision, the Board states:

> The availability of water for appropriative water right permittees is affected by the quantity needed to satisfy holders of prior rights and the quantity necessary for protection of other beneficial uses. (State Water Resources Control Board 1983: 2)

In the process leading up to D-1594, the Board initiated a process to conduct a planning-level water availability analysis. Unfortunately, it abandoned that analysis:

> Staff had originally proposed a comprehensive analysis of water supply and demand which attempted to identify and quantify water usage by all diverters below the foothill reservoirs within the Delta watershed. [SWRCB Exhibit. 1, pp. 19-20] This approach was discontinued [apparently in April 1983, according to reporter's transcript dated April 11, 1983, p. 14, lines 16-20] due to the lack of adequate data for factors such as return flow, groundwater accretions, unmeasured tributary inflow, riparian use, appropriative use, and Delta consumptive use. (State Water Resources Control Board 1983: 9-10)

D-1594 states at least twice that application of Term 91 to post-1978 permittees is an "interim solution" or an "interim measure." Nearly 30 years later, the Board still employs Term 91's method of calculating water availability. D-1594 commits the Board to occasionally requiring the post-1978 permittees in the Delta's extensive watershed to curtail deliveries when flows are insufficient to meet Delta water quality objectives and protect the Delta's beneficial uses.

Our planning-level water availability analysis focuses on water rights claims compared to historical hydrology. As we earlier showed, it finds there are far more water right diversion claims than there are flows in the Bay-Delta Estuary's Central Valley watershed (including the Trinity River claims of the Bureau). Our water availability analysis incorporates Board-approved instream flow determination the Board approved as fully protective of public trust resources in the Bay-Delta Estuary and its watershed. Its results suggest that *making Delta water quality and flow objectives fully protective of public trust resources will require moving the priority date of Term 80 permittees far earlier than 1978 for determining when and for whom Term 91 diversion curtailments would occur*. This is necessary because the State Water Resources Control Board (2010) found that current Delta flow objectives on the mainstem and tributaries of the two basins, including the Vernalis Adaptive Management Plan on the San Joaquin River, are insufficiently protective of the Delta's fish and wildlife beneficial uses. (State Water Resources Control Board 2010: 9-10) Conversely, this means that Term 91 *currently* applies Delta water quality objectives that are well known to be ineffective at protecting public trust resources in the Delta.

C-WIN believes it will be necessary for the State Water Resources Control Board to revisit Term 91 and D-1594's method of estimating water availability in the Bay-Delta Estuary's Central Valley watershed when implementing new Delta inflow (instream flow) objectives for the Sacramento and San Joaquin River Basins and their major tributaries upstream of the Delta. For the same reason, the Board's 1998 water rights order must also be revisited to update and expand the seasons where appropriations would be prohibited as a matter of protecting all beneficial uses in compliance with Water Code Section 1205 through 1207. The Board should include these actions in the Bay-Delta Plan's implementation program.

In sum: the Board has acknowledged that existing Delta water quality and flow objectives for the Bay-Delta Estuary are inadequate. (State Water Resources Control Board 2000: 5) However, the Board *assumes* these water quality and flow objectives when it enforces Term 91 on post-1978 water rights permittees. Improving these objectives will mean the Board must curtail diversions by water right permittees (also probably licensees) with priority dates *earlier* than August 16, 1978, in order for Board-required Delta water quality and flow objectives to perform their functions protecting Delta watershed public trust resources. As part of its Phase III process to implement the Bay-Delta Plan, the Board must take testimony on how to determine this earlier priority date.

In all types of hydrology and using the Sacramento River Basin flow determination of 75 percent of unimpaired flow from November through June, C-WIN's water availability analysis suggests that for the Sacramento River Basin above the Feather River confluence, and the Feather River basin itself, the earliest date for curtailment should be December 19, 1914. On the Yuba and the Bear Rivers, the date of curtailment could be somewhat later, ranging from 1924 on the Yuba to 1941 on the Bear. On the American River, the earliest date should coincide with the priority date of Placer County Water Agency's 1958 water rights.

In all types of hydrology and applying the San Joaquin River Basin flow determination of 60 percent of unimpaired flow from February through June, C-WIN's water availability analysis suggests that for the Stanislaus and Merced Rivers, the Term 91 curtailment date should be December 19, 1914. On the Tuolumne River, the Term 91 curtailment date should be 1871. On the upper San Joaquin River, our analysis suggests that Term 91 curtailment dates should be on or before the dates of the Bureau of Reclamation's permits for Friant Dam and Millerton Lake in 1916. (See Appendix D.1 for Water Availability Analysis model results.)

The Board has acknowledged that current Delta water quality and flow objectives do not protect Delta fish and wildlife beneficial uses adequately. The Board must decrease the seasons of diversion for the Delta and its major tributaries of the Sacramento and San Joaquin River Basin watersheds, because the Board is obligated under the Public Trust Doctrine to protect all beneficial uses in the Delta. To implement this obligation, the Board must also revisit its Fully-Appropriated Streams Declaration and push back the priority date used to conduct diversion curtailments under Term 91.

Court Adjudication. Still another path that may be used is that of adjudication by a court of competing water rights claims in a watershed. It may take years of painstaking testimony and argumentation by attorneys and (usually) engineers. But the present situation of extreme uncertainty and unreliability, clouded water titles, trespassing on the public trust, and related boundary disputes of many surface and groundwater water rights throughout the Bay-Delta Estuary's Central Valley watershed argues for its consideration.

In the 1930s and 1940s, staff within the Department of the Interior and the old State Water Rights Board advocated an adjudication of water rights prior to construction of the Central Valley Project. Both Governor Earl Warren and State Water Rights Board Chairman Henry Holsinger testified during the Clair Engle's Congressional hearings in 1951 that a complete adjudication of water rights on the Sacramento River should have occurred prior to the completion of the Central Valley Project. In fact, the Engle committee concluded that, "[t]hat for all practical purposes, the developed water supplies of the Sacramento River are overcommitted and oversubscribed." This was prior to approval and construction of the State Water Project. That project was predicated on obtaining some 5,000,000 acre- feet of water annually from north coastal streams (Figure 11). With the exception of about 1 million acre-feet of Trinity River flows to the Central Valley Project service area, this "surplus" of surface water to the Delta system never arrived. Adjustments to the State Water Project should have been made earlier, but were not. The logical result is that the Delta's native aquatic ecosystems have collapsed.

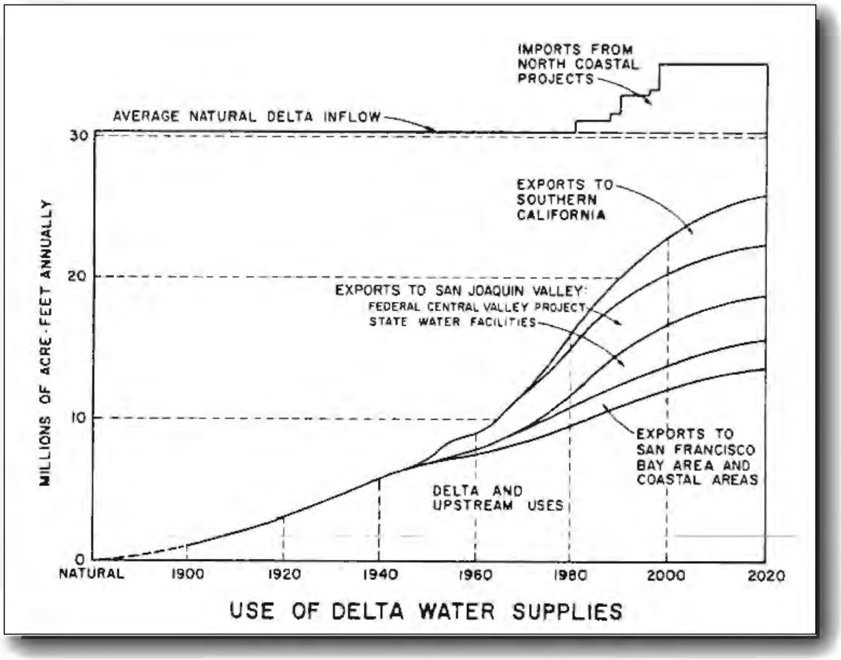

Figure 11
Source: California Department of Water Resources, 1960: 13.

A reliable source of surplus water for the State Water Project and the Central Valley Project eludes the Department and the Bureau, so far. Because surface water imports from north coast watersheds were precluded by wild and scenic river designations the Department and the Bureau have instead tried to establish a "water market" to transfer water from northern California across the Delta as an interim strategy for increasing water supplies in dry years for low-priority water service contractors south of the Delta. C-WIN, CSPA and AquAlliance see this as a grave threat to the regional aquifers of the Sacramento Valley from the Delta to Redding.

This threat is manifest in "groundwater substitution transfers." In such water transfers, surface water rights are transferred by "willing sellers" to the Department or the Bureau. The agencies facilitate the transportation of the water in the deal to the buyer south of the Delta using their export pumps near Tracy. To continue producing their crop however, the seller replaces or substitutes the surface water supply with water pumped from underground. The seller is thus able to achieve a net profit from the gross revenues from selling surface water rights, less the cost of pumping water from below ground, and still can sell a crop after harvest.

Such transactions however assume that groundwater may be treated simply as an individual's property under their land. Such a legal theory runs straight into the reality of groundwater in the Central Valley watershed being a regional commons, a shared resource, particularly among all individual landowners of the Sacramento Valley who overlie its extensive aquifers. One landowner or a set of landowners in one general location may cause a region-wide cone of depression by pumping a lot of groundwater to replace surface water they sold to someone south of the Delta. Such intensive pumping can damage the wells of neighbors near to and far from the scene of the original pumping. Many of the Valley's rivers are well known as "gaining" streams—that is, surface flows are actually enhanced upslope by accretions from groundwater sources. Too much groundwater pumping lower down in the aquifers for the "surplus" benefitting only the State Water Project and the Central Valley Project could drastically lower water tables upslope and reduce river flow permanently if allowed to become "the new normal." Potentially permanent injuries to many beneficial users of water in the Sacramento Valley would result.

A glimpse of this prospect occurred in 1994 when the Department sponsored a drought water bank program. The program resulted in damage to a municipal well and to individual wells in Durham and Cherokee areas of Butte County. More recently, the Department and the Bureau have since 2002 repeatedly sought "willing sellers" to offer surface water among the numerous public and private Sacramento Valley water right holders in Sacramento, Yolo, Sutter, Butte, Glenn, and Colusa counties. The State Water Resources Control Board in 1996 engaged in proceedings to determine the responsibility of Sacramento River Basin diverters to meet water quality standards in the Bay-Delta Estuary. The Board had completed phases 1 through 7 of the proceeding that led in 2000 to adoption of Water Rights Decision 1641 (D-1641). Phase 8 of that proceeding was to focus on the Sacramento River and its tributaries. In Phase 8, the Department of Water Resources and the Bureau of Reclamation, as operators of the state and federal export projects, claimed that certain water right holders in the Sacramento Valley must cease diversions or release water from storage to help meet water quality standards in the Delta. Sacramento Valley water users claimed that their water use has not contributed to any water quality problems in the delta, and, as senior water right holders and water users within the watershed and counties of origin, they are not responsible for meeting these standards. To avoid both litigation and independent regulatory action by the State Water Resources Control Board, water diverters throughout the Sacramento River Basin executed an agreement in April 2001. (Northern California Water Association, 2001) As a result of the Sacramento Valley Water Management Agreement, the Phase 8 process was dismissed by the State Water Resources Control Board. (State Water Resources Control Board 2001)

The Department and the Bureau have encouraged planning approaches to regional water management to facilitate water transfers, such as those in this partial list:

- The Department of Water Resources undertook a draft and final Program Environmental Impact Report in 1993 on a drought water bank, but to our knowledge has never certified this document.
- The Sacramento Valley Water Management Agreement, signed in 2002, but which ten years on still lacks a programmatic environmental review document. It expired December 31, 2010.
- The 2000 Governor's Advisory Drought Planning Panel Report, Critical Water Shortage Contingency Plan, which also promised a program environmental document on a drought response water transfer program, but was never undertaken.
- The Sacramento Valley Integrated Regional Water Management Plan of 2006, overseen by a joint powers authority of numerous water agencies in the Valley.
- DWR's last Drought Water Bank in 2009 sought authorization for over 100,000 acre-feet of temporary transfers of water, though only 16,000 acre-feet were eventually supplied to Southern California buyers.
- The Northern Sacramento Valley Integrated Regional Water Management Plan, now in development.
- The Delta Stewardship Council's Delta Plan, whose planning scope includes the entire Sacramento Valley and assumes a groundwater surplus is necessary for meeting Delta export water demands. The Council has also expressed support for water transfers using groundwater substitution.
- The Bay Delta Conservation Plan, which would provide coverage from a 50-year habitat conservation plan for Governor Brown's recently announced Peripheral Tunnels Project. This project has no identified water source, other than acknowledgement by the Bureau of Reclamation that it would reroute existing surface flows around the Delta from the Sacramento River Basin. (Vlamis et al 2012)

C-WIN, CSPA, AquAlliance, and other knowledgeable experts are concerned that long term impacts of regional use of groundwater to substitute for transferred surface supplies will accelerate the depletion of the Valley's groundwater supplies. There are significant gaps in scientists' grasp of how the aquifer system recharges; how surface flows and groundwater systems interact in the Valley's creeks and rivers; how supplies contained within upper and lower aquifers interact; how the aquifers respond in the long-term to increasingly intense demands on them, even during wetter years. And the regional effect of declines in groundwater levels on river and creek flows and riparian corridor species and wetland ecosystems has never been adequately explored. These are beneficial uses upstream along the major tributaries of the Sacramento River Basin that must also be considered part of the public trust responsibilities of the State Water Resources Control Board in its Bay-Delta Plan. (Vlamis et al 2012)

State and federal water planners assume that surface and groundwater flows will always be there to support this hoped-for surplus. Based on that assumption they continue each winter and spring to plan the next water transfer program that relies on and encourages groundwater substitution transfers. This assumption has been built into the Department and the Bureau's chief water supply and operations planning tool, CalSIM II. When surface water supplies for riparian and appropriative water right holders are exhausted in model runs through CalSIM II, the model's automatic response is to add pumped groundwater to make up for any deficit to water demands in the model. (Draper and Bourez 2004: slide 20; Close et al 2003: 26-27; California Department of Water Resources and US Bureau of Reclamation 2004: Appendix A) Sacramento Valley groundwater activity is explicitly modeled to include "minimum groundwater pumping" for those land uses that rely exclusively on groundwater in the Valley. (California Department of Water Resources and US Bureau of Reclamation et al 2004: Appendix A) San Joaquin Valley groundwater is not modeled. (Close et al 2003) This can result in low estimates of salinity reaching the south Delta. (San Joaquin Valley CalSIM II External Review 2006: 45) Upper bounds on potential pumping from aquifers in the Sacramento Valley are undefined. According to Close et al:

> This does not represent reality, since, if CalSIM II is used for statewide planning, it would allow pumping of vast quantities of water for export to southern parts of the state, something which agency staff [i.e. California Bay-Delta Authority Science Program and the Association of Bay Area Governments] claim is unrealistic. Realistic upper bounds to pumping from any of the aquifers represented in the model need to be developed and implemented. (Close et al 2003: 26-27)

The Department and the Bureau responded that CalSIM II does explicitly model the "impact on groundwater storage of each sub-basin." They state that CalSIM II runs that result in groundwater pumping over and above the natural and artificial recharge and which causes depletion of the basin will cause CalSIM II to no longer run. They also state, however, that CalSIM II "does not include local ground water inventories" but instead relies on a historically-modeled calibration of approximated inventories. They state further that "no groundwater is exported from the overlying watershed (except in the form of surface water return flow or tailwater that results from irrigation using groundwater)." (California Department of Water Resources and US Bureau of Reclamation 2004: A-1) Thus, CalSIM II assumes that groundwater "backstops"surface water rights holders and their needs for supplies, when in reality groundwater now backstops river flows (and all associated beneficial uses associated with those flows). It is small comfort that CalSIM II ceases to work when a basin is depleted from the program's operations; more to the point, it fails to assume, let alone build in a rational groundwater management strategy of sustained yield.

CalSIM II's reliance on groundwater to meet overall water demand when surface supplies must not be the de facto water supply development strategy for the state of California when supplies run low. When supplies run low—as they are forecasted to as climate change affects the American West—the state and its responsible and lead agencies must increase other means of stretching water supplies. This can be done through water recycling, reuse, conservation, and a range of urban, industrial, and agricultural efficiency measures.

Bibliography (including references in appendices)

Cahill, V., for E.G. Brown. 2008. *Reallocation of Water Under Specified Conditions*, letter representing the California Attorney General to John J. Kirlin, Executive Director of Delta Vision, 9 July. Accessible online at http://deltavision.ca.gov/BlueRibbonTaskForce/July2008/Handouts/Item_3_Attachment2.pdf.

California Appeals Court, Third District. 1986. *United States of America, et al, v. State Water Resources Control Board (and seven other cases)*, 182 Cal.App. 3d 82, July.

California Department of Fish and Game. 1992. *Summary and Recommendations for the Department of Fish and Game's Testimony on the Tributaries to the Sacramento-San Joaquin Estuary*, presented to the State Water Resources Control Board, Interim Water Rights Actions Phase, Bay-Delta Estuary Proceedings, WRINT-DFG Exhibit No. 29, 8 pages.

California Department of Water Resources and US Bureau of Reclamation. 2004. *Peer Review Response: A Report by DWR/Reclamation in Reply to the Peer Review of the CalSIM-II Model Sponsored by the CalFED Science Program in December 2003.* August. 27 pages plus six appendices. Accessible online at http://baydeltaoffice.water.ca.gov/modeling/hydrology/Peer%20Review%20Response%20(August%202004).pdf.

California Department of Water Resources. 1960. *Bulletin 76: Delta Water Facilities.* December, 61 pages.

California Department of Water Resources. 2007. *California Central Valley Unimpaired Flow Data*, 4th edition, Bay Delta Office, May, 50 pages.

California Supreme Court. 1983. *National Audubon Society, et al., v. The Superior Court of Alpine County and Department of Water and Power of the City of Los Angeles*, et al. S.F. 24368. Filed February 17, 1983. Cited as 33 Cal.3d 419, 189 Cal.Rptr. 346, cert. denied, 464 U.S. 977. Accessible online at http://www.monobasinresearch.org/images/legal/nassupct.htm.

California Water Project Authority, 1951. *Data and Information on the Central Valley Project*, October 29, 66 pages.

Close, A., Hanneman, WM, Labadie, JW, Loucks, DP, Lund, JR, McKinney DC, and Stedinger, JR. 2003. *A Strategic Review of CALSIM II and its Use for Water Planning, Management, and Operations in Central California.* December 4, 129 pages. Accessible online at http://sacramentoriverportal.org/modeling/CALSIM-Review.pdf.

Domagalski JL, Knifong DL, MacCoy DE, Dileanis PD, Dawson BJ, and Majewski MS. 1998. *Water Quality Assessment of the Sacramento River Basin, California—Environmental Setting and Study Design*. United States Geological Survey Water Resources Investigations Report 97-4254. National Water Quality Assessment Program. Accessible online at http://pubs.er.usgs.gov/publication/wri974254.

Draper, A, and Bourez, W. 2004. *CalSIM II Sacramento River Basin Hydrology Enhancements*. Powerpoint presentation, February 26. 58 slides. Accessible online at http://www.cwemf.org/Asilomar/Draper.pdf.

Garner, B.A., ed. 2010. *Black's Law Dictionary*, Abridged Ninth Edition.

Gronberg, JM, Dubrovsky NM, Kratzer CR, Domagalski JL, Brown LR, and Burow KR. 1998. *Environmental Setting of the San Joaquin-Tulare Basins, California*. United States Geological Survey Water Resources Investigations Report 97-4205. National Water Quality Assessment Program. Accessible online at http://pubs.er.usgs.gov/publication/wri974205.

Holsinger, H. 1936. *Comments Pertaining to Some Fundamental Theories of California Water Law*, An address presented before Sacramento Section, American Society of Civil Engineers on February 4, manuscript in the Water Resources Collections and Archives, University of California, Riverside.

Bibliography (including references in appendices)

Horwitz, M.J. 1977. *The Transformation of American Law, 1780-1860*, Cambridge, MA: Harvard University Press, 356 pages.

Hutchins, W.A.. 1956. *The California Law of Water Rights*, prepared for the US Department of Agriculture, 571 pages.

Kibel P.S. 2011. Instream Flow and the Public Trust: Statutory Innovation in California's 2009 Delta Reform Act. 13 Water Resources Committee Newsletter 4 (ABA, January 2011). Accessible online at http://digitalcommons.law.ggu.edu/pubs/444/

Knowles, N. and D.R. Cayan. 2002. Potential effects of global warming on the Sacramento/San Joaquin watershed and the San Francisco estuary. *Geophysical Research Letters* 29(18): 1891-1894. Accessible online at http://cirrus.ucsd.edu/~pierce/crd/globalwarming/knowles_cayan_2002.pdf.

Littleworth, A.L. and E.L. Garner, *California Water II*, 2nd edition, Point Arena, CA: Solano Press Books, 2007, 428 pages.

Northern California Water Association. 2001. *The Sacramento Valley Water Management Agreement*. 28 pages including three appendices. Accessible online at http://www.norcalwater.org/res/docs/sac_valley_water_mgmt_agrmt.pdf.

O'Laughlin, T. 2011a. *Draft Technical Workshop: Need to Disclose Legal Theory Behind Intended Plan of Implementation.* Letter to Charlie Hoppin, Frances Spivy-Weber, Tam Doduc, and Dwight Russell, State Water Resources Control Board, February 22, 3 pages. Accessible online at http://www.swrcb.ca.gov/waterrights/water_issues/programs/bay_delta/bay_delta_plan/water_quality_control_planning/docs/sjrf_spprtinfo/022211sjrga2.pdf.

O'Laughlin, T. 2011b. *SWRCB's Jurisdiction in the Bay-Delta Proceedings*, Letter to Charlie Hoppin, Frances Spivy-Weber, and Tam Doduc, State Water Resources Control Board, June 27, 2 pages. Accessible online at http://www.swrcb.ca.gov/waterrights/water_issues/programs/bay_delta/bay_delta_plan/water_quality_control_planning/docs/sjrf_spprtinfo/062711sjrga2.pdf.

Pearsall, J., ed. 1999. *Oxford Concise English Dictionary*, Tenth Edition.

Review Panel. 2010. *The Vernalis Adaptive Management Program (VAMP)*, prepared for the Delta Science Program, May 11, 45 pages. Accessible online at http://www.sjrg.org/peerreview/review_vamp_panel_report_final_051110.pdf.

San Joaquin River Group Authority. 2000. *San Joaquin River Agreement*, and Appendix A: Vernalis Adaptive Management Plan. Accessible online at http://www.sjrg.org/agreement.htm.

San Joaquin River Group Authority. 2008. *South Delta Hydrology and Water Rights: Comments of the San Joaquin River Group Authority*, prepared by O'Laughlin & Paris LLP, Chico, CA, 8 July, 73 pages plus appendices. Accessible online at http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/strategic_plan/comments/south_delta_diversion_report.pdf.

San Joaquin River Group Authority. 2011. *2010 Annual Technical Report on Implementation and Monitoring of the San Joaquin River Agreement and the Vernalis Adaptive Management Plan (VAMP)*. Prepared for the California Water Resources Control Board in compliance with D-1641. September. 167 pages. Accessible online at http://www.sjrg.org/technicalreport/2010/2010_SJRGA_Annual_Technical_Report.pdf.

San Joaquin Valley CalSIM II External Review. 2006. *Review Panel Report: San Joaquin River Valley CalSIM II Model Review.* 12 January. 87 pages. Accessible online at http://science.calwater.ca.gov/pdf/calsim/calsim_II_final_report_011206.pdf.

Bibliography (including references in appendices)

Soulé, F. 1901. "Irrigation from the San Joaquin River," in Elwood Mead, *Report of Irrigation Investigations*, US Department of Agriculture Office of Irrigation Investigations. Accessible at University of California at Riverside, Water Resources and Collections Archives, Call No. G4094 C1.

State Water Resources Board. 1951. *Bulletin No. 1: Water Resources of California*, State of California, 648 pages.

State Water Resources Control Board. 1983. *Water Right Decision 1594: In the Matter of Water Right Permits in the Sacramento-San Joaquin Delta Watershed in which the Board Reserved Jurisdiction to Change the Season of Diversion (Term 80 Permits)*, November 1983, 61 pages, plus Appendix A, and Order WR 84-2, amending and affirming Decision 1594 and Denying Petitions for Reconsideration, February 1984, 29 pages. Accessible online at http://www.waterboards.ca.gov/waterrights/board_decisions/adopted_orders/decisions/d1550_d1599/wrd1594.pdf.

State Water Resources Control Board. 1989. *Order WR 89-25: In the Matter of Declaration of Fully Appropriated Stream Systems in California: Order Adopting Declaration of Fully Appropriated Stream Systems and Specifiying Conditions for Acceptance of Applications and Registrations*. November 16, 58 pages plus Exhibit A. Accessible online at http://www.swrcb.ca.gov/waterrights/board_decisions/adopted_orders/orders/1989/wro89-25.pdf.

State Water Resources Control Board. 1991. *Order WR 91-07: In the Matter of Declaration of Fully Appropriated Stream Systems in California: Order Revising Declaration of Fully Appropriated Stream Systems*. August 22, 28 pages plus revisions to Exhibit A. Accessible online at http://www.swrcb.ca.gov/waterrights/board_decisions/adopted_orders/orders/1991/wro91-07.pdf.

State Water Resources Control Board. 1992. *Draft Water Right Decision 1630: San Francisco Bay/Sacramento-San Joaquin Delta Estuary*, December, 121 pages.

State Water Resources Control Board. 1994. *Mono Lake Basin Water Right Decision 1631: Decision and Order Amending Water Right Licenses to Establish Fishery Protection Flows in Streams Tributary to Mono Lake and to Protect Public Trust Resources at Mono Lake and in the Mono Lake Basin*, September 28, 212 pages. Accessible online at http://www.swrcb.ca.gov/waterrights/board_decisions/adopted_orders/decisions/d1600_d1649/wrd1631.pdf.

State Water Resources Control Board. 1998. *Order WR 98-08: In the Matter of Declaration of Fully Appropriated Stream Systems in California: Order Revising Declaration of Fully Appropriated Stream Systems*. November 19, 28 pages plus Exhibit A. Accessible online at http://www.swrcb.ca.gov/waterrights/board_decisions/adopted_orders/orders/1998/wro98-08.pdf.

State Water Resources Control Board. 2000. *Revised Water Right Decision 1641: In the Matter of Implementation of Water Quality Objectives for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary; A Petition to Change Points of Diversion of the Central Valley Project and the State Water Project in the Southern Delta; and A Petition to Change Places of Use and Purposes of Use of the Central Valley Project*, December 29, 1999, revised in accordance with Order WR 2000-02, March 15, 193 pages. Accessible online at http://www.waterboards.ca.gov/waterrights/board_decisions/adopted_orders/decisions/d1600_d1649/wrd1641_1999dec29.pdf

State Water Resources Control Board. 2001. *Order WR 2001-05*. April. Accessible online at http://www.swrcb.ca.gov/waterrights/board_decisions/adopted_orders/orders/2001/wro2001-05.pdf.

Bibliography (including references in appendices)

State Water Resources Control Board. 2008. *Water Rights Within the Bay-Delta Watershed.* Provided to the Delta Vision Blue Ribbon Task Force for its October 16 and 17, 2008, meeting. Document dated September 26, 2008, 4 pages. Accessible online at http://deltavision.ca.gov/BlueRibbonTaskForce/Oct2008/Respnose_from_SWRCB.pdf.

State Water Resources Control Board. 2010. *Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem*, prepared pursuant to the Sacramento-San Joaquin Delta Reform Act of 2009, 178 pages. Accessible online at http://www.swrcb.ca.gov/waterrights/water_issues/programs/bay_delta/deltaflow/final_rpt.shtml

State Water Resources Control Board. 2011a. *Revised Notice of Preparation and Notice of Additional Scoping Meeting (San Joaquin River Flow and South Delta Water Quality Objectives)*, 18 pages. Accessible online at http://www.swrcb.ca.gov/waterrights/water_issues/programs/bay_delta/bay_delta_plan/water_quality_control_planning/docs/notice_sjr_flow_southern_delta_scoping_mtg_with_attachments.pdf.

State Water Resources Control Board. 2011b. California Code of Regulations, Title 23 Waters, Division 3 State Water Resources Control Board and Regional Water Quality Control Boards (Sections pertaining to water rights), January, 168 pages. Accessible online at http://www.swrcb.ca.gov/laws_regulations/docs/wrregs.pdf.

State Water Resources Control Board. 2011c. *Technical Report on the Scientific Basis for Alternative San Joaquin River Flow and Southern Delta Salinity Objectives*. October, 170 pages, including appendices. Accessible online 6 December 2011 at http://www.swrcb.ca.gov/water_issues/programs/peer_review/docs/sanjoaquin_river_flow/technical_report.pdf.

Steinberg, T. 1991. *Nature Incorporated: Industrialization and the Waters of New England*, Amherst, MA: University of Massachusetts Press, 284 pages.

Stevens, J.S. 2005. *Applying the Public Trust Doctrine to River Protection*, presentation given June 9, 2004 at University of California at Davis, reprinted in California Department of Water Resources, *California Water Plan Update 2005, Volume 4*, pp. 393-400. Accessible online at http://www.waterplan.water.ca.gov/docs/cwpu2005/vol4/vol4-environment-applyingpublictrustdoctrine.pdf.

US Department of the Interior. 2000. *Record of Decision: Trinity River Mainstem Fishery Restoration Final Environmental Impact Statement/Environmental Impact Report.* December. 28 pages plus three appendices. Accessible online at http://odp.trrp.net/Library/Details.aspx?document=227.

Vlamis, B., Krieger, C., and Jennings, B. 2012. *Letter re: Initial Study and Proposed Negative Declaration for the Butte Water District 2012 Water Transfer Program*, to Mark Orme, General Manager, Butte Water District, Gridley, CA, March 29, 2012, 22 pages.

Wiel, S.C. 1928. The Pending Water Amendment to the California Constitution, and Possible Legislation (Concluded), *California Law Review* 16(4): 257-280, May.

Wilson, C.M. 2011. *The State Water Resources Control Board's Role in Implementing the Delta Plan*, Report to the State Water Resources Control Board and the Delta Stewardship Council by the Delta Watermaster. 8 pages. Accessible online at http://www.swrcb.ca.gov/board_info/agendas/2011/mar/031511_9att.pdf.

Wilson, C.M. 2012. *Water Right Compliance and Enforcement in the Delta.* Report to the State Water Resources Control Board and the Delta Stewardship Council by the Delta Watermaster. 9 pages. Accessible online at http://www.swrcb.ca.gov/board_info/agendas/2012/feb/020712_9_with%20report.pdf.

Appendix A
River Flow Regulation to the Bay-Delta Estuary

In 1992, the Board proposed in a draft Bay-Delta water right decision regulating flows to the Delta from the San Joaquin River Basin by apportioning responsibility for Delta inflows according to the size of major reservoirs on the Basin's major tributary streams. This draft decision was withdrawn by order of then-governor Pete Wilson. While the Board considers regulating inflows from the San Joaquin River tributaries once again, many years of delay have elapsed: This section recounts and evaluates the Board's record regulating inflows to the Delta from the San Joaquin River Basin.

After backing away from its "global" approach to regulating inflow to the Delta from the San Joaquin River in 1993, the State Water Resources Control Board instead chose to continue regulating Delta conditions in part by regulating flow and water quality at Vernalis. In Water Rights Decision 1641 (D-1641), the Board assigned responsibility for meeting the Vernalis water quality standards to the California Department of Water Resources and the US Bureau of Reclamation and added interior Delta salinity objective monitoring sites to evaluate compliance by the Department and the Bureau. The Department has no regulating reservoirs of its own on San Joaquin River Basin rivers, so it fell to the Bureau to provide most of the flows to Vernalis from the Basin to meet the Board's objectives there. The bulk of the flows the Bureau has available for this purpose come from its New Melones Dam and Reservoir facility on the Stanislaus River. This strategy has been largely unsuccessful for the Bureau, the Department and the Board. Migratory fish populations and open water fish populations endemic to the Delta have crashed over the last decade since D-1641 was implemented. An experiment to provide helpful spring flows for migratory salmon, called the Vernalis Adaptive Management Plan, has achieved only limited results (Review Panel, 2010).

Table 13 summarizes the State Water Resources Control Board's present river flow objectives set for compliance at Vernalis and Rio Vista. These flow criteria were adopted as part of its Water Right Decision 1641 (D-1641) in 2000. Under D-1641, the Board currently regulates flows on the San Joaquin River at Vernalis during two main periods of the year: February 1 through June 30, and throughout the month of October. Within the February to June period, there are two regimes as well. One flow regime is in place from February 1 through April 14 and then again from May 16 through the end of June. The second flow regime occurs generally from April 15 to May 15, a 31-day period in which spring pulse flows are required to increase over the early and late spring periods. The spring pulse flow is intended to aid young salmon smolts migrating to the ocean by improving their chances of survival as they pass through the Delta. Minimum flow criteria in this spring regime vary depending on the water year type, and the water year type is generally finally forecasted by May 1. Note that these flow rates are a monthly average, which allows for great variability as long as the average is maintained throughout the 30-day running average during these flow regimes.

October minimum flows must be 1,000 cubic feet per second or greater using a 30-day running average. This is a period of time when adult fall-run Chinook salmon return from the ocean to migrate upstream and spawn in their natal streams. Again, as with the February through June regime, the use of a 30-day running average allows upstream water right holders wide latitude in providing flows that meet the Vernalis flow standard for October as long as the 30 day running average during October is not less than 1,000 cubic feet per second of flow.

Instead of implementing D-1641 San Joaquin River flow objectives to benefit fish and wildlife, the State Water Resources Control Board approved the San Joaquin River Agreement under which the major water right holders of the San Joaquin River Basin agreed to provide spring pulse flows

Table 13
State Water Resources Control Board
D-1641 Flow Regulations at Vernalis

Compliance Location	Water Year Type	Time Period	Minimum Monthly Average Flow Rate (cfs)
Sacramento River at Rio Vista	All	September	3,000
	W, AN, BN, D	October	4,000
	Critically Dry	October	3,000
	W, AN, BN, D	Nov-Dec	4,500
	Critically Dry	Nov-Dec	3,500
San Joaquin River at Airport Way Bridge, Vernalis	W, AN	Feb-Apr 14 and May 16-Jun	2,130 or 3,420
	BN, D		1,420 or 2,280
	C		710 or 1,140
	W	Apr 15 to May 15	7,330 or 8,620
	AN		5,730 or 7,020
	BN		4,620 or 5,480
	D		4,020 or 4,880
	C		3,110 or 3,540
	All	October	1,000

Source: State Water Resources Control Board, 2000.
Key to Water Year Types: W = Wet; AN = Above Normal; BN = Below Normal; D = Dry; C = Critically Dry.

intended to benefit outmigrating salmon smolts.[1] The Board agreed to its provisions as a voluntary approach to achieve the objectives. In exchange for providing these spring pulse flows totaling up to 110,000 acre-feet, the Agreement called upon the state and federal pumps in the south Delta to limit their export rates to certain specified levels. The Agreement further called upon the state, federal and San Joaquin River Group Authority member agencies to participate in an annual experimental study of the effects of these pulse flows on salmon smolt survival and other ecological indicators in the San Joaquin River in the Vernalis area. That study was called the Vernalis Adaptive Management Plan (VAMP).

The State Water Resources Control Board hoped that by using VAMP to implement its D-1641 flow criteria for the San Joaquin River at Vernalis, the scientific study would find salmon smolt survival is closely related to the humanly manageable actions of river flow, export limits at the pumps, and maintaining a barrier at the head of Old River to direct smolts toward Suisun Bay and the Pacific Ocean via the most direct and safest route. The Board also hoped that increased smolt survival would contribute to increased salmon escapement (that is, fish leaving the ocean in late summer and early fall to spawn in the fall).

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[1] The parties to the agreement included California Departments of Water Resources and Fish and Game; United States Department of the Interior agencies Reclamation and Fish and Wildlife; and member agencies of the San Joaquin River Group Authority: South San Joaquin and Oakdale irrigation districts on the Stanislaus River; Modesto and Turlock irrigation districts on the Tuolumne; Merced Irrigation District on the Merced River; and Central California Irrigation District, Firebaugh Canal Water District, Columbia Canal Company, and San Luis Canal Company on the upper San Joaquin River. Other parties included state and federal water contractors south of the Delta export pumps, and two environmental community parties: the Natural Heritage Institute and the Bay Institute of San Francisco.

The VAMP seeks to test the hypothesis that increasing San Joaquin River flows, sharply limiting Delta export pumping during the spring pulse flow period, and blocking fish access to Old River (which leads to the state and federal export pumps) will increase survival rates of young salmon juveniles and smolts migrating through the Delta to the Pacific Ocean (San Joaquin River Group Authority, 2000: Section 2.5).

The 110,000 acre-feet of water from these agencies was intended for use in reaching "target flows" under VAMP at Vernalis that increased flow in the San Joaquin at Vernalis over defined

Table 14
Vernalis Adaptive Management Plan Target Flows

Existing Flow (cfs)	Single Step Target Flow (cfs)	Double-Step Target Flow (cfs)
0 to 1,999	2,000	3,200
2,000 to 3,199	3,200	4,450
3,200 to 4,449	4,450	5,700
4,450 to 5,699	5,700	7,000
5,700 to 6,999	7,000	Existing Flow
7,000 or greater	Existing flow	Existing flow

Source: San Joaquin River Agreement, 2000, Articles 5.5 and 5.6.

Table 15
VAMP Flows Summary, 2000-2010
(cubic feet per second, except where noted otherwise)

Year	VAMP Target Flow Period	Target flow Condition	VAMP Target Flow	Actual Mean Flow	Existing Flow	VAMP Supplementing Flows (AF)	Delta Export Target	Actual Delta Exports
2000	4/15-5/15	Double-step	5,700	5,869	4,800	77,680	2,250	2,155
2001	4/20-5/20	Single-step	4,450	4,224	2,909	78,650	1,500	1,420
2002	4/15-5/15	Single-step	3,200	3,301	2,757	33,430	1,500	1,430
2003	4/15-5/15	Single-step	3,200	3,235	2,290	58,065	1,500	1,446
2004	4/15-5/15	Single-step	3,200	3,155	2,088	65,591	1,500	1,331
2005	5/1-5/31	na[a]	>7,000	10,390	10,390	0	2,250	2,986[b]
2006	5/1-5/31	na[a]	>7,000	26.220 to 24,262 [c]	26,020	0	1,500 to 6,000	1,599 to 5,748[c]
2007	4/22-5/22	Single-step	3,200	3,263	2,721	33,330	1,500	1,486
2008	4/22-5/22	Single-step	3,200	3,163	1,939	75,250	1,500	1,520
2009	4/19-5/19	Off-ramp	na	2,260	2,260	0	na	1,990
2010	4/25-5/25	Single-step	4,450	5,140	4,830	23,980	1,500	1,515
		Average VAMP Supplementing Flows				**40,543**	**Acre-feet**	

Source: San Joaquin River Group Authority 2011: Table 2-8; California Water Impact Network. Notes: [a] Existing flow greater than maximum VAMP Target Flow of 7,000 cfs; [b] May 1 through 25 average was 2,260 cfs; exports were increased starting May 26 in conjunction with increasing existing flow; May 26 through 31 average was 6,012 cfs; [c] "First fish release-recapture period"/"Second fish release-recapture period"; "na" means not available or not applicable.

"existing flows" that would occur in the River in the absence of the VAMP flows. The VAMP flows were intended to be released during the spring pulse flow period coinciding with the State Water Resources Control Board's flow criteria period of April 15 through May 15 (or a reasonable 31-day period thereabouts based on the presence or absence of migrating salmon). The Agreement employs the State Board's water year classification scheme as an indicator for determining target flows. Wet years would have an indicator of 5, decreasing by one to Critical years having an indicator of 1. Double step target flows could be invoked under VAMP in situations where the sum of present plus current water year indicators added to 7 or greater. When that occurred, a "double step" target flow, showed in Table 14, would become the new target flow.

The Agreement also limits Central Valley Project and State Water Project export pumping during this same mid-April to mid-May period. Combined export rates for the pumps would be limited to no more than 1,500 cubic feet per second when Vernalis target flows are between 2,000 and 4,450 cubic feet per second. When the target flow reach 5,700 cubic feet per second, combined export rates are limited to no more than 2,250 cubic feet per second. And when target flows reach 7,000 cubic feet per second, the pumping plants are limited either to 1,500 or 3,000 cubic feet per second (San Joaquin River Group Authority, 2000: Article 6.4). The rationale for this "either/or" export rate at the high VAMP target flow is explained in Appendix A of the Agreement as a matter of safety and operational capacity of installing the barrier at the head of Old River and minimum pumping capacity of the export pumps, as well as the intent of the US Fish and Wildlife biological opinion that export rates in this period be less than 50 percent of the required Vernalis standard. Hence, the export pumping rate at a target flow of 7,000 cubic feet per second would be able to go as high as 3,000 cfs (San Joaquin River Group Authority, 2000, Appendix A, p. 3).

At present, VAMP is a 12-year study. Through 2010, double step target flows have been invoked once (San Joaquin River Group Authority [SJRGA], 2011: Table 2-8). Table 15 below summarizes VAMP flow activity from 2000 to 2010 (SJRGA, 2011). This table shows that over the course of the VAMP experiments through 2010, average supplemental VAMP flow contributions have averaged just 40,543 acre-feet per year, about 37 percent of the maximum annual commitment by SJRGA agencies of 110,000 acre-feet for VAMP.

Previous studies have shown that salmon smolt survival could be enhanced if increased flows were directed primarily down the mainstem of the San Joaquin River below Vernalis past Stockton (Review Panel, 2010). To facilitate fish using that route, the San Joaquin River Agreement called upon the Department of Water Resources to install a fish barrier at the head of Old River (which is a direct route for San Joaquin River water to the state and federal export pumps near Old River at the export pumps where fish can be all too easily entrained and killed).

In the event that more water than the 110,000 acre-feet was needed to meet target flows, the US Bureau of Reclamation and the California Department of Water Resources could approach the agencies making up the San Joaquin River Group Authority as willing sellers of additional water. As Table 15 reveals, neither the Bureau nor the Department needed to purchase additional water for VAMP flows, since no VAMP flows exceeded 110,000 acre-feet.

VAMP results have largely been inconclusive because there have been only a narrow range of flows subject to VAMP researchers. The State Water Resources Control Board permitted the VAMP experiment to proceed in D-1641 for over a decade. Table 16 compares spring pulse flow range criteria set by the State Board in D-1641 with mean (average) VAMP flows. For years with VAMP results (of which there were only 8 of 11 total), only four years yielded VAMP results that actually complied with D-1641 flow criteria at Vernalis (2000, 2001, 2007, and 2008). Four other VAMP flow years were *beneath* the D-1641 flow criteria, and did not comply with the Board's adopted objective. It appears that VAMP as a regulatory experiment performs adequately only half the time when it can be invoked. Of the three years with no VAMP flow results, two were wet years (2005 and 2006) where high flows on the San Joaquin overwhelmed the need to regulate or experiment. The

Table 16
Comparison of D-1641 Spring Pulse Flow Criteria and Mean Actual VAMP Flows, 2000-2010 (Years with VAMP Results Only)

Year	San Joaquin River Basin Water Year Type	Spring Pulse Flow Range Criteria, D-1641 (cubic feet per second)	Mean Actual VAMP Flows (cubic feet per second)
2000	Above Normal	5,730 or 7,020	5,869
2001	Dry	4,020 or 4,880	4,224
2002	**Dry**	**4,020 or 4,880**	**3,301**
2003	**Below Normal**	**4,620 or 5,480**	**3,235**
2004	**Dry**	**4,020 or 4,880**	**3,155**
2007	Critically Dry	3,110 or 3,540	3,263
2008	Critically Dry	3,110 or 3,540	3,163
2010	**Above Normal**	**5,730 or 7,020**	**5,140**

Source: SJRGA, 2011; State Water Resources Control Board, 2000; California Water Impact Network. **Years in bold did not comply with minimum D-1641 flow criteria.**

remaining year (2009) was considered an "off-ramp" year (that is, a dry year following two critically dry years). VAMP and Agreement requirements were in part short-circuited by prolonged dry weather in order to protect upstream water supply reliability. It appears from these results that VAMP and the San Joaquin River Agreement have failed to "provide the environmental benefits in the lower San Joaquin River and Delta at a level of protection equivalent to the San Joaquin River portion of the 1995 WQCP for the duration of this Agreement (SJRGA, 2000: Section 2.5.3)." In effect, protective flows for Delta public trust resources such as Chinook salmon populations have been delayed for the sake of seeking greater scientific certainty.

Appendix B
Omission of the Upper San Joaquin River from the Bay-Delta Plan

The Board proposes different flow objectives for the Sacramento and San Joaquin Rivers. C-WIN and CSPA applaud the State Water Resources Control Board's decision to include the major tributaries of the San Joaquin River Basin (specifically, the Stanislaus, the Tuolumne, and Merced rivers) and of the Sacramento River Basin (the Trinity [via Central Valley Project facilities], Pit, Feather, Yuba, Bear, and American) in its proposed analysis of San Joaquin River flow requirements and the scope of the Bay-Delta Plan. The Upper San Joaquin River (above its confluence with the Merced River) is excluded from the Plan by the Board. The Board has not provided adequate rationale to justify excluding the Upper San Joaquin River from the "project area" for purposes of environmental evaluation of proposed San Joaquin River flow criteria. The State Water Resources Control Board wants to use the criterion of "salmon-bearing tributaries" to justify excluding the upper San Joaquin River. The Board then states in a footnote:

> Currently, the San Joaquin River does not support salmon runs upstream of the Merced River confluence (upper San Joaquin River). However, pursuant to the San Joaquin River Restoration Program (SJRRP), spring-run Chinook salmon are planned to be reintroduced to the upper San Joaquin River no later than December 31, 2012. Flows needed to support this reintroduction are being determined and provided through the SJRRP. During the next review of the Bay-Delta Plan, the State Water Board will consider information made available through the SJRRP process, and any other pertinent sources of information, in evaluating the need for any additional flows from the upper San Joaquin River Basin to contribute to the narrative San Joaquin River flow objective. State Water Resources Control Board 2011a: Map on page 1 and narrative on page 3 of Attachment 2)

In essence, if it adheres to this reasoning during this process, the State Water Resources Control Board would allow the SJRRP to determine what those flows are to be, and would allow the SJRRP to dictate the Board's time schedule for Basin-wide flow objective-setting and implementation. This provides incentive to minimize the upper San Joaquin River's contribution to overall basin flows to benefit the Delta. It will put greater pressure on the water right holders on the tributaries of the San Joaquin to provide additional flows. In its Water Rights Orders 2010-0029 and 2009-0058-DWR, the Board authorized interim schedules for "experimental flows" sought by the parties to the San Joaquin River Restoration Program and settlement agreement. At minimum, these interim flows should be incorporated into the project description, so that it is clear that upper San Joaquin River flows will contribute to solving flow and water quality problems in the Delta. In addition, there needs to be a basic description in the Substitute Environmental Document of how future contributions from the upper San Joaquin River will contribute to improving the health of the Bay-Delta estuary. This can be expressed in the form of project alternatives, but it must not be deferred.

Appendix C
Definitions and Terminology

This report relies on several definitions and terminology that readers should grasp as they read. Here too is the method C-WIN employs to describe water rights in the San Joaquin River Basin.

The geographic scope of the "San Joaquin River Basin" used in this report is that portion of the basin that extends from the measurement of flows on the San Joaquin River near Vernalis all the way upstream on both sides of the river to the headwaters of the river and its tributary creeks and streams in the Coast Range and Sierra Nevada; and including the "major tributaries" of the San Joaquin: the Stanislaus River, the Tuolumne River, and the Merced River all the way to their headwaters in the Sierra Nevada. See Figure C-1.

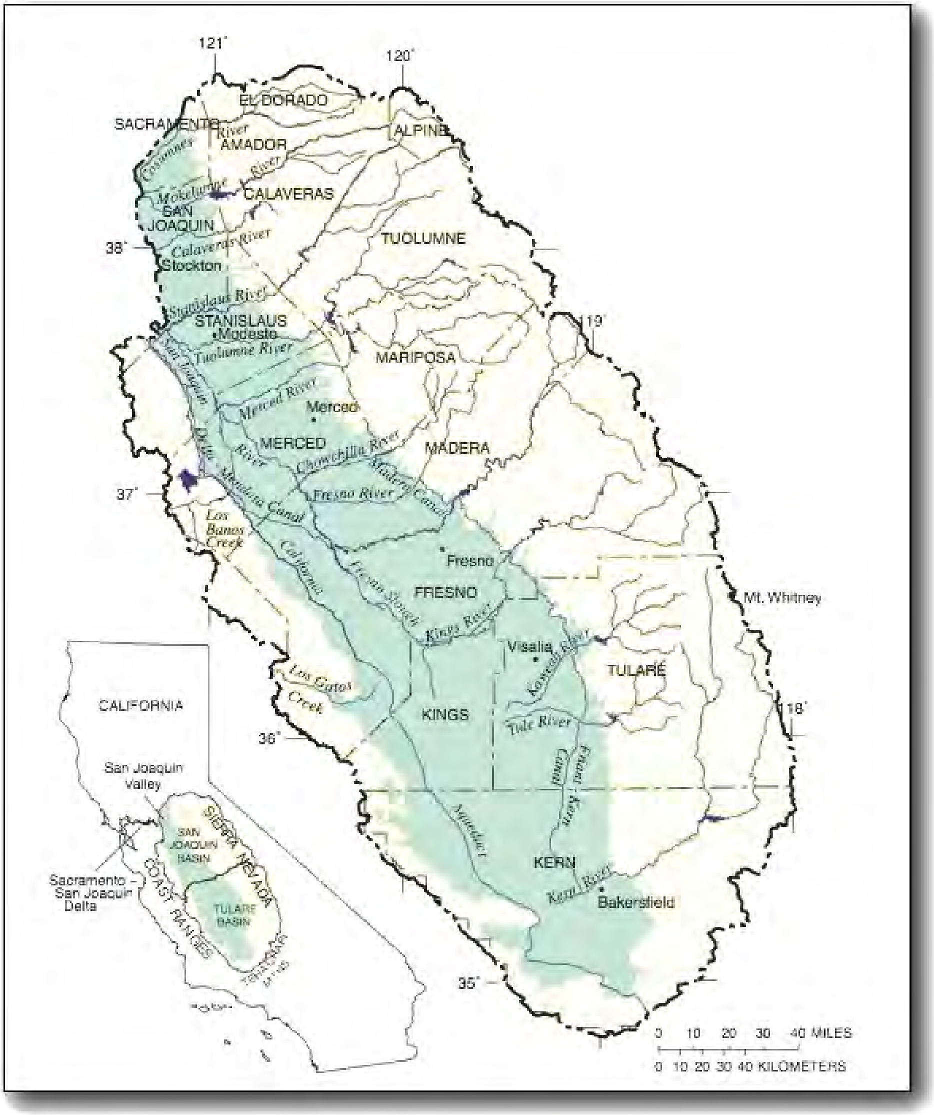

Figure C-1: Location of San Joaquin River Basin in the San Joaquin Valley, and the major rivers in the Basin. Green shading denotes the outline of the Valley floor. Source: Gronberg et al 1998.

The geographic scope of the "Sacramento River Basin" used in this report is that portion of the basin that extends from that portion of the basin that extends from the measurement of flows on the San Joaquin River at Rio Vista all the way upstream on both sides of the river to the headwaters of the river and its tributary creeks and streams in the southern Cascade range, up the McCloud River, the Pit River to their headwaters, and including east creeks (such as Deer, Butte, Battle, and others), the west creeks (such as Cottonwood, Clear, Putah, Stony, Cache and others), and the major tributary rivers including the Feather, Yuba, Bear, and American rivers all the way to their headwaters in the Coast Range (for the east and west creeks) and the Sierra Nevada. See Figure C-2.

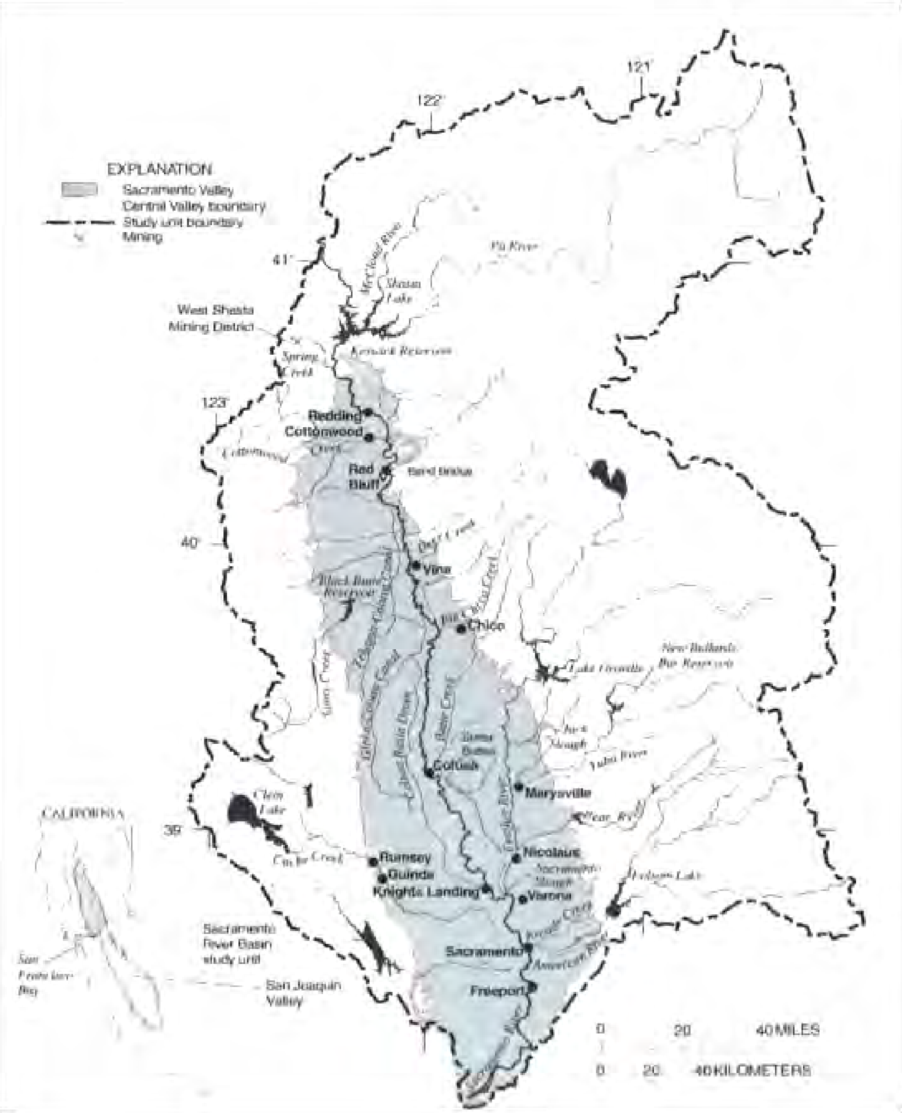

Figure C-2: Location of Sacramento Valley floor in the Sacramento River Basin. Source: Domagalski et al 1998.

Two common measures of water amounts are “acre-feet (AF)” and “cubic feet per second (cfs).” An acre-foot is 325,851 gallons of water, and is a measure of the *volume* of water, or about the amount of water that two families of four in California consume in a year. (There are 7.48052 gallons to a cubic foot, and 43,560 cubic feet in an acre-foot.) Cubic feet per second measures the *rate of flow* of a volume of water: a cubic foot of water that flows past a given point within a second of time passing. Since there are 43,560 square feet to an acre, 3600 seconds in an hour and 24 hours in a day and 365.25 days in an average year, one cubic foot per second flowing yields about 1.98 acre-feet per day in volume, or about 724.46 acre-feet in a year’s time. For perspective, the San Joaquin River Basin’s “unimpaired flow” has been estimated by the California Department of Water Resources to average about 6.18 million acre-feet per year. The average annual natural or unimpaired flow of the Upper San Joaquin River (above its confluence with the Merced River) is about 1.8 million acre-feet.

“Unimpaired flow” is one of several phrases (such as “full natural flow”, “natural flow”, and “natural runoff”) used by the California Department of Water Resources to approximate “what would have occurred” on California streams “had man not altered the flow of water in the basin.” (California Department of Water Resources, 2006: 5). Estimation of unimpaired flow by the Department typically assumes the current configuration of contemporary altered rivers, dams, levees, and the absence of former wetlands, floodplains and other features of rivers that may no longer exist. In some instances, it is possible that “natural flow,” other things being equal might be less than “unimpaired flow” in a situation where wetlands and floodplains were reconstructed. These features of rivers tend to absorb water or at a minimum slow the rate of flow. For this report, unimpaired flows are used for the description and analysis of natural Basin hydrology, but the reader should keep in mind that, other things being equal, restoration of more natural conditions in the Basin might yield flows somewhat lower than those characterized by unimpaired conditions.

The State Water Resources Control Board employs a measure of water rights it calls "face amount" or "face value" that it applies to the rights it administers. Typically, descriptions of water rights have three basic components that describe the quantity of the right:

- "Direct diversion rates" (usually measured in cubic feet per second, or older rights may be stated in "miners inches")
- "Collection to storage" or "contribution to storage" which is the amount of water that may be cumulated in a reservoir.
- "Season" during which the diversions and collections are permitted to occur under the water right. For a season that is "January 1 to December 31 inclusive"

To estimate the face amount, the direct diversion rate is converted to cubic feet per day (that is, 3600 seconds in an hour multiplied by 24 hours in a day), then multiplied by the number of days contained in the diversion season to derive a maximum volume (in cubic feet) for the entire diversion season. That amount is divided by 43,560 square feet per acre, to arrive at the acre-footage volume for the diversion season. If a storage amount (in acre-feet) is included in the water right, it is either substituted because it represents a cap on the entire collection to storage for the year, or is added to the diversion volume to arrive at the total face amount. The water right terms and conditions in state-issued permits and licenses usually say whether the collection to storage is capped or not.

Additional geographic components of water rights are used to pinpoint both where the diversion and/or storage occur and where the water so diverted/stored is to be used. These are the "point of diversion" and the "place of use." This information is presented frequently in terms of the American "township and range system." The base map meridian in the San Joaquin River Basin is always the Mount Diablo Base and Meridian ("MDB&M"). For some rights, a familiar water facility is stated.

Finally, the water rights also state what the "purpose of use" for the water is intended: most often in the San Joaquin River Basin the purposes of use are for "irrigation" or "power generation" (meaning the generation of hydroelectricity by running water through power plant turbines). Other uses may include fish and wildlife, recreation, municipal, and industrial uses.

Water Rights and Water Law in California

The use of water is first and foremost a matter of owning rights to its *use*. In our capitalist economy, this means use of water is a form of property right. This kind of property right is known as a *usufruct*. *Black's Law Dictionary* defines a usufruct as:

> "a right for a certain period to use and enjoy the fruits of another's property without damaging or diminishing it, but allowing for any natural deterioration in the property over time." (Garner 2010)

A usufruct, according to the Oxford English Dictionary, "is a right to use another's property short of the destruction or waste of its substance." (Pearsall 1999) As water lawyers Arthur Littleworth and Eric Garner wrote, "Water rights are usufructuary, a right to the use of water, not a right to own it." (Littleworth and Garner 2007: 27) The 20th century California water law authority, Wells Hutchin, wrote: "Water flowing in a natural stream is not the subject of private ownership," and cites the California Supreme Court's earliest water rights decision which stated in part, "the right of property in water is *usufructuary*, and consists not so much of the fluid itself as the advantage of its use. (Hutchins 1956: 36; *Eddy v. Simpson* 3 Calif 249 (1853), 252)"

The history of water rights in California has long been contentious. The state legislature beginning at statehood never passed a law that established California's water rights system. Instead, it was cobbled together by the court system on a case-by-case basis. In all cases, water rights in California give their owner a right to use, but not to horde or otherwise possess water; all uses must be reasonable. The question, of course, is "what is reasonable?"

Riparian Rights

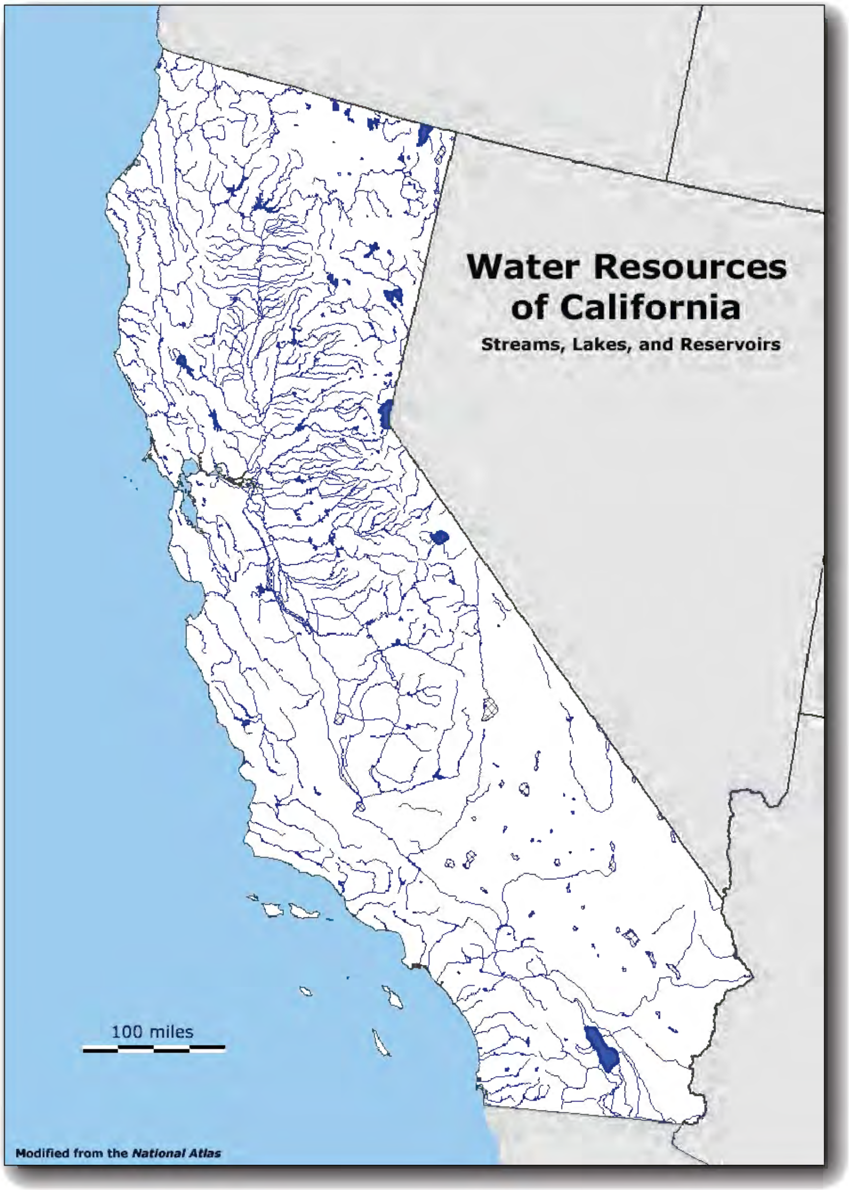
Water Resources of California
Streams, Lakes, and Reservoirs
100 miles
Modified from the *National Atlas*

Figure C-3
Source: U.S. Geological Survey.

Prior to statehood, California's territorial legislature adopted the English Common Law for its legal code. This action implied that landowners had riparian rights to water, consistent with the common law, when they owned property abutting a stream. ***Riparian rights*** are predominant in California and are held by those who own parcels of land that abut a flowing stream or spring. (Analogously, land owners may possess "overlying rights" to pump water from the ground for use on their property.) Riparian water rights are "part and parcel of the land" and are held in common with other riparian land owners along the same stream. A map of the streams of California gives an impression of the large number of potential riparian water right holders there are in California (Figure C-3). Riparian water rights are not quantified. But right holders along a stream share the river in common. They may make explicit agreement with neighbors divert water subject to reasonable use. Riparian water right holders may irrigate their lands immediately adjacent to the river, and their drainage must be returned to the river. They may have small ponds, under California state law, for purposes of managing their irrigation efforts, watering livestock, and incidental domestic uses. Riparian rights are the predominant water right in California and riparian diverters have priority to divert for use before prior appropriators do. Unlike appropriative water rights (see below), riparian water rights cannot be lost to the right holder from disuse. However, in specific circumstances such rights may be severed from land, usually having to do with land subdivision.

Appropriative Water Rights

Appropriative water rights are the other major form of water rights in California. Under the doctrine of prior appropriation, right holders gain the right to use a specific quantity of water from a stream, and no more. They may move that water out of the watershed. In California, this right arose in the Sierra Nevada mining districts in the 1850s, though the right's doctrine was known in the humid eastern United States where it facilitated American accommodation of mill-wheel technology to water law (Steinberg 1991; Horwitz 1977: 34-40). It follows the logic of mining claims: the miner who was first in time had the prior right not only to the mining claim but to the water in the adjacent stream needed to work the claim. "First in time, first in right," is the familiar adage for this right. Appropriators may divert their supplies only in order of the dates of their claims. The earlier the claim in time, the more senior the right. In dry years such a right has a more reliable water supply than rights with later dates of claim. Rights later in time are considered to be more junior, and have lower reliability of actual supply in dry years.

Appropriative rights have another important aspect: the water right must be *diligently exercised* year-in and year-out. The water must be applied to beneficial use under the right or else the right can be lost. "Use it or lose it," is another familiar adage for appropriative water rights. Once someone obtains the right, they must develop the facilities to divert, transport and store the water in a diligent manner, and once those facilities are completed, the water must be demonstrably used to the extent the right allows, or the right to use may be reduced or lost. Generally, long-distance canals, dams, and hydropower plants are the subjects of appropriative water rights. But it is also true that small ditches to parcels non-riparian in their location may rely on appropriative water rights to divert water to a ditch that irrigates some acreage, provides private domestic use, facilitates a mining claim, or runs a small hydroelectric generator.

Prescriptive Rights

Prescriptive rights come into play when one water user uses water adversely to the rights of another. They may divert water for years without discovery or objection by a neighboring user. In California, if that usage continues for five years or longer, that use may be demonstrated in court to have ripened into a legitimate right through the prescriptor's adverse use against the other existing right holder(s). This right has come into play in some instances in the San Joaquin River Basin, most notably involving rights held by San Francisco, and rights that came to be acquired by the US Bureau of Reclamation on the upper San Joaquin River .

State Water Rights Regulation

There are other water rights in California besides these. Groundwater is the subject of overlying rights. These rights are analogous to riparian rights because land owners may drill wells to pump groundwater for use on their properties. And like riparian rights, their overlying rights are held in correlation to the rights of neighbors over the same underground reservoir (or "aquifer") of water. In other words, both riparian and overlying rights holders use water from their sources in common with those of other adjacent land owners. Their rights are not quantified, but receive a percent share of the yield of the river or aquifer. Groundwater rights are not described in this report, but are very important to the history and use of water throughout the San Joaquin Valley. Groundwater has never been formally regulated by a state-level administrative agency. But some groundwater basins are regulated under supervision of court-appointed watermasters.

Until 1914, California water rights were obtained either by purchasing riparian land or by posting a noticed claim at the site of the intended river diversion or dam site, and then recording that claim within a specified time at the local County Recorder's office. Beginning December 19, 1914, the start date for California's formal administrative system of water rights regulation approved by referendum, appropriative water rights may only be obtained by filing an application with the state water rights board. Today, that regulatory authority is vested in the Division of Water Rights of the State Water Resources Control Board. Applications are prioritized by the date on which they are filed with the Division, and have been since December 19, 1914.

However, the Water Commission Act only committed California to regulate appropriative water rights moving forward from December 19, 1914. Riparian and appropriative rights (now known as "pre-1914" water rights) created before this date are unregulated from the new water rights administration. While unregulated, the State Water Resources is empowered to investigate these prior water rights (both riparian and pre-1914). There is disagreement about how far the Board's authority reaches in adjusting rights that might, for example, come into conflict with post-1914 water rights.

Legally speaking, stream flows are first available to riparian diverters, and any surplus determined by the State Water Resources Control Board is then available for appropriation by other water rights applicants. In deciding whether to permit a new water right on a stream, the State Water Resources Control Board performs a water availability analysis that determines whether such a surplus is available for new appropriations.

Exceptional Water Rights: The State Filings

Before taking up analysis of "paper water" in the San Joaquin River Basin in detail, it is necessary to present background and context for where the tremendous quantities of federal Bureau of Reclamation water rights originated.

California, on one hand, has a rather complex water rights system, what some scholars and attorneys call the "California Doctrine" (e.g., Holsinger 1936). Riparian right holders (owners of riparian lands) generally have paramount (but unquantified) claim to a correlative (i.e., "pro rata" fair share) of waters of a stream or lake, followed by appropriators who made their claims prior to 1914 and who perfect their quantified flow and storage rights by diligent completion of their facilities and diversion for use. The next class of water right holders are those who applied for rights to appropriate and use water through California's permit system that began in December 1914. These right holders are regulated by the State Water Resources Control Board today. Riparian and pre-1914 right holders are exempt from the Board's permit process.

Because of the California Doctrine and the state's water rights permit and license system, priority of application of water to use has long been the established system for determining whose rights get served and whose don't during droughts. One of the more difficult problems for state water policy, in the 1920s, became how the state could acquire water rights for a project of statewide scope when claims, permits, and licenses for water rights (especially the system for *acquiring* water rights) cumulated as the state's economy developed through time. How could the state gather the rights it needed to move forward with statewide coordinated water development? The staet was clearly a late-comer to obtain water rights for a state-sponsored system, and its rights were likely to face larger cutbacks during droughts than those with more senior rights on the same river systems.

When the Water Code was adopted by the State Legislature in 1914, it included (and still includes) Sections 104 and 105, which state:

> **Section 104.** It is hereby declared that the people of the State have a paramount interest in the use of all the water of the State and that the State shall determine what water of the State, surface and underground, can be converted to public use or controlled for public protection.
>
> **Section 105.** It is hereby declared that the protection of the public interest in the development of the water resources of the State is of vital concern to the people of the State and that the State shall determine in what way the water of the State, both surface and underground, should be developed for the greatest public benefit.

These provisions provide a policy rationale, if not the tools, for the State to intervene in the cumulating claims of water rights (essentially private rights) on behalf of the public interest in coordinated water development. Provoked by growing perceptions of shortage around the fast-developing state, which were aggravated by drought and litigation in the early 1920s[1], the State of California came up with its first statewide plan to develop and reallocate water to meet the state's water problems. In 1925, state planners realized they had to address how water rights could be obtained without injury to vested rights. The California Water Project Authority describes the problem this way in 1951:

> With respect to the protection of water rights and water requirements in carrying out such a plan of coordinated development, [a 1925 report to the Legislature on California's water resources] contains the following statement...:
>
>> The whole discussion of the diversion of surplus waters from the Sacramento River into the San Joaquin Valley, must be predicated upon the institution of a coordinated development in both valleys that gives full protection against present or future loss to the owners of vested rights and to present users of water as well as to those potential users whose lands lie tributary to streams from which exportations of water are proposed. (California Water Project Authority, 1951: 21-23)

A 1926 California Supreme Court decision once again upholding riparian over appropriative rights made the water rights issue for statewide development even more immediate. In 1927, a Legislative committee studying the "coordinated plan of development" recommended the legislature "*at once* take the necessary steps, either through its proper officials or by legislation, to file on or withdraw from filing by private parties the water rights to be utilized and required for the consummation of the coordinated plan. (California Water Project Authority, 1951: 23; italics added)"

The Legislature passed the Feigenbaum Act, Chapter 286, Statutes of 1927[2] to authorize the California Department of Finance to file applications for water rights "for any water which in its judgment is or may be required in the development and completion of the whole or any part of a general or coordinated plan looking toward the development, utilization, or conservation of the water resources of the State."[3] The Act gave the State the power to literally but fictitiously *stop time* for the purpose of filing applications for water rights on behalf of the state water plan:

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[1] The case of *Town of Antioch v. Williams Irrigation District*, the first Delta water case that attempted to address low Delta inflows and tidal salinity intrusion, was filed during dry conditions in 1920, and decided by the California Supreme Court in 1922.

[2] Today, portions of its provisions live on in Water Code sections 10500 and 10504, while other sections of the Feigenbaum Act were subsequently repealed in 1953. The Feigenbaum Act is also mentioned in Jackson and Mikesell, (1979: 29).

[3] Water Code §10500, quoted in California Water Project Authority (1951: 28).

> Section 10501. Any application filed by the Department of Finance within nine months after July 29, 1927, has priority as of that date and such priority shall be retained over any application made by others subsequent application made by others subsequent to that date in conflict therewith, regardless of any requirements or provisions for water or the use thereof, until October 1, 1955.
>
> Section 10502. Any priority under this part may be maintained and extended by further legislative enactment.[4]

The Feigenbaum Act further empowered the Department of Finance to "release from priority or assign any portion of any appropriation filed by it under this part when the the release or assignment is for the purpose of development not in conflict with such general or coordinated plan." While benefiting from a special state-filed priority date under the Act, assignees would still be obligated to proceed with their water development plans with due diligence. Assignees of these applications could include state agencies, commissions, and departments, as well as the United States of America or any of its departments or agencies.[5]

Subsequent legislation also enables counties and watersheds of origin to benefit from such state filing assignments. State filings provide the State of California with the water rights-equivalent of a "wild card" (within some limits) that can reserve, withdraw or otherwise control the waters of any California river or stream so that they may be incorporated into either the State Water Project or the Central Valley Project, either for export or to benefit areas of origin—until or unless that state filing right is revoked by the State Water Resources Control Board.

State Filings for San Joaquin River Basin Water Rights

According to State Water Resources Control Board records, there have been 26 state filings on rivers and creeks of the San Joaquin River Basin since enactment of the Feigenbaum Act in 1927.[6] They are listed in Appendix J. The filings include claims for creeks and tributaries of the Stanislaus, Merced, and San Joaquin Rivers. No state filings appear to exist for the Tuolumne River.

In the San Joaquin River Basin, state filings were assigned to the US Bureau of Reclamation to develop Friant Dam, its associated Madera and Friant-Kern Canals, and New Melones Dam and Reservoir on the Stanislaus River. State filing Application 5638 was assigned to the Bureau to supplement earlier, insufficient water rights applications for the Friant Dam site filed in 1916 and 1919.

The rest of the state filings are as yet unassigned and therefore technically (if not politically) still in play with regard to coordinated statewide water development and/or area of origin claims. For example, Application 5949 (priority date of July 30, 1927) on the south fork of the Stanislaus River has been the subject of requests for assignment by Pacific Gas & Electric Company (beginning in 1951) and by Tuolumne Regional Water District (1980s). Neither request for assignment was acted on by the State, deferring action until some sort of coordinated plan of development was further along. Meanwhile, 184 other state filings throughout California have similar status as Application 5649.

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[4] These sections were repealed in 1953.

[5] Water Code § 10504, quoted in California Water Project Authority (1951). This provision remains in effect today.

[6] According to eWRIMS, the State Water Board's online water rights application database, there are 185 active state filings. San Joaquin River Basin state filings amount to about 14 percent of all state filings at this time. Excel file accessed and downloaded 12 November 2010 and updated in July 2011. They may be found by searching on both California Department of Finance and State Water Resources Control Board.

Additional file research at the State Water Resources Control Board Records Room would be necessary to determine the current status of these and other state filing applications.

Reasonable Use of Water

Even before Californians amended their constitution in 1928, legal precedents set by California courts required that water use among riparians had to be reasonable, and water use between appropriators had to be reasonable. Appropriators also were accountable to riparians for reasonable use. Major political conflict arose about water rights though because California law contained no requirement that the water use of riparians with respect to appropriators had to be reasonable. Then, in 1928, California voters approved an amendment to the California Constitution that required all water use in California by any water right holder (riparians included) had to be reasonable and not wasteful.[7] The California Constitution stresses that "the right to water...does not and shall not extend to the waste or unreasonable use or unreasonable method of use or unreasonable method of diversion of water." Where riparian rights were once entitled to the "full natural flow" of the stream to which the rights attached, the California Constitution now limits attachment of the riparian right to "no more than so much of the flow thereof as may be required or used consistently with this section, for the purposes for which such lands are, or may be made adaptable, in view of such reasonable and beneficial uses" without "depriving any riparian owner of the reasonable use of water of the stream...or as depriving any appropriator of water to which the appropriator is lawfully entitled."

The question remains under this doctrine: what uses, methods of use, and methods of diversion represent are reasonable, and how does that translate into more efficient allocation and use of water so that waste of water and significant environmental impacts of water development are avoided or at least mitigated? In case law, the answer is a matter of the facts involved.

The new Delta Watermaster, Craig M. Wilson, whose office was created by the water reform legislation of 2009, calls the Reasonable Use Doctrine "the cornerstone of California's complex water rights laws. All water use must be reasonable and beneficial regardless of the type of underlying water right. No one has an enforceable property interest in the unreasonable use of water. (Wilson, 2011: 3)"

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[7] Article X, Section 2 of the California Constitution.

Appendix D

Supporting Data and Analyses

Contents

D.1 Water Availability Analysis Spreadsheet Models

D.2 Unimpaired Flow Hydrology

D.3 Adjudication Decree Quantification

D.4 Consumptive Statements of Diversion and Use

D.5 Other Pre-1914 Consumptive Water Rights

D.6 Post-1914 Consumptive Water Rights

D.7 Sacramento River Post-1914 Water Rights Priorities

Appendix D

Section D.1
Water Availability Analysis Spreadsheet Models

Trinity River Water Rights Yield Analysis

Tributary Inflow Criteria	Diversion Cap	
75%	25%	of unimpaired flow
60%	40%	of unimpaired flow
50%	50%	of unimpaired flow
40%	60%	of unimpaired flow
	94%	average regulated period share of flow during water year

	Water Year Flow Percentile										
75% Inflow Criterion Scenario	10th Percentile	20th Percentile	25th Percentile	30th Percentile	40th Percentile	Median Flow	60th Percentile	70th Percentile	75th Percentile	80th Percentile	90th Percentile
Total Annual Unimpaired Flow (TAF)	679	789	824	866	1,025	1,133	1,424	1,582	1,611	1,683	2,035
November through June Unimpaired Flow (TAF)	624	743	785	838	968	1,064	1,341	1,455	1,529	1,599	1,930
Delta Inflow Criterion (75% of UF, TAF)	468	557	589	629	726	798	1,006	1,091	1,147	1,199	1,448
Diversion Cap (TAF)	156	186	196	210	242	266	335	364	382	400	483
Riparian and Pre-1914 Claimants (134.1 TAF)	126	126	126	126	126	126	126	126	126	126	126
USBR 1927 Trinity Claim (3,349.9 TAF)	30	60	70	84	116	140	209	238	256	274	357
USBR 1959 Trinity Claim (3,030.8 TAF)	0	0	0	0	0	0	0	0	0	0	0
USBR 2002 Trinity Claim (2,203.1 TAF)	0	0	0	0	0	0	0	0	0	0	0
Remaining Flows, July-October	55	46	39	27	57	69	82	127	82	85	105
Riparian and Pre-1914 Claimants (134.1 TAF)	8	8	8	8	8	8	8	8	8	8	8
USBR 1927 Trinity Claim (3,349.9 TAF)	47	37	31	19	49	61	74	119	74	77	97
USBR 1959 Trinity Claim (3,030.8 TAF)	0	0	0	0	0	0	0	0	0	0	0
USBR 2002 Trinity Claim (2,203.1 TAF)	0	0	0	0	0	0	0	0	0	0	0
Total Riparian and Pre-1914 Claimants	134	134	134	134	134	134	134	134	134	134	134
Total USBR Trinity Claims	77	97	101	103	165	201	284	357	330	350	454

Sources: DWR, SWRCB, C-WIN.

Feather River Water Rights Yield Analysis

Tributary Inflow Criteria	Diversion Cap	
75%	25%	of unimpaired flow
60%	40%	of unimpaired flow
50%	50%	of unimpaired flow
40%	60%	of unimpaired flow
	90%	average regulated period share of flow during water year

75% Inflow Criterion	10th Percentile	20th Percentile	25th Percentile	30th Percentile	40th Percentile	Median Flow	60th Percentile	70th Percentile	75th Percentile	80th Percentile	90th Percentile
Total Annual Unimpaired Flow (TAF)	2,007	2,511	2,638	2,932	3,251	3,854	4,596	5,673	5,767	6,268	7,095
November through June Unimpaired Flow (TAF)	1,705	2,150	2,270	2,562	2,893	3,466	4,201	5,160	5,260	5,583	6,470
Delta Inflow Criterion (75% of UF, TAF)	1,278	1,613	1,703	1,921	2,170	2,600	3,151	3,870	3,945	4,187	4,852
Diversion Cap (TAF)	426	538	568	640	723	867	1,050	1,290	1,315	1,396	1,617
Paramount Riparian and Possibly Prior Pre-1914 Water Right Holders (Total 3,493 TAF)	426	538	568	640	723	867	1,050	1,290	1,315	1,396	1,617
South Feather WPA and Thermalito Water & Sewer 1920s Rights (331.8 TAF)	0	0	0	0	0	0	0	0	0	0	0
DWR 1927, 1951, and 1956 Rights (10,447.2 TAF)	0	0	0	0	0	0	0	0	0	0	0
North Yuba Water District 1958 Rights (624 TAF)	0	0	0	0	0	0	0	0	0	0	0
DWR 1967 Right (83 TAF)	0	0	0	0	0	0	0	0	0	0	0
Remaining Flow July-October (TAF)	303	360	368	371	359	388	395	513	507	685	625
Paramount Riparian and Possibly Prior Pre-1914 Water Right Holders (Total 3,493 TAF)	303	355	355	355	355	355	355	355	355	355	355
South Feather WPA and Thermalito Water & Sewer 1920s Rights (331.8 TAF)	0	6	13	16	4	33	34	34	34	34	34
DWR 1927, 1951, and 1956 Rights (10,447.2 TAF)	0	0	0	0	0	0	7	124	118	297	236
North Yuba Water District 1958 Rights (624 TAF)	0	0	0	0	0	0	0	0	0	0	0
DWR 1967 Right (83 TAF)	0	0	0	0	0	0	0	0	0	0	0
Total Riparian and Pre-1914	729	892	922	995	1,078	1,221	1,405	1,645	1,670	1,750	1,972
Total South Feather & Thermalito	0	6	13	16	4	33	34	34	34	34	34
Total DWR	0	0	0	0	0	0	7	124	118	297	236
Total North Yuba Water District	0	0	0	0	0	0	0	0	0	0	0

Source: DWR, SWRCB, C-WIN.

Yuba River Water Rights Yield Analysis

Tributary Inflow Criteria	Diversion Cap	
75%	25%	of unimpaired flow
60%	40%	of unimpaired flow
50%	50%	of unimpaired flow
40%	60%	of unimpaired flow
	94%	average regulated period share of flow during water year

75% Inflow Criterion	10th Percentile	20th Percentile	25th Percentile	30th Percentile	40th Percentile	Median Flow	60th Percentile	70th Percentile	75th Percentile	80th Percentile	90th Percentile
Total Annual Unimpaired Flow (TAF)	921	1,231	1,363	1,521	1,826	2,123	2,428	2,949	3,164	3,284	3,765
November through June Unimpaired Flow (TAF)	884	1,151	1,268	1,438	1,746	2,006	2,280	2,780	2,993	3,079	3,681
Delta Inflow Criterion (75% of UF, TAF)	663	863	951	1,078	1,310	1,505	1,710	2,085	2,245	2,310	2,761
Diversion Cap (TAF)	221	288	317	359	437	502	570	695	748	770	920
Paramount Riparian and Possibly Prior Pre-1914 Water Right Holders (1,497 TAF)	221	288	317	359	437	502	570	695	748	770	920
Nevada ID and Yuba County Water District 1920s Rights (212.6 TAF)	-	-	-	-	-	-	-	-	-	-	-
Yuba County Water Agency 1927 Right (1,159 TAF)	-	-	-	-	-	-	-	-	-	-	-
Nevada ID 1930s Rights (212.8 TAF)	-	-	-	-	-	-	-	-	-	-	-
North Yuba Water District 1958 Rights (145.1 TAF)	-	-	-	-	-	-	-	-	-	-	-
Nevada ID 1961 Right (101.2 TAF)	-	-	-	-	-	-	-	-	-	-	-
Yuba County Water Agency 1966 Rights (760 TAF)	-	-	-	-	-	-	-	-	-	-	-
Remaining Flow July-October (TAF)	37	80	95	83	80	117	148	169	171	204	84
Paramount Riparian and Possibly Prior Pre-1914 Water Right Holders (1,497 TAF)	37	80	85	83	80	85	85	85	85	85	84
Nevada ID and Yuba County Water District 1920s Rights (212.6 TAF)	-	-	10	-	-	12	12	12	12	12	-
Yuba County Water Agency 1927 Right (1,159 TAF)	-	-	-	-	-	20	51	66	66	66	-
Nevada ID 1930s Rights (212.8 TAF)	-	-	-	-	-	-	-	6	8	12	-
North Yuba Water District 1958 Rights (145.1 TAF)	-	-	-	-	-	-	-	-	-	8	-
Nevada ID 1961 Right (101.2 TAF)	-	-	-	-	-	-	-	-	-	6	-
Yuba County Water Agency 1966 Rights (760 TAF)	-	-	-	-	-	-	-	-	-	15	-
Total Riparian & Pre-1914	258	368	402	442	516	587	655	780	833	855	1,004
Total Nevada ID and YCWD Yields	0	0	10	0	0	12	12	12	12	12	0
Total Yuba County Water Agency Yields	0	0	0	0	0	20	51	66	66	81	0
Total North Yuba Water District Yield	0	0	0	0	0	0	0	0	0	8	0
Total Nevada ID Yield	0	0	0	0	0	0	0	0	0	6	0

Source: DWR, SWRCB, C-WIN.

Central Valley Water Rights Yield Model.xls
Yuba_River

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Bear River Water Rights Yield Analysis

Tributary Inflow Criteria	Diversion Cap	
75%	25%	of unimpaired flow
60%	40%	of unimpaired flow
50%	50%	of unimpaired flow
40%	60%	of unimpaired flow
	97%	average regulated period share of flow during water year

75% Inflow Criterion	10th Percentile	20th Percentile	25th Percentile	30th Percentile	40th Percentile	Median Flow	60th Percentile	70th Percentile	75th Percentile	80th Percentile	90th Percentile
Total Unimpaired Flow (TAF)	102	137	171	181	247	290	384	434	462	489	567
November through June Unimpaired Flow (TAF)	102	130	165	177	239	278	365	410	453	482	553
Delta Inflow Criterion (75% of UF, TAF)	76	98	124	132	179	209	274	308	340	361	415
Diversion Cap (TAF)	25	33	41	44	60	70	91	103	113	120	138
Paramount Riparian and Possibly Prior Pre-1914 Water Right Holders (92.1 TAF)	25	33	41	44	60	70	89	89	89	89	89
Camp Far West 1918 Right (4.8 TAF)	0	0	0	0	0	0	2	5	5	5	5
Nevada ID 1921 Rights (77.5 TAF)	0	0	0	0	0	0	0	9	20	27	45
Camp Far West 1922 and 1924 Rights (8.6 TAF)	0	0	0	0	0	0	0	0	0	0	0
Nevada ID 1929 Right (50.9 TAF)	0	0	0	0	0	0	0	0	0	0	0
Camp Far West 1941 Right (5 TAF)	0	0	0	0	0	0	0	0	0	0	0
South Sutter Water District 1952 Right (139.5 TAF)	0	0	0	0	0	0	0	0	0	0	0
Lake of the Pines 1966 Right (4.2 TAF)	0	0	0	0	0	0	0	0	0	0	0
South Sutter Water District 1981 Right (130.7 TAF)	0	0	0	0	0	0	0	0	0	0	0
Remaining Flow July-October (TAF)	1	7	6	4	8	12	18	24	9	7	14
Paramount Riparian and Possibly Prior Pre-1914 Water Right Holders (92.1 TAF)	1	3	3	3	3	3	3	3	3	3	3
Camp Far West 1918 Right (4.8 TAF)	0	0	0	0	0	0	0	0	0	0	0
Nevada ID 1921 Rights (77.5 TAF)	0	3	2	1	3	3	3	3	3	3	3
Camp Far West 1922 and 1924 Rights (8.6 TAF)	0	0	0	0	0	0	0	0	0	0	0
Nevada ID 1929 Right (50.9 TAF)	0	0	0	0	2	2	2	2	2	0	2
Camp Far West 1941 Right (5 TAF)	0	0	0	0	0	0	0	0	0	0	0
South Sutter Water District 1952 Right (139.5 TAF)	0	0	0	0	0	4	5	5	1	0	5
Lake of the Pines 1966 Right (4.2 TAF)	0	0	0	0	0	0	0	0	0	0	0
South Sutter Water District 1981 Right (130.7 TAF)	0	0	0	0	0	0	5	5	0	0	1
Total Riparian & Pre-1914 Yield	26	36	44	47	63	73	92	92	92	92	92
Total Camp Far West Yield	0	0	0	0	1	1	3	5	5	5	5
Total Nevada ID Yield	0	3	2	1	4	4	4	13	24	30	49
Total South Sutter Water District Yield	0	0	0	0	0	4	9	9	1	0	6
Total Lake of the Pines Yield	0	0	0	0	0	0	0	0	0	0	0

Sources: DWR, SWRCB, C-WIN

American River Water Rights Yield Analysis

Tributary Inflow Criteria	Diversion Cap	
75%	25%	of unimpaired flow
60%	40%	of unimpaired flow
50%	50%	of unimpaired flow
40%	60%	of unimpaired flow
	95%	average regulated period share of flow during water year

75% Instream Flow Criterion	10th Percentile	20th Percentile	25th Percentile	30th Percentile	40th Percentile	Median Flow	60th Percentile	70th Percentile	75th Percentile	80th Percentile	90th Percentile
Total Annual Unimpaired Flow (TAF)	1,041	1,252	1,416	1,613	2,023	2,521	2,844	3,300	3,554	3,886	4,525
November through June Unimpaired Flow (TAF)	984	1,188	1,363	1,556	1,983	2,422	2,731	3,140	3,311	3,687	4,340
Delta Inflow Criterion (75% of UF, TAF)	738	891	1,022	1,167	1,487	1,817	2,048	2,355	2,483	2,766	3,255
Diversion Cap (TAF)	246	297	341	389	496	606	683	785	828	922	1,085
Paramount Riparian and Possibly Prior Pre-1914 Water Right Holders (286 TAF)	246	273	273	273	273	273	273	273	273	273	273
Nevada ID 1930s Rights (5.0 TAF)	0	5	5	5	5	5	5	5	5	5	5
City of Sacramento 1940s Rights (715.2 TAF)	0	19	63	111	218	328	405	507	550	644	683
Georgetown Divide 1955 Rights (20.4 TAF)	0	0	0	0	0	0	0	0	0	0	19
Placer County Water Agency 1958 Rights (1,291 TAF)	0	0	0	0	0	0	0	0	0	0	105
USBR 1958 Rights (5,347.8 TAF)	0	0	0	0	0	0	0	0	0	0	0
City of Sacramento 1958 Rights (95.1 TAF)	0	0	0	0	0	0	0	0	0	0	0
Foresthill PUD 1964 Rights (24.1 TAF)	0	0	0	0	0	0	0	0	0	0	0
El Dorado ID 1992 Rights (47.9 TAF)	0	0	0	0	0	0	0	0	0	0	0
Remaining Flow July-October (TAF)	57	64	53	57	40	99	113	160	243	198	185
Paramount Riparian and Possibly Prior Pre-1914 Water Right Holders (286 TAF)	13	13	13	13	13	13	13	13	13	13	13
Nevada ID 1930s Rights (5.0 TAF)	0	0	0	0	0	0	0	0	0	0	0
City of Sacramento 1940s Rights (715.2 TAF)	32	32	32	32	26	32	32	32	32	32	32
Georgetown Divide 1955 Rights (20.4 TAF)	1	1	1	1	0	1	1	1	1	1	1
Placer County Water Agency 1958 Rights (1,291 TAF)	11	18	7	11	0	53	58	58	58	58	58
USBR 1958 Rights (5,347.8 TAF)	0	0	0	0	0	0	9	55	139	94	80
City of Sacramento 1958 Rights (95.1 TAF)	0	0	0	0	0	0	0	0	0	0	0
Foresthill PUD 1964 Rights (24.1 TAF)	0	0	0	0	0	0	0	0	0	0	0
El Dorado ID 1992 Rights (47.9 TAF)	0	0	0	0	0	0	0	0	0	0	0
Total Riparian & Pre-1914 Yield	259	286	286	286	286	286	286	286	286	286	286
Total Nevada ID Yield	0	5	5	5	5	5	5	5	5	5	5
Total City of Sacramento Yield	32	51	95	143	244	360	437	539	582	676	715
Total Georgetown Divide PUD Yield	1	1	1	1	0	1	1	1	1	1	20
Total Placer County Water Agency Yield	11	18	7	11	0	53	58	58	58	58	163
Total USBR Yield	0	0	0	0	0	0	9	55	139	94	80
Total Foresthill PUD Yield	0	0	0	0	0	0	0	0	0	0	0
Total El Dorado ID Yield	0	0	0	0	0	0	0	0	0	0	0

Sources: DWR, SWRCB, C-WIN.

Sacramento River at Feather River Confluence Water Rights Yield Analysis

Tributary Inflow Criteria	Diversion Cap	
75%	25%	of unimpaired flow
60%	40%	of unimpaired flow
50%	50%	of unimpaired flow
40%	60%	of unimpaired flow
	87%	average regulated period share of flow during water year

	Water Year Flow Percentile										
75% Inflow Criterion Scenario	10th Percentile	20th Percentile	25th Percentile	30th Percentile	40th Percentile	Median Flow	60th Percentile	70th Percentile	75th Percentile	80th Percentile	90th Percentile
Total Annual Unimpaired Flow (TAF)	5,572	6,984	7,371	7,877	8,860	10,162	13,046	14,151	14,945	15,697	19,369
November through June Unimpaired Flow (TAF)	4,638	5,876	6,170	6,806	7,721	9,163	11,451	12,658	13,688	14,434	17,849
Delta Inflow Criterion (75% of UF, TAF)	3,479	4,407	4,627	5,104	5,791	6,872	8,588	9,494	10,266	10,826	13,386
Diversion Cap (TAF)	1,160	1,469	1,542	1,701	1,930	2,291	2,863	3,165	3,422	3,609	4,462
Paramount Riparian and Prior Pre-1914 Water Right Holders (42,261.8 TAF)	1,160	1,469	1,542	1,701	1,930	2,291	2,863	3,165	3,422	3,609	4,462
Water Right Holders with Priorities 1915 to Early 1927 (1,352.4 TAF)	0	0	0	0	0	0	0	0	0	0	0
Early CVP Sacramento River State Filings, Other Claimants, 1927-1936 (11,263.6 TAF)	0	0	0	0	0	0	0	0	0	0	0
1938 CVP and Post-War Claimants through June 1951 (8,145.4 TAF)	0	0	0	0	0	0	0	0	0	0	0
1951 Feather River Project, CVP State Filings, Other Claimants through 1961 (18,901.4 TAF)	0	0	0	0	0	0	0	0	0	0	0
Remaining Flows, July-October (TAF)	934	1,107	1,201	1,071	1,139	999	1,595	1,493	1,257	1,263	1,520
Paramount Riparian and Prior Pre-1914 Water Right Holders (42,261.8 TAF)	934	1,107	1,201	1,071	1,139	999	1,595	1,493	1,257	1,263	1,520
Water Right Holders with Priorities 1915 to Early 1927 (1,352.4 TAF)	0	0	0	0	0	0	0	0	0	0	0
Early CVP Sacramento River State Filings, Other Claimants, 1927-1936 (11,263.6 TAF)	0	0	0	0	0	0	0	0	0	0	0
1938 CVP and Post-War Claimants through June 1951 (8,145.4 TAF)	0	0	0	0	0	0	0	0	0	0	0
1951 Feather River Project, CVP State Filings, Other Claimants through 1961 (18,901.4 TAF)	0	0	0	0	0	0	0	0	0	0	0
Total Paramount Riparian and Possibly Prior Pre-1914 Water Right Holders (1,433.7 TAF)	2,094	2,576	2,743	2,773	3,069	3,290	4,458	4,657	4,679	4,872	5,983
Total, 1915-Early 1927 Claimants (up to 1,352.4 TAF)	0	0	0	0	0	0	0	0	0	0	0
Total 1927-1936 Claimants (14,613.5 TAF)	0	0	0	0	0	0	0	0	0	0	0
Total 1938-June 1951 Claimants (8,145.4 TAF)	0	0	0	0	0	0	0	0	0	0	0
Total 1951 through 1961 Claimants (18,901.4 TAF)	0	0	0	0	0	0	0	0	0	0	0

Source: DWR, SWRCB, C-WIN.

Stanislaus River Water Rights Yield Analysis

Tributary Inflow Criteria	Diversion Cap	
60%	40%	of unimpaired flow
50%	50%	of unimpaired flow
40%	60%	of unimpaired flow
30%	70%	of unimpaired flow
	85%	Average of Regulated Period to Total Flow during Water Year

60% Instream Flow Criterion	10th Percentile	20th Percentile	25th Percentile	30th Percentile	40th Percentile	Median Flow	60th Percentile	70th Percentile	75th Percentile	80th Percentile	90th Percentile
Total Annual Unimpaired Flow (TAF)	457	592	637	680	894	1,107	1,265	1,359	1,460	1,559	1,912
Feb-June Unimpaired Flow Level (TAF)	382	500	551	566	740	822	994	1,077	1,127	1,180	1,459
Delta Inflow Criterion (60% of UF, TAF)	229	300	330	340	444	493	596	646	676	708	875
Diversion Cap (TAF)	153	200	220	226	296	329	398	431	451	472	583
Paramount Riparian and Possibly Prior Pre-1914 Water Right Holders (29.4 TAF)	25	25	25	25	25	25	25	25	25	25	25
Pre-1914 Oakdale ID Claims (1,371.4 TAF)	128	175	195	201	271	304	372	406	425	447	558
Total USBR Post-1914 Claims (3,400 TAF)	0	0	0	0	0	0	0	0	0	0	0
Remaining Flows, July through January	75	92	87	114	154	285	271	282	333	380	454
Paramount Riparian and Possibly Prior Pre-1914 Water Right Holders (29.4 TAF)	4	4	4	4	4	4	4	4	4	4	4
Pre-1914 Oakdale ID Claims (1,371.4 TAF)	70	88	82	110	150	199	199	199	199	199	199
Total USBR Post-1914 Claims (3,400 TAF)	0	0	0	0	0	81	67	79	129	176	250
Total Riparian and Pre-1914 Yield	29	29	29	29	29	29	29	29	29	29	29
Total Oakdale ID Claims	198	262	277	311	421	503	572	605	625	646	758
Total USBR Claims	0	0	0	0	0	81	67	79	129	176	250

Sources: DWR, SWRCB, C-WIN. Totals may not sum due to effects of rounding.

Tuolumne River Water Rights Yield Analysis

Tributary Inflow Criteria	Diversion Cap	
60%	40%	of unimpaired flow
50%	50%	of unimpaired flow
40%	60%	of unimpaired flow
30%	70%	of unimpaired flow
	76%	Average of Regulated Period to Total Flow during Water Year

60% Instream Flow Criterion	10th Percentile	20th Percentile	25th Percentile	30th Percentile	40th Percentile	Median Flow	60th Percentile	70th Percentile	75th Percentile	80th Percentile	90th Percentile
Total Annual Unimpaired Flow (TAF)	836	1,053	1,107	1,183	1,416	1,786	2,030	2,181	2,363	2,483	3,093
Feb-June Unimpaired Flow Level (TAF)	675	898	961	984	1,189	1,299	1,578	1,704	1,755	1,852	2,188
Delta Inflow Criterion (60% of UF, TAF)	405	539	577	591	713	779	947	1,023	1,053	1,111	1,313
Diversion Cap (TAF)	270	359	384	394	475	520	631	682	702	741	875
Gallo Riparian and Tuolumne Utilities District Pre-1914 Claims (22.6 TAF)	17	17	17	17	17	17	17	17	17	17	17
Turlock ID/Modesto ID 1855 and 1871 Claims (3,382.1 TAF)	253	342	367	376	458	502	614	665	685	724	858
San Francisco 1901, 1902, and 1908 Claims (1,840.1 TAF)	0	0	0	0	0	0	0	0	0	0	0
Modesto ID 1908 Claim (40 TAF)	0	0	0	0	0	0	0	0	0	0	0
San Francisco 1908 through 1911 Claims (4,114.9 TAF)	0	0	0	0	0	0	0	0	0	0	0
Turlock ID 1911 Claim (100 TAF)	0	0	0	0	0	0	0	0	0	0	0
Remaining Flow, July-January	161	154	146	199	228	487	451	477	609	631	904
Gallo Riparian and Tuolumne Utilities District Pre-1914 Claims (22.6 TAF)	5	5	5	5	5	5	5	5	5	5	5
Turlock ID/Modesto ID 1855 and 1871 Claims (3,382.1 TAF)	155	149	141	193	222	482	446	471	603	626	804
San Francisco 1901, 1902, and 1908 Claims (1,840.1 TAF)	0	0	0	0	0	0	0	0	0	0	95
Modesto ID 1908 Claim (40 TAF)	0	0	0	0	0	0	0	0	0	0	0
San Francisco 1908 through 1911 Claims (4,114.9 TAF)	0	0	0	0	0	0	0	0	0	0	0
Turlock ID 1911 Claim (100 TAF)	0	0	0	0	0	0	0	0	0	0	0
Total Riparian and Senior Pre-1914 Claims	23	23	23	23	23	23	23	23	23	23	23
Total Turlock ID/Modesto ID Claims	408	491	508	570	680	984	1,060	1,136	1,288	1,349	1,662
Total San Francisco Claims	0	0	0	0	0	0	0	0	0	0	95

Sources: DWR, SWRCB, C-WIN. Totals may not sume due to effects of rounding.

Merced River Water Rights Yield Analysis

Tributary Inflow Criteria	Diversion Cap	
60%	40%	of unimpaired flow
50%	50%	of unimpaired flow
40%	60%	of unimpaired flow
30%	70%	of unimpaired flow
	81%	Average of Regulated Period to Total Flow during Water Year

60% Instream Flow Criterion	10th Percentile	20th Percentile	25th Percentile	30th Percentile	40th Percentile	Median Flow	60th Percentile	70th Percentile	75th Percentile	80th Percentile	90th Percentile
Total Annual Unimpaired Flow (TAF)	409	492	527	562	669	906	1,077	1,160	1,220	1,389	1,708
Jan-June Unimpaired Flow Level (TAF)	326	432	459	471	568	648	805	924	977	1,030	1,223
Delta Inflow Criterion (60% of UF, TAF)	196	259	275	283	341	389	483	554	586	618	734
Diversion Cap (TAF)	130	173	183	189	227	259	322	370	391	412	489
Decrees + Riparian Claims (282.7 TAF)	130	173	183	189	227	228	228	228	228	228	228
Merced ID Pre-1914 Claims + SDUs (4,193.3 TAF)	0	0	0	0	0	31	94	142	163	184	261
Remaining Flow, July-January	82	60	69	91	101	258	272	236	243	359	485
Decrees + Riparian Claims (282.7 TAF)	55	55	55	55	55	55	55	55	55	55	55
Merced ID Pre-1914 Claims + SDUs (4,193.3 TAF)	27	5	14	36	46	203	217	181	188	304	430
Total Riparian and Pre-1914 Yield	185	228	238	244	282	283	283	283	283	283	283
Total Merced ID Pre-1914 Yield	27	5	14	36	46	235	311	323	351	489	692

Sources: DWR, SWRCB, C-WIN. Totals may not sum due to effects of rounding.

San Joaquin River Water Rights Yield Analysis

Tributary Inflow Criteria	Diversion Cap	
60%	40%	of unimpaired flow
50%	50%	of unimpaired flow
40%	60%	of unimpaired flow
30%	70%	of unimpaired flow
	77%	Average of Regulated Period to Total Flow during Water Year

60% Instream Flow Criterion	10th Percentile	20th Percentile	25th Percentile	30th Percentile	40th Percentile	Median Flow	60th Percentile	70th Percentile	75th Percentile	80th Percentile	90th Percentile
Total Annual Unimpaired Flow (TAF)	813	928	1,052	1,128	1,257	1,449	1,854	2,047	2,195	2,322	3,018
Feb-June Unimpaired Flow Level (TAF)	656	749	839	881	1,007	1,137	1,458	1,572	1,623	1,779	2,075
Delta Inflow Criterion (60% of UF, TAF)	394	450	503	529	604	682	875	943	974	1,068	1,245
Diversion Cap (TAF)	262	300	335	353	403	455	583	629	649	712	830
Paramount Riparian Claims (171.7 TAF)	131	131	131	131	131	131	131	131	131	131	131
Pre-1914 San Joaquin River Exchange Contractors Claims (816.6 TAF)	131	168	204	221	271	323	452	497	518	580	625
Pre-1914 Chowchilla, Tranquillity & James Claims (111.1 TAF)	0	0	0	0	0	0	0	0	0	0	74
Patterson ID 1910 Claims (60.2 TAF)	0	0	0	0	0	0	0	0	0	0	0
Post-1914 USBR Claims (623.2 TAF)	0	0	0	0	0	0	0	0	0	0	0
Remaining Flow, July-December	157	179	214	246	250	312	396	475	572	542	942
Paramount Riparian Claims (171.7 TAF)	40	40	40	40	40	40	40	40	40	40	40
Pre-1914 San Joaquin River Exchange Contractors Claims (816.6 TAF)	117	139	173	191	191	191	191	191	191	191	191
Pre-1914 Chowchilla, Tranquillity & James Claims (111.1 TAF)	0	0	0	15	19	26	26	26	26	26	26
Patterson ID 1910 Claims (60.2 TAF)	0	0	0	0	0	14	14	14	14	14	14
Post-1914 USBR Claims (623.2 TAF)	0	0	0	0	0	40	124	146	146	146	146
Total Riparian Claims Yield	172	172	172	172	172	172	172	172	172	172	172
Total SJREC Claims Yield	248	307	377	413	463	515	643	689	709	772	817
Total Chowchilla, et al, Yield	0	0	0	15	19	26	26	26	26	26	100
Total Patterson ID Yield	0	0	0	0	0	14	14	14	14	14	14
Total USBR Yield	0	0	0	0	0	40	124	146	146	146	146

Sources: DWR, SWRCB, C-WIN. Totals May not sum due to effects of rounding.

Appendix D

Section D.2
Unimpaired Flow Hydrology

Unimpaired Flow Hydrology for Trinity, Sacramento, and San Joaquin River Basins
(Thousands of Acre-Feet)

Indicator	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL	Regulated Period Total	Regulated Period as % of Total Flow
Trinity River at Lewiston														November Through June	
Minimum Flow	0	4	7	10	14	19	37	27	7	2	0	0	200	176	85.9%
Maximum Flow	134	413	544	552	648	515	380	662	514	248	77	35	2,990	2,587	98.9%
Average Flow	17	52	102	130	153	181	209	249	129	40	13	8	1,283	1,205	94.0%
10th Percentile	3	10	18	26	46	80	111	111	42	11	4	1	679	624	90.7%
20th Percentile	7	13	24	34	59	100	141	150	59	17	6	3	789	743	92.4%
25th Percentile	8	15	28	43	76	114	147	160	63	19	7	4	824	785	92.9%
30th Percentile	9	17	36	47	83	134	160	178	77	20	7	4	866	838	93.3%
40th Percentile	10	22	43	69	111	147	185	201	86	24	9	6	1,025	968	93.9%
Median Flow	12	33	59	93	130	165	207	223	97	27	10	7	1,133	1,064	94.5%
60th Percentile	14	42	86	120	153	179	234	262	110	35	12	8	1,424	1,341	94.9%
70th Percentile	16	54	119	149	167	199	252	282	156	42	15	10	1,582	1,455	95.3%
75th Percentile	17	66	149	173	195	214	260	307	178	48	16	10	1,611	1,529	95.6%
80th Percentile	19	76	163	209	234	230	270	339	204	55	18	12	1,683	1,599	95.8%
90th Percentile	29	128	240	295	286	312	316	411	254	73	23	16	2,035	1,930	96.7%
Sacramento River to Feather Confluence (including Pit River,														November Through June	
Minimum Flow	201	223	259	284	321	352	290	284	238	203	177	184	3,825	2,633	68.8%
Maximum Flow	1,377	2,897	4,792	6,915	6,817	7,171	3,556	2,481	1,851	771	477	442	25,936	23,892	93.3%
Average Flow	356	594	1,210	1,778	1,944	1,838	1,380	955	564	363	302	299	11,583	10,263	86.9%
10th Percentile	243	265	322	449	554	728	610	459	327	265	220	219	5,572	4,638	81.4%
20th Percentile	258	313	421	576	758	983	786	578	386	283	241	242	6,984	5,876	83.3%
25th Percentile	271	324	480	653	911	1,079	808	605	403	295	254	250	7,371	6,170	84.3%
30th Percentile	287	341	509	693	1,017	1,186	835	646	418	302	266	266	7,877	6,806	85.3%
40th Percentile	308	379	624	931	1,221	1,360	985	752	456	319	280	274	8,860	7,721	86.5%
Median Flow	325	430	876	1,321	1,589	1,518	1,123	812	481	334	296	300	10,162	9,163	87.8%
60th Percentile	351	486	1,039	1,645	2,044	1,714	1,326	955	546	375	318	320	13,046	11,451	88.8%
70th Percentile	381	622	1,274	2,156	2,351	2,134	1,656	1,121	612	400	341	335	14,151	12,658	89.9%
75th Percentile	405	651	1,474	2,445	2,585	2,293	1,830	1,255	661	408	352	340	14,945	13,688	90.6%
80th Percentile	420	758	2,062	2,858	2,795	2,456	2,073	1,343	706	431	358	346	15,697	14,434	91.1%
90th Percentile	451	1,132	2,690	3,890	3,921	3,292	2,531	1,568	917	493	378	376	19,369	17,849	92.1%

Sources: California Department of Water Resources, 2007;
California Water Impact Network.

Unimpaired Flow Hydrology for Trinity, Sacramento, and San Joaquin River Basins
(Thousands of Acre-Feet)

Indicator	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL	Regulated Period Total	Regulated Period as % of Total Flow
Feather River														November Through June	
Minimum Flow	53	57	62	69	89	92	100	101	64	63	58	46	995	733	73.7%
Maximum Flow	855	1,240	1,997	2,539	2,678	2,283	1,830	1,700	1,122	370	197	154	9,418	8,608	91.4%
Average Flow	106	191	376	497	555	663	682	638	324	151	100	87	4,370	3,926	89.8%
10th Percentile	63	73	96	132	181	279	307	216	109	86	67	59	2,007	1,705	84.9%
20th Percentile	70	92	119	155	220	369	379	316	159	98	74	65	2,511	2,150	85.6%
25th Percentile	73	100	126	160	247	396	416	361	176	106	81	72	2,638	2,270	86.1%
30th Percentile	77	107	139	184	303	415	471	402	186	113	84	73	2,932	2,562	87.4%
40th Percentile	82	121	168	263	366	465	528	444	220	119	91	78	3,251	2,893	89.0%
Median Flow	93	132	205	320	467	540	611	537	241	134	96	86	3,854	3,466	89.9%
60th Percentile	103	144	270	402	565	646	686	631	294	142	103	89	4,596	4,201	91.4%
70th Percentile	110	178	349	554	674	743	837	784	342	164	108	97	5,673	5,160	91.0%
75th Percentile	114	194	405	668	748	782	885	838	401	173	112	99	5,767	5,260	91.2%
80th Percentile	120	219	550	724	781	870	932	939	453	198	118	104	6,268	5,583	89.1%
90th Percentile	143	337	859	1,131	1,103	1,216	1,134	1,168	662	253	143	120	7,095	6,470	91.2%
Yuba River														November Through June	
Minimum Flow	0	13	17	20	29	35	58	78	17	6	0	0	370	324	87.6%
Maximum Flow	451	677	1,341	1,482	1,351	993	885	929	713	275	66	45	4,925	4,729	96.0%
Average Flow	32	90	200	266	293	330	362	411	206	56	23	19	2,287	2,157	94.3%
10th Percentile	13	21	33	47	84	148	189	161	44	15	9	10	921	884	96.0%
20th Percentile	17	29	43	63	127	199	231	229	75	21	12	13	1,231	1,151	93.5%
25th Percentile	17	31	48	82	143	213	249	265	89	25	13	13	1,363	1,268	93.0%
30th Percentile	19	35	57	100	155	218	263	282	107	27	14	15	1,521	1,438	94.5%
40th Percentile	22	39	74	133	186	244	307	330	127	34	18	17	1,826	1,746	95.6%
Median Flow	25	48	108	156	240	281	336	397	162	38	19	19	2,123	2,006	94.5%
60th Percentile	29	59	134	224	292	320	403	461	203	46	24	20	2,428	2,280	93.9%
70th Percentile	33	72	189	309	344	373	429	506	246	63	27	22	2,949	2,780	94.3%
75th Percentile	34	91	248	354	411	394	454	539	284	67	29	23	3,164	2,993	94.6%
80th Percentile	36	107	286	400	452	421	491	564	309	84	32	25	3,284	3,079	93.8%
90th Percentile	43	174	414	573	566	578	539	708	428	108	42	30	3,765	3,681	97.8%

Sources: California Department of Water Resources, 2007;
California Water Impact Network.

Unimpaired Flow Hydrology for Trinity, Sacramento, and San Joaquin River Basins
(Thousands of Acre-Feet)

Indicator	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL	Regulated Period Total	Regulated Period as % of Total Flow
Bear River														November Through June	
Minimum Flow	0	0	0	0	2	1	0	0	0	0	0	0	13	9	69.2%
Maximum Flow	85	108	225	244	313	208	175	60	52	36	33	18	740	736	99.5%
Average Flow	4	14	41	62	69	61	38	17	7	3	2	2	320	309	96.6%
10th Percentile	0	1	6	9	14	16	7	4	0	0	0	0	102	102	99.2%
20th Percentile	0	3	10	13	21	26	13	6	2	0	0	0	137	130	95.2%
25th Percentile	1	4	12	15	25	31	14	8	3	0	0	0	171	165	96.8%
30th Percentile	1	5	14	19	27	35	18	10	3	1	0	0	181	177	97.7%
40th Percentile	2	6	18	30	35	41	22	12	4	2	0	1	247	239	96.7%
Median Flow	3	8	23	43	52	50	25	15	5	2	1	1	290	278	95.9%
60th Percentile	4	10	31	52	67	61	34	18	7	3	1	2	384	365	95.3%
70th Percentile	5	14	38	70	88	71	49	20	8	3	2	2	434	410	94.5%
75th Percentile	5	16	54	93	104	76	56	22	10	4	2	3	462	453	98.1%
80th Percentile	6	18	65	111	113	88	62	25	11	5	3	3	489	482	98.6%
90th Percentile	7	32	112	152	146	121	74	40	14	7	3	4	567	553	97.5%
American River														November Through June	
Minimum Flow	0	6	3	11	24	42	75	92	17	0	0	0	349	334	95.7%
Maximum Flow	335	985	1,509	1,988	1,866	1,172	1,254	1,136	942	382	90	61	6,380	5,842	91.6%
Average Flow	25	85	200	298	325	387	441	501	265	66	16	12	2,621	2,503	95.5%
10th Percentile	9	15	25	44	95	153	212	180	48	5	0	2	1,041	984	94.5%
20th Percentile	11	21	35	58	119	212	264	260	86	13	3	4	1,252	1,188	94.9%
25th Percentile	12	26	42	70	138	228	292	283	107	16	4	5	1,416	1,363	96.3%
30th Percentile	13	30	48	98	153	239	309	326	131	20	6	6	1,613	1,556	96.5%
40th Percentile	15	34	81	124	205	293	372	401	169	33	10	8	2,023	1,983	98.0%
Median Flow	17	44	99	159	257	341	417	487	222	42	13	10	2,521	2,422	96.1%
60th Percentile	19	53	128	255	317	382	462	553	282	62	17	12	2,844	2,731	96.0%
70th Percentile	22	63	164	353	361	440	528	627	352	84	19	14	3,300	3,140	95.2%
75th Percentile	26	77	184	421	425	449	554	653	375	88	21	15	3,554	3,311	93.2%
80th Percentile	29	90	276	486	513	528	589	692	422	96	25	17	3,886	3,687	94.9%
90th Percentile	36	161	458	635	696	665	657	901	516	134	34	21	4,525	4,340	95.9%

Sources: California Department of Water Resources, 2007;
California Water Impact Network.

Unimpaired Flow Hydrology for Trinity, Sacramento, and San Joaquin River Basins
(Thousands of Acre-Feet)

Indicator	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL	Regulated Period Total	Regulated Period as % of Total Flow
Sacramento Valley Total														November Through June	
Minimum Flow	302	324	353	386	482	548	527	582	398	287	244	259	5,584	4,065	72.8%
Maximum Flow	3,185	5,129	9,730	12,592	13,050	11,922	7,687	5,762	4,257	1,701	794	670	48,368	44,187	91.4%
Average Flow	527	998	2,076	3,013	3,299	3,343	2,939	2,526	1,387	646	444	420	21,619	19,581	90.6%
10th Percentile	344	399	487	682	972	1,409	1,326	1,072	526	389	303	305	10,049	8,779	87.4%
20th Percentile	373	453	636	870	1,350	1,848	1,716	1,415	756	431	345	336	12,363	10,624	85.9%
25th Percentile	390	504	710	979	1,620	2,019	1,783	1,558	870	460	368	345	13,599	11,909	87.6%
30th Percentile	403	521	791	1,076	1,691	2,154	1,989	1,686	886	484	380	366	14,670	13,051	89.0%
40th Percentile	419	585	1,014	1,571	2,074	2,503	2,281	2,092	1,018	517	400	388	16,461	14,710	89.4%
Median Flow	462	660	1,303	2,094	2,705	2,639	2,737	2,258	1,143	569	419	414	19,436	17,687	91.0%
60th Percentile	510	820	1,609	2,722	3,387	3,163	3,000	2,550	1,312	610	463	442	23,670	21,209	89.6%
70th Percentile	539	954	2,059	3,671	3,882	3,796	3,397	2,986	1,471	715	488	475	27,725	25,397	91.6%
75th Percentile	573	1,052	2,456	4,160	4,512	4,069	3,653	3,287	1,776	750	508	485	28,202	26,048	92.4%
80th Percentile	594	1,236	3,492	4,803	5,008	4,442	4,216	3,640	1,921	798	552	510	30,108	27,965	92.9%
90th Percentile	681	1,977	4,271	6,604	6,460	5,715	5,008	4,537	2,519	1,025	590	534	35,614	33,016	92.7%
Stanislaus River														February Through June	
Minimum Flow	0	2	3	3	1	13	35	44	11	0	0	0	155	107	69.0%
Maximum Flow	88	366	412	659	532	415	433	595	632	286	77	38	2,950	3,266	110.7%
Average Flow	10	28	53	82	96	128	192	283	176	53	13	7	1,120	957	85.5%
10th Percentile	3	6	9	13	23	51	100	101	41	7	2	1	457	382	83.7%
20th Percentile	4	7	12	18	33	71	123	163	59	13	4	2	592	500	84.4%
25th Percentile	5	8	13	23	40	78	136	175	71	16	5	3	637	551	86.4%
30th Percentile	6	9	14	25	45	82	152	188	96	20	6	3	680	566	83.3%
40th Percentile	7	10	19	34	55	97	173	238	127	27	7	4	894	740	82.7%
Median Flow	8	14	25	42	72	105	192	281	167	36	9	5	1,107	822	74.3%
60th Percentile	10	17	32	59	98	124	207	322	193	51	11	5	1,265	994	78.6%
70th Percentile	11	23	45	88	108	143	227	355	223	63	14	7	1,359	1,077	79.2%
75th Percentile	12	27	50	104	115	154	246	375	240	72	17	8	1,460	1,127	77.2%
80th Percentile	12	31	58	117	130	161	254	390	248	83	19	10	1,559	1,180	75.7%
90th Percentile	16	48	124	179	195	233	275	439	331	111	26	13	1,912	1,459	76.3%

Sources: California Department of Water Resources, 2007;
California Water Impact Network.

Unimpaired Flow Hydrology for Trinity, Sacramento, and San Joaquin River Basins
(Thousands of Acre-Feet)

Indicator	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL	Regulated Period Total	Regulated Period as % of Total Flow
Tuolumne River														February Through June	
Minimum Flow	0	1	4	5	8	23	79	106	17	10	0	0	384	330	85.9%
Maximum Flow	153	522	650	1,033	616	579	660	960	1,016	652	205	104	4,632	2,904	62.7%
Average Flow	17	48	88	125	147	191	274	446	353	123	26	12	1,851	1,411	76.2%
10th Percentile	4	8	13	22	42	86	162	214	90	17	3	1	836	675	80.8%
20th Percentile	5	9	20	33	60	117	186	294	137	22	6	3	1,053	898	85.3%
25th Percentile	6	12	24	40	64	125	195	326	158	28	8	3	1,107	961	86.8%
30th Percentile	7	14	27	43	70	129	221	347	222	36	10	4	1,183	984	83.2%
40th Percentile	9	17	35	56	88	146	248	380	291	57	14	5	1,416	1,189	83.9%
Median Flow	11	24	48	78	119	160	266	449	336	70	18	7	1,786	1,299	72.7%
60th Percentile	12	35	58	107	145	178	290	495	401	109	21	10	2,030	1,578	77.8%
70th Percentile	16	48	81	133	166	216	319	537	451	142	27	13	2,181	1,704	78.1%
75th Percentile	18	55	93	150	193	232	328	551	476	161	30	16	2,363	1,755	74.2%
80th Percentile	21	68	106	178	231	255	344	574	529	189	34	18	2,483	1,852	74.6%
90th Percentile	39	96	218	258	308	338	385	658	598	302	55	22	3,093	2,188	70.8%
Merced River														February Through June	
Minimum Flow	0	1	1	3	3	8	31	39	13	4	0	0	151	128	44.5%
Maximum Flow	51	259	373	634	362	370	429	565	656	352	97	47	2,786	1,837	93.6%
Average Flow	7	20	43	66	85	101	147	241	171	56	13	6	956	746	80.6%
10th Percentile	1	4	5	10	19	37	80	102	43	8	2	0	409	326	79.8%
20th Percentile	2	5	8	13	26	52	93	135	53	11	3	0	492	432	87.8%
25th Percentile	2	6	10	16	30	56	101	163	69	15	4	1	527	459	87.0%
30th Percentile	3	6	10	20	34	60	113	175	83	18	4	1	562	471	83.8%
40th Percentile	4	8	16	23	47	69	129	205	114	26	6	2	669	568	84.9%
Median Flow	5	9	22	37	55	82	142	246	147	33	8	4	906	648	71.5%
60th Percentile	6	14	28	48	73	96	158	268	171	45	11	5	1,077	805	74.8%
70th Percentile	7	18	34	66	104	115	171	290	208	52	13	6	1,160	924	79.7%
75th Percentile	9	21	42	82	118	131	181	309	227	62	15	7	1,220	977	80.1%
80th Percentile	11	22	52	95	148	152	192	321	261	79	17	8	1,389	1,030	74.1%
90th Percentile	16	41	100	159	201	167	216	387	335	122	31	12	1,708	1,223	71.6%

Sources: California Department of Water Resources, 2007;
California Water Impact Network.

Unimpaired Flow Hydrology for Trinity, Sacramento, and San Joaquin River Basins
(Thousands of Acre-Feet)

Indicator	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL	Regulated Period Total	Regulated Period as % of Total Flow
San Joaquin River														February Through June	
Minimum Flow	5	6	7	10	11	19	57	75	35	16	9	4	361	277	54.7%
Maximum Flow	126	247	461	735	472	485	613	1,096	1,166	752	280	170	4,642	2,896	88.3%
Average Flow	19	33	59	83	103	144	236	432	374	168	52	24	1,728	1,289	76.6%
10th Percentile	7	10	15	18	30	67	127	209	121	41	14	8	813	656	80.7%
20th Percentile	10	13	16	24	42	83	155	240	148	46	18	10	928	749	80.7%
25th Percentile	10	15	19	28	49	89	166	273	172	51	21	11	1,052	839	79.7%
30th Percentile	11	16	21	33	55	95	173	314	212	58	23	12	1,128	881	78.2%
40th Percentile	13	17	31	40	63	108	203	372	278	91	28	14	1,257	1,007	80.1%
Median Flow	16	22	36	48	76	119	234	419	325	115	34	15	1,449	1,137	78.5%
60th Percentile	19	26	43	67	99	134	249	464	373	145	42	18	1,854	1,458	78.7%
70th Percentile	21	33	54	82	113	162	279	509	476	181	51	22	2,047	1,572	76.8%
75th Percentile	24	37	62	95	134	174	289	543	500	213	63	27	2,195	1,623	73.9%
80th Percentile	25	42	73	112	163	201	308	594	581	266	73	33	2,322	1,779	76.6%
90th Percentile	34	66	114	168	208	232	350	704	642	364	125	42	3,018	2,075	68.8%
San Joaquin Valley Total														February Through June	
Minimum Flow	9	13	17	23	25	65	204	266	76	36	11	7	1,061	879	45.8%
Maximum Flow	426	1,535	2,213	3,813	2,315	2,603	2,578	3,563	3,792	2,151	731	346	18,977	12,250	90.8%
Average Flow	55	140	280	425	529	668	929	1,467	1,117	413	107	50	6,181	4,711	78.7%
10th Percentile	16	29	47	67	124	266	501	629	304	78	24	13	2,535	2,033	80.2%
20th Percentile	25	40	60	101	180	366	559	836	401	95	34	18	3,273	2,732	83.5%
25th Percentile	28	43	67	124	200	381	631	982	475	107	40	20	3,381	2,921	86.4%
30th Percentile	30	48	75	134	226	403	685	1,044	612	135	43	21	3,626	2,966	81.8%
40th Percentile	35	52	105	174	281	448	785	1,225	839	213	52	27	4,385	3,623	82.6%
Median Flow	39	69	140	222	370	520	901	1,404	970	251	68	31	5,896	4,187	71.0%
60th Percentile	47	98	198	357	488	625	954	1,639	1,157	346	92	38	6,559	5,069	77.3%
70th Percentile	56	130	244	419	614	726	1,084	1,732	1,394	447	106	44	7,393	5,752	77.8%
75th Percentile	63	147	268	481	763	826	1,135	1,880	1,496	489	121	58	7,934	5,947	74.9%
80th Percentile	72	187	330	616	875	971	1,154	1,925	1,653	623	132	67	8,667	6,347	73.2%
90th Percentile	95	271	615	977	1,224	1,147	1,462	2,451	2,070	948	243	84	11,004	7,891	71.7%

Sources: California Department of Water Resources, 2007;
California Water Impact Network.

Appendix D

Section D.3
Adjudication Decree Quantifications

Butte Creek Decree
Butte County Decree No. 18917
Seasons of Use

Continuous, regardless of season	365.25	days
April 1 through October 15	198.00	days
March 1 through October 15	229.00	days

				Allotments									
Claimants	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority (cfs)	Fourth Priority Face Value (AF)	Total, cfs	Total, AF
Schedule 3, Foreign Water Rediversion Group													
Dayton Mutual Water Company	1,796.30	50	Parrott Ditch and Crouch Lateral	3.33	2,414.63							3.33	2,414.63
M & T Incorporated	3,620.00	50	Parrott Ditch and Edgar Slough	3.33	2,414.63	50.00	36,223.14					53.33	38,637.78
Parrott Investment Company	17,427.00	50	Parrott Ditch and Edgar Slough	3.33	2,414.63	50.00	36,223.14					53.33	38,637.78
Subtotal, Schedule 3, Foreign Water Rediversion Group	22,843.30			10.00	7,243.90	100.00	72,446.28	0.00	0.00	0.00	0.00	110.00	79,690.18
Schedule 4, Nonconsumptive Claimants on Butte Creek and Tributaries													
Harold B Rathwell	Power	27	Unnamed Spring	0.20	144.89							0.20	144.89
Almon E Smith	Mining	26	Ethel	1.90	1,376.48							1.90	1,376.48
David S Webb and Mary D Webb	Mining	13	Webb	0.15	108.67							0.15	108.67
Herbert W Whitten, Marjorie C Whitten, Olive M Young, George Mead, Anna Mead, T H Polk, and Lucia V Polk	Mining	26A, 26B, 28A	Eureka Middle, Eureka Pump, Eureka Little	3.45	2,499.40							3.45	2,499.40
Jack L Post	Mining	28	La Monte	12.90	9,345.57							12.90	9,345.57
Jack L Post	Mining	28B	Post Pump	0.85	615.79							0.85	615.79
W J McGann and Elizabeth T Cussick	Potable Domestic	36	Davis	0.50	362.23							0.50	362.23
Grace D Taylor	Potable Domestic	37	Thomas	0.50	362.23							0.50	362.23
L H McLain and C J McLain	Mining	45A, 45B	Butte Bell, McLain Sluice	0.90	652.02							0.90	652.02
Margaret A Smith	Mining	46	Smith	2.50	1,811.16							2.50	1,811.16
Pacific Gas & Electric Company	Power	45	Butte Creek	88.50	64,114.96							88.50	64,114.96
Pacific Gas & Electric Company	Power	47	Centerville Canal	179.50	130,041.07							179.50	130,041.07
Electric Mining Company	Power	49	Electric Mining Co	305.00	220,961.16							305.00	220,961.16
Subtotal, Schedule 4, Nonconsumptive Claimants on Butte Creek and Tributaries				596.85	432,395.63							596.85	432,395.63
Schedule 5, Little Butte Creek and Tributaries Claimants Group													
David S Webb and Mary D Webb	Domestic	13	Webb	0.10	72.45							0.10	72.45
Anna Spangler	1.00	13A	Spangler Pipe	0.20	144.89							0.20	144.89
Estate of Ernest Duensing	11.80	14	Duensing	0.25	181.12	0.25	98.18					0.50	279.30
Vandegrift Trust	87.00	20, 20A	Richardson, Richardson	3.00	2,173.39							3.00	2,173.39

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				Allotments									
Claimants	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority (cfs)	Fourth Priority Face Value (AF)	Total, cfs	Total, AF
Paradise Irrigation District	11,100.00	22, 23	Paradise ID, Nickerson		0.00	8.00	3,141.82					8.00	3,141.82
Harold B Rathwell	Domestic	27	Ripley Spring	0.20	144.89							0.20	144.89
S A Vandegrift	Domestic	23A	Vandegrift	0.50	362.23							0.50	362.23
Jack L Post	Domestic	28, 28B	La Monte, Post Pump	0.15	108.67							0.15	108.67
D A Hook, W S Hook, and Lillian M Hook	3.00	24A	Hook	0.10	72.45	0.10	39.27					0.20	111.72
S A Vandegrift	Domestic	24B	Hook	1.00	724.46							1.00	724.46
S A Vandegrift	Domestic	24D	Hook	1.00	724.46							1.00	724.46
Almon E Smith	Domestic	26	Ethel	0.10	72.45							0.10	72.45
Herbert W Whitten, Marjorie C Whitten, Olive M Young, George Mead, Anna Mead, T H Polk, and Lucia V Polk	Domestic	26A, 26B, 28A	Eureka Middle, Eureka Pump, Eureka Little	0.05	36.22							0.05	36.22
Ella G Evers	13.60	30	Todd (Evers)	1.00	724.46	1.00	392.73					2.00	1,117.19
H W Skillin and Alice Skillin	9.40	31	Burke		0.00	0.67	263.13	0.66	259.20			1.33	522.33
H D March and Henrietta March	14.40	31	Burke		0.00	0.67	263.13	0.66	259.20			1.33	522.33
Thurman and Wright	6.00	31	Burke		0.00	0.67	263.13	0.66	259.20			1.33	522.33
George E McLain and C J McLain	17.10	32	McLain	0.10	72.45	0.50	196.36			2.50	981.82	3.10	1,250.63
Subtotal, Schedule 5, Little Butte Creek and Tributaries Group	11,263.30			7.75	5,614.59	11.86	4,657.75	1.98	777.60	2.50	981.82	24.09	12,031.75
Schedule 6, Upper Butte Creek and Tributaries Claimants (above Little Butte Creek)													
John J Mahan and Wm J Doyle	21.30	6	Cirby	0.20	144.89	0.30	117.82					0.50	262.71
E L Franks and Ida May Franks	103.40	7, 8	Stephenson Upper, Stephenson Lower	0.20	144.89	1.80	706.91					2.00	851.80
L B Stephenson	25.00	8A, 8B, 8C	Abietene	0.50	362.23	0.50	196.36					1.00	558.60
USDA Lassen Nat'l Forest	10.20	1, 3	Jonesville Bl 1 Pipes, Jones	0.25	181.12	0.25	98.18					0.50	279.30
F K Mickey and J H Minderman	112.00	3, 4	Jones, Mickey-Minderman	1.50	1,086.69	1.50	589.09					3.00	1,675.79
Edwin B Copeland	33.00	3	Jones	0.50	362.23	0.50	196.36					1.00	558.60
J H Lucas and Estate of Wm Johnson	38.30	5	Lucas-Jones	0.20	144.89	0.50	196.36					0.70	341.26
J H Lucas and Estate of Wm Johnson	150.00	5B	Colby Creek	0.50	362.23	1.50	589.09					2.00	951.32
J H Lucas and Estate of Wm Johnson	70.00	5A	Willow Creek	0.25	181.12	0.35	137.45					0.60	318.57
Anne Kennedy Anderson, Donald Mathewson, and Winifred M Kennedy	10.00	5A	Willow Creek	0.05	36.22	0.20	78.55					0.25	114.77
W J McGann and Elizabeth T Cussick	57.90	9A	McGann Springs, Davis	0.20	144.89	0.80	314.18					1.00	459.07

Butte Creek Decree
Butte County Decree No. 18917
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April 1 through October 15	198.00	days
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				Allotments									
Claimants	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority (cfs)	Fourth Priority Face Value (AF)	Total, cfs	Total, AF
W J McGann and Elizabeth T Cussick	200.00	36	Davis	0.25	181.12	0.10	39.27					0.35	220.39
J H Lucas, G W Lucas, and C F Lucas	32.90	9, 9A	Lucas Springs, McGann Springs	0.20	144.89	0.60	235.64					0.80	380.53
J H Lucas, G W Lucas, and C F Lucas	30.00	36A	Lucas	0.20	144.89	0.50	196.36					0.70	341.26
Grace D Taylor	5.00	37	Thomas	0.25	181.12	0.25	98.18					0.50	279.30
Eleanor Propfe Welch	Domestic	39	Welch Pipe	0.01	7.24							0.01	7.24
USDA Lassen Nat'l Forest	Domestic	44	Butte Meadows Pipes	0.10	72.45							0.10	72.45
Pacific Gas & Electric Company	Public Service	45	Butte Creek Canal	1.18	851.24							1.18	851.24
Pacific Gas & Electric Company	Domestic	45	Butte Creek Canal	0.33	235.45							0.33	235.45
Pacific Gas & Electric Company	Domestic	47	Centerville Canal	0.50	362.23							0.50	362.23
L H McLain and C J McLain	Domestic	45A, 45B	Butte Bell, McLain Sluice	0.10	72.45							0.10	72.45
Margaret A Smith	Domestic	46	Smith	0.03	21.73							0.03	21.73
Electric Mining Company	Domestic	49	Electric Mining Co	0.10	72.45							0.10	72.45
Subtotal Schedule 6, Upper Butte Creek and Tributaries Group	899.00			7.59	5,498.67	9.65	3,789.82	0.00	0.00	0.00	0.00	17.24	9,288.49

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Seasons of Use

Continuous, regardless of season	365.25	days
April 1 through October 15	198.00	days
March 1 through October 15	229.00	days

Allotments

Claimants	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority (cfs)	Fourth Priority Face Value (AF)	Total, cfs	Total, AF
Schedule 7, Lower Butte Creek and Tributaries Claimants (Below Little Butte Creek)				First Priority, All Year (cfs)	First Priority, All Year (AF)	First Priority, Apr 1 - Oct 15 (cfs)	First Priority, Apr 1 - Oct 15 (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)		
Dayton Mutual Water Company		50	Parrott and Crouch Lateral	4.80	3,477.42	11.20	4,398.55					16.00	7,875.97
Donald Hale and Alice Hilby Hale	160.20	51	Hale	0.90	652.02	2.10	824.73					3.00	1,476.74
USDA Bureau of Plant Industry	154.50	53	Plant Garden Pump	0.60	434.68	1.40	549.82					2.00	984.50
Clarence S Entler	81.00	54	Compton-Entler	0.33	239.07	0.78	306.33					1.11	545.40
Mary E Roth	75.00	54	Compton-Entler	0.17	123.16	0.39	153.16					0.56	276.32
Bee P Compton	689.00	54	Compton-Entler	0.50	362.23	1.17	457.53					1.67	819.76
Bee P Compton	241.00	54	Compton-Entler	0.50	362.23	1.17	457.53					1.67	819.76
A F Lieurance and Lenore E Lieurance	527.10	55	Marybill	1.20	869.36	3.80	1,492.36					5.00	2,361.72
Parrott Investment Company	211.00	56	Colony Upper	0.60	434.68	1.40	549.82					2.00	984.50
Edwin A Carlson and Gladys Carlson	36.70	56	Colony Upper	0.14	101.42	0.34	133.53					0.48	234.95
D A Hook, W S Hook	30.00	56	Colony Upper	0.12	86.94	0.27	106.04					0.39	192.97
Elmo Jacks and Louise Jacks	24.90	56	Colony Upper	0.09	65.20	0.22	86.40					0.31	151.60
Samuel A Atkins and Barbara Ina Atkins	30.00	56	Colony Upper	0.11	79.69	0.26	102.11					0.37	181.80
Samuel A Atkins and Barbara Ina Atkins	34.00	58	Wakefield Pump	0.13	94.18	0.30	117.82					0.43	212.00
Durham Mutual Water Company, Ltd.	3,566.20	56, 59	Colony Upper, Colony Lower	12.00	8,693.55	32.70	12,842.18					44.70	21,535.74
The Federal Land Bank of Berkeley	156.50	57	Ollinger Pump	0.60	434.68	1.40	549.82					2.00	984.50
Varney F Wakefield	14.00	58	Wakefield Pump	0.05	36.22	0.13	51.05					0.18	87.28
Ralph J Baxter, C W Baxter, and F T Woell, and M B Woell	178.00	56	Colony Upper	0.60	434.68	1.40	549.82					2.00	984.50
Stephen Vernoga	47.30	56	Colony Upper	0.30	217.34	0.70	274.91					1.00	492.25
Corporation of America	20.00	56	Colony Upper	0.12	86.94	0.28	109.96					0.40	196.90
George Setka, Anna Setka, Joe Bebich, Same Bebich, and Steve Vlatkovich	96.70	56	Colony Upper	0.40	289.79	0.94	369.16					1.34	658.95
L E Wheelock and Nellie Wheelock	13.00	56	Colony Upper	0.08	57.96	0.18	70.69					0.26	128.65
George Brandt and Edna May Brandt	50.00	59B	Brandt Pump	0.12	86.94	0.27	106.04					0.39	192.97
Roy White	53.00	60A	Roy White Pump	0.20	144.89	0.46	180.65					0.66	325.55
E L Adams and Lou R Adams	1,191.20	56	Colony Upper					1.48	1,072.20			1.48	1,072.20
E L Adams and Lou R Adams	2,533.20	60	Adams					4.52	3,274.57			4.52	3,274.57
Ralph C Gorrill	2,282.00	61	Gorrill							1.00	724.46	1.00	724.46

Butte Creek Decree
Butte County Decree No. 18917
Seasons of Use

Continuous, regardless of season	365.25	days
April 1 through October 15	198.00	days
March 1 through October 15	229.00	days

				Allotments									
Claimants	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority (cfs)	Fourth Priority Face Value (AF)	Total, cfs	Total, AF
Herbert W Whitten and Marjorie C Whitten	665.30	56, 60	Colony Upper, Adams							0.75	543.35	0.75	543.35
E E White	541.60	62	White Pumps							1.00	724.46	1.00	724.46
Subtotal, Schedule 7, Lower Butte Creek and Tributaries Claimants Group	13,702.40			24.66	17,865.25	63.25	24,840.00	6.00	4,346.78	2.75	1,992.27	96.66	49,044.30
Additional Continuous Year-Round Usage Claimants - Special Class													
Lovie L Downs	Domestic, Stockwater, Irrigation	17	Downs Spring	0.03	21.73								
Frances B Mahilton, A C Musselman, George P Morse	Domestic, Stockwater, Irrigation	16A, 18	Hamilton Ditches	0.50	362.23								
Joe A Sagi	Domestic, Stockwater, Irrigation	24	Sagi Pipelines	0.15	108.67								
Merritt Musselman and Florence V Musselman	Domestic, Stockwater, Irrigation	18A	Musselman Springs Pipe Line	0.10	72.45								
Elsie Hume Mann	Domestic, Stockwater, Irrigation	35	Mann Spring Pipeline	0.02	14.49								
Fannie M McEnespy	Domestic, Stockwater, Irrigation	33, 34	McEnespy North, McEnespy Main Ditches	1.00	724.46								
Fannie M McEnespy	Domestic, Stockwater, Irrigation	34A	McEnespy Pipe Line and McEnespy Spring Channel	0.10	72.45								
S A Vandegrift	Domestic, Stockwater, Irrigation	240	Vandegrift Spring Ditch	0.50	362.23								
S A Vandegrift	Domestic, Stockwater, Irrigation	24E	Michaels Ditch	0.15	108.67								
Anna Spangler	Domestic, Stockwater	13A	Spangler Pipe	0.05	36.22								
Estate of Ernest Duensing	Domestic, Stockwater, Irrigation	14A	Duensing Spring Ditch	0.15	108.67								
Vandegrift Trust	Domestic, Stockwater, Irrigation	21	Meadowbrook Ditch	1.00	724.46								
F E Whitlock	Domestic, Stockwater	24F, 25	Hupp Canal	0.20	144.89								

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Claimants	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotments First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority (cfs)	Fourth Priority Face Value (AF)	Total, cfs	Total, AF
Roy L Pearson, Orval Pearson, Eunice A Cartwright, and Mildred Laughlin	Domestic, Stockwater	24F, 25	Hupp Canal	0.05	36.22								
A P Kundert	Domestic, Stockwater	24F, 25	Hupp Canal	0.05	36.22								
Subtotal, Additional Continuous Usage Claimants				4.05	2,934.07								
Additional Irrigation Season Usage Claimants - Special Class													
F E Whitlock	Irrigation	24F, 25	Hupp Canal	0.40	289.79								
Roy L Pearson, Orval Pearson, Eunice A Cartwright, and Mildred Laughlin	Irrigation	24F, 26	Hupp Canal	0.05	36.22								
A P Kundert	Irrigation	24F, 27	Hupp Canal	0.05	36.22								
The Diamond Match Company	Domestic, Stockwater, Industrial	10, 10A, 10B, 10C	Diamond Match System	2.00	1,448.93	Continuous							
Richard A Colgan Jr	Domestic, Commercial	40	Colgan Pipe Line	0.14	101.42	Continuous							
F K Mickey and J H Minderman	Domestic, Stockwater	2	Mickey-Minderman Pipe Line	0.07	50.71	Continuous							
Edwin B Copeland	Domestic, Stockwater	Riparian		0.20	144.89	Continuous							
J H Lucas	Domestic, Stockwater, Irrigation	Riparian		0.40	289.79	Continuous							
Carl Nelson Swartz and Esther M Swartz	Domestic, Stockwater, Irrigation	Riparian		0.15	108.67	Continuous							
E L Adams and Lou R Adams	Domestic, Stockwater	64, 65	Adams Hamlin Slough Ditch, Adams Hamlin Pump	0.82	594.06	Continuous	Riparian						
E L Adams and Lou R Adams	Irrigation	64, 65	Adams Hamlin Slough Ditch, Adams Hamlin Pump	3.00	916.36	May 1 - Oct 1							
E L Adams and Lou R Adams	Domestic, Stockwater	64, 65	Adams Hamlin Slough Ditch, Adams Hamlin Pump	1.00	724.46	Continuous	Riparian						

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				Allotments									
Claimants	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority (cfs)	Fourth Priority Face Value (AF)	Total, cfs	Total, AF
E L Adams and Lou R Adams	Irrigation	64, 65	Adams Hamlin Slough Ditch, Adams Hamlin Pump	3.58	1,093.53	May 1 - Oct 1							
Herbert W Whitten and Marjorie C Whitten	Domestic	64, 65	Adams Hamlin Slough Ditch, Adams Hamlin Pump	0.60	434.68	Continuous	Riparian						
Herbert W Whitten and Marjorie C Whitten	Irrigation	64, 65	Adams Hamlin Slough Ditch, Adams Hamlin Pump	3.00	916.36	May 1 - Oct 1							
Ralph C Gorrill	Domestic, Stockwater	66	Gorrill-Hamlin Ditch	1.00	724.46	Continuous	Riparian						
Ralph C Gorrill	Irrigation	66	Gorrill-Hamlin Ditch	14.00	2,138.18	Apr 15 - Jun 30							
E L Adams and Lou R Adams	Irrigation	64, 65	Adams Hamlin Slough Ditch, Adams Hamlin Pump	3.22	1,168.78	Apr 1 - Sep 30							
Herbert W Whitten and Marjorie C Whitten	Irrigation	64, 65	Adams Hamlin Slough Ditch, Adams Hamlin Pump	1.38	459.85	Apr 1 - Sep 15							
Ralph C Gorrill	Irrigation	66	Gorrill-Hamlin Ditch	6.70	1,209.32	Apr 1 - Jun 30							
Ralph C Gorrill	Irrig	66	Gorrill-Hamlin Ditch	21.70	3,314.18	Jul 1 - Sep 15							
Subtotal, Additional Irrigation Season Usage Claimants				63.46	16,200.87								
Surplus Class Rights Claimants													
Paradise Irrigation District	Irrigation	22	Magalia Reservoir	Little Butte Creek	9,500.00	Subject to completion of Permit 271							
Paradise Irrigation District	Domestic, Stockwater	22	Magalia Reservoir	Little Butte Creek	0.00	Continuous							
Ralph C Gorrill	Irrigation	61	Gorrill Ditch	14.00	2,526.94	Jul 1 - Sep 30							
E L Adams and Lou R Adams	Irrigation	56, 60	Colony Upper, Adams	9.80	3,557.16	Apr 1 - Sep 30							
Herbert W Whitten and Marjorie C Whitten	Irrigation	56, 60	Colony Upper, Adams	3.45	1,252.26	Apr 1 - Sep 30							

Butte Creek Decree
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				Allotments									
Claimants	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority (cfs)	Fourth Priority Face Value (AF)	Total, cfs	Total, AF
E L Adams and Lou R Adams	Irrigation	56, 60	Colony Upper, Adams	4.60	693.42	Apr 1 - Jun 15							
E L Adams and Lou R Adams	Irrigation	56, 60	Colony Upper, Adams	1.00	150.74	Apr 1 - Jun 15							
Herbert W Whitten and Marjorie C Whitten	Irrigation	56, 60	Colony Upper, Adams	2.40	361.79	Apr 1 - Jun 15							
Ralph C Gorrill	Irrigation	61	Gorrill Ditch	15.00	5,444.63	Apr 1 - Sep 30							
Ralph C Gorrill	Irrigation	61	Gorrill Ditch	6.70	2,431.93	Jul 1 - Sep 30							
E E White	Irrig	62	White Pumps	9.50	3,448.26	Apr 1 - Sep 30							
Parrott Investment Company	Domestic	50	Parrott Ditch	5.00	1,668.60	Oct 16 - Mar 31							
M & T Incorporated	Domestic	50	Parrott Ditch	5.00	1,668.60	Oct 16 - Mar 31							
Parrott Investment Company	Domestic, Stockwater, Irrigation	50	Parrott Ditch	25.00	9,818.18	Apr 1 - Oct 15							
M & T Incorporated	Domestic, Stockwater, Irrigation	50	Parrott Ditch	25.00	9,818.18	Apr 1 - Oct 15							
California Lands, Inc			Butte Creek	2.50	1,811.16	Continuous							
Yuba Consolidated Gold Fields			Butte Creek	2.50	1,811.16	Continuous							
Western Canal Company	Irrigation	63	Western Canal	33.33	5,024.29	Apr 1 - Jun 15							
Subtotal, Additional Surplus Class Claimants				164.78	60,987.30								

Butte Creek Decree
Butte County Decree No. 18917
Seasons of Use

Continuous, regardless of season	365.25	days
April 1 through October 15	198.00	days
March 1 through October 15	229.00	days

				Allotments									
Claimants	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority (cfs)	Fourth Priority Face Value (AF)	Total, cfs	Total, AF
Summary	Total, cfs	Total, AF											
Schedule 3, Foreign Water Rediversion Group	110.00	79,690.18											
Schedule 4, Nonconsumptive Claimants on Butte Creek and Tributaries	596.85	432,395.63											
Schedule 5, Little Butte Creek and Tributaries Claimants Group	24.09	12,031.75											
Schedule 6, Upper Butte Creek and Tributaries Claimants (above Little Butte Creek)	17.24	9,288.49											
Schedule 7, Lower Butte Creek and Tributaries Claimants (Below Little Butte Creek)	96.66	49,044.30											
Additional Continuous Year-Round Usage Claimants - Special Class	4.05	2,934.07											
Additional Irrigation Season Usage Claimants - Special Class	63.46	16,200.87											
Subtotal, Consumptive Use Claimants in Butte Creek System	315.50	169,189.68											
Subtotal, Basic Claimants to Butte Creek System Flows	912.35	601,585.30											
Subtotal, Additional Surplus Class Claimants	164.78	60,987.30											
Total, All Consumptive Use Claimants to Butte Creek System	480.28	230,176.97											
Total, All Claimants to Butte Creek System	1,077.13	662,572.60											

							Allotments			
Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Total Allotments, Face Value (AF)
Schedule 3, Claimants from Wolf Creek and its Tributaries										
David J. Anderson	16.40	130C	Haun Creek Camp	0.30	217.34				0.00	217.34
David J. Anderson	24.00	130D	Haun Creek Springs	0.40	289.79				0.00	289.79
Setzer Forest Products, Inc.	Domestic	59A	Setzer Camp Pipeline	0.05	36.22					36.22
Bidwell Water Company	Municipal	64	Round Valley Reservoir	2.00	1,448.93					1,448.93
Bidwell Water Company	7.10	65	Kauffman	0.10	72.45	0.10	48.60			121.04
Alford S. Calais & Nellie E. Calais	10.00	66	Short and Morel	0.07	50.71	0.11	53.45			104.17
John Rilea	4.00	66	Short and Morel	0.03	21.73	0.04	19.44			41.17
H.A. Morel & Mabel Francis Morel	24.50	66	Short and Morel	0.10	72.45	0.15	72.89			145.34
Albert E. McKeen & Randall H Smith	30.30	76	Pecks Valley	0.50	362.23					362.23
Reese L Jones	1.50	76A	Jones	0.15	108.67					108.67
Delfina Taddei	12.60	77	Taddei	0.25	181.12					181.12
A P Pedretti	12.60	77	Taddei	0.25	181.12					181.12
Wolf Creek Timber Co., Inc.	Industrial	61	Cedar Mill Lower Pump	0.10	72.45					72.45
Setzer Forest Products, Inc.	Industrial	62	Clark	0.28	136.07					136.07
Setzer Forest Products, Inc.	Industrial	63	Setzer Standby Pump							0.00
Setzer Forest Products, Inc.	15.00	63A	Setzer Standby Pump							0.00
Helen J. Shiell	145.50	62	Clark	0.70	340.17					340.17
E T Kunzler & Edna M Kunzler	125.40	62	Clark	0.70	507.12					507.12
E T Kunzler & Edna M Kunzler		78	Williams Creek	0.50	362.23	0.20	97.19			459.42
H G McCune	82.70	67, 79	Schieser Gott Williams Creek	0.10	72.45	0.75	364.46			436.91
A.O. Lewis	249.00	67	Schieser	0.45	326.01	2.25	1,093.39			1,419.40
Wesley T Wheeler & Idell C Wheeler	94.30	67	Schieser	0.10	72.45	0.45	218.68	0.50	242.98	534.10
United States of America	66.60	67	Schieser	0.05	36.22	0.30	145.79	0.35	170.08	352.09
C G Frederickson & Helen V Frederickson	193.60	68	Frederickson & Forgay Hamblin Spring	0.38	271.67	1.88	911.16			1,182.83
Dan Guidici and James Guidici	334.00	68	Frederickson & Forgay	0.38	271.67	1.88	911.16			1,182.83
Dan Guidici and James Guidici		70, 72	Forgay	0.20	144.89	1.40	680.33			825.22
R Avery Sheehan and Sarah Sheehan	167.10	69, 71	McIntosh	0.15	108.67	0.87	422.78	0.73	354.74	886.19

							Allotments			
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L E Wheelock & C H Wheelock	95.60	69, 73	McIntosh, Wheelock	0.05	36.22	0.53	257.55	0.42	204.10	497.88
W B Ferry R L Perry, Ivy Mae Heald and Susie Perry (Rogers)	126.90	69, 73, 74	McIntosh, Wheelock, Perry	0.05	36.22			1.35	656.03	692.26
Subtotals, Schedule 3 - Wolf Creek Group	1,838.70			8.38	5,837.26	10.90	5,296.86	3.35	1,627.93	12,762.05
Schedule 4: Claimants from Lights Creek and Its Tributaries										
United States of America	3.00	85B	Morton Creek	0.15	108.67					108.67
William M Hosken	219.00	80, 80A	Hosken Cooks Creek; Proposed Hosken Pump		0.00	1.50	728.93			728.93
Fred Ratcliffe-Smith & Mildred Ratcliffe-Smith	62.00	81	Smiths Cooks Creek	0.50	362.23	0.50	242.98			605.21
Martin A Maier & Cleo B Maier	35.00	82	Burns Cooks Creek	0.20	144.89	0.25	121.49			266.38
W S Quigley & Icie A Quigley	20.90	83	Quigley Pasture	0.20	144.89	0.10	48.60			193.49
W S Quigley & Icie A Quigley	37.00	84	Quigley Meadow		0.00	0.45	218.68			218.68
Walter E Cliff & Ruth M Cliff	66.60	85	Cliff Cooks Creek	0.10	72.45	0.38	182.23			254.68
J B Peter	157.70	96	Peter Creek	1.00	724.46	1.00	485.95			1,210.41
J B Peter		97	Peter Creek Barn							0.00
J B Peter		98	Peter Creek Upper Field							0.00
J B Peter		99	Peter Creek Lower Field							0.00
Arthur Peter and Emma A Peter	14.30	100	A. Peter			0.20	97.19			97.19
Dora Johnson	69.10	103	Road Dam	0.10	72.45	0.75	364.46			436.91
A J Downey and D W Downey	Power	86, 87	Downey Upper, Downey Lower	1.50	1,086.69					1,086.69
California-Engles Mining Company	Domestic & Industrial	87A	Engels	0.10	72.45		0.00			72.45
Hattie Potts	10.00	87B	Potts	0.10	72.45	0.10	48.60			121.04
James T Freeman & Elma L Freeman	87.70	88	Freeman & Bates	0.40	289.79	1.05	510.25			800.03
E B Bates and Minnie Bates	87.80	88	Freeman & Bates	0.40	289.79	1.05	510.25			800.03
Ralph Defanti & Elvezia Defanti	195.40	89	Defanti & Smith	0.60	434.68	1.58	765.37	0.68	328.02	1,528.07

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Fred Ratcliffe-Smith & Mildred Ratcliffe-Smith	65.00	89	Defanti & Smith	0.20	144.89	0.53	255.12	0.23	109.34	509.36
Martin A Maier & Cleo B Maier	93.00	90	Burns	0.20	144.89	1.00	485.95			630.84
W S Quigley & Icie A Quigley	247.40	91	Quigley Upper	0.20	144.89	2.90	1,409.26			1,554.15
W S Quigley & Icie A Quigley	152.20	92	Quigley Middle	0.20	144.89	1.70	826.12			971.01
J B Peter	44.30	93	Peter Upper	0.10	72.45	0.45	218.68			291.12
Arthur Peter and Emma A Peter	100.00	93	Peter Upper	0.10	72.45	1.25	607.44			679.88
Arthur Peter and Emma A Peter	126.90	95	Peter Lower	0.10	72.45	0.75	364.46	0.33	157.93	594.84
W S Quigley & Icie A Quigley	69.00	94	Quigley & Cliff	0.10	72.45	0.75	364.46			436.91
Walter E Cliff & Ruth M Cliff	168.40	94	Quigley & Cliff	0.10	72.45	0.75	364.46	0.63	303.72	740.63
S S Openshaw, Gerald Openshaw, & Gene Openshaw	Stockwater	95A	Lights Creek	0.05	36.22					36.22
C H Taresh & H W Awbrey Lumber Company	Industrial	104	Taresh Mill	0.20	144.89					144.89
Subtotals, Schedule 4 - Lights Creek Group	2,131.70			6.90	4,998.79	18.98	9,220.91	1.85	899.01	15,118.71
Schedule 5: Claimants from Streams in Upper Tributary Area										
Clover Valley Lumber Company	40.00	2A	Lowe	0.20	144.89	0.25	106.12			251.01
Clover Valley Lumber Company	50.00	2B	Hallet	0.20	144.89	0.30	127.34			272.23
United States of America	12.00	2	Boulder Creek	0.20	144.89	0.05	21.22			166.12
Clover Valley Lumber Company	42.60	3, 4	Antelope North, Antelope East	0.10	72.45	0.35	148.56			221.01
F W Flux and Alma A Flux	45.70	5	Flux Antelope	0.10	72.45	0.28	116.73			189.17
W S Quigley & Icie A Quigley	39.60	6, 7	Quigley Upper Antelope, Quigley Antelope Springs	0.10	72.45	0.28	116.73			189.17
Jack W Humphrey	32.80	8, 9	Humphrey West, Humphrey East	0.10	72.45	0.18	74.28			146.73
Claude Harwood and LaViena Harwood	43.70	7E	Fitch Canyon	0.10	72.45	0.30	127.34			199.79
Elbert R Spraker & Roy E Harwood	8.60	7A	S & H Cabin	0.10	72.45	0.05	21.22			93.67
Elbert R Spraker & Roy E Harwood	35.60	7B	Thompson Creek	0.10	72.45	0.20	84.89			157.34
Clover Valley Lumber Company	13.50	7C	Doyle Upper	0.10	72.45	0.05	21.22			93.67
Clover Valley Lumber Company	13.70	7D	Doyle Lower	0.10	72.45	0.05	21.22			93.67

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Clover Valley Lumber Company	63.40	9B	Doyle Last Chance	0.20	144.89	0.35	148.56			293.45
Howard Bass, Warren Bass, Dudley Bass, Claude Bass, deceased	26.50	9C	Bass	0.10	72.45	0.15	63.67			136.12
Howard Bass, Warren Bass, Dudley Bass, Claude Bass, deceased	9.80	9D	Bass Cabin	0.10	72.45	0.05	21.22			93.67
Howard Bass, Warren Bass, Dudley Bass, Claude Bass, deceased	11.00	9E	Upper Poison	0.10	72.45	0.05	21.22			93.67
Howard Bass, Warren Bass, Dudley Bass, Claude Bass, deceased	24.50	9F	Lower Poison	0.10	72.45	0.15	63.67			136.12
Clark C Rowland	38.60	10, 10A	Rowland Dixie Creek, Rowland Power	0.20	144.89	0.18	74.28			219.17
Westover Company	617.00	11, 12, 13, 14, and 15	Dixie Upper West, Dixie upper East, Dixie Upper Meadow Dam, Dixie Middle Mdw Dam	0.50	362.23	4.25	1,803.97			2,166.20
Westover Company	58.50	28	Clover Overflow	0.30	217.34	0.25	106.12			323.45
Westover Company	24.50	105	Clover Valley Ranch Spring	0.20	144.89					144.89
George Humphrey	560.00	17 through 27	Upper Dotta Neck, North Spring Clover Upper, Clover Middle, Clover North Meadow, Clover South Meadow, Clover Lower, Spring Ch Upper Spring Ch Lower, Crocker Creek Crocker Old Channel	1.00	724.46	3.50	1,485.62			2,210.08
R H Conklin	270.00	16, 29	Guidici Dixie, Guidici Clover	0.50	362.23	2.00	848.93			1,211.16

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Allotments Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Total Allotments, Face Value (AF)
Clover Valley Lumber Company	Industrial	-	Upper Tributary of Stream System	1.00	724.46					724.46
Subtotals, Schedule 5 - Upper Tributary Area Group	2,081.60			5.80	4,201.88	13.25	5,624.13	0.00	0.00	9,826.02
Schedule 6, Indian Creek in Genesee and Indian Valleys Group										
J LaRue Robinson & Elizabeth Evans Robinson	362.90	36	Robinson	0.78	565.08	4.50	2,186.78			2,751.86
P R Evans	14.10	36, 37	Robinson, Evans	0.02	14.49	0.20	97.19			111.68
Joseph C Kaitner	8.80	30, 31, 32	Pratt Upper, Pratt Lower, Pratt House	0.10	72.45	0.20	97.19			169.64
Department of Veteran Affairs & Edward D Riehl & Helen Riehl	116.60	33, 34, 35	Curnow Upper, Curnow Pasture, Curnow	0.50	362.23	1.35	656.03			1,018.26
J W Goodhue	Domestic & Power	38	Goodhue	0.50	362.23	9.50	4,616.53			4,978.76
John B Sobrero & Lena M Sobrero	0.50	38A, 38B	Sobrero Field, Sobrero House	0.10	72.45					72.45
Mary Sobrero, Heirs	5.30	39, 40	Sobrero East, Sobrero West	0.10	72.45	0.20	97.19			169.64
Willoughby T Grace and Helen M Grace	291.70	41, 42, 43, 44	Ward Upper West, Ward Middle West, Ward East, Ward Pipeline	1.00	724.46	4.50	2,186.78			2,911.24
Plumas Land Company	Mining	46, 47	Walker Flume, Walker Pipe	2.00	1,448.93					1,448.93
Willoughby T Grace and Helen M Grace	96.80	48, 49	Grizzly Upper, Grizzly Lower	1.00	724.46	1.40	680.33			1,404.79
Willoughby T Grace and Helen M Grace	46.80	45	Hosselkus	0.45	326.01					326.01
W J Beacom	18.00	50	Beacom	0.40	289.79	0.35	170.08			459.87
W J Beacom	Fish Culture	50	Beacom	0.50	362.23					
William F Masters	66.30	51, 52	Barnes East, Barnes West	0.50	362.23	0.83	403.34			765.57

							Allotments			
Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Total Allotments, Face Value (AF)
James G Young, William G Young, George W Young, and Hazel Dolphin	Municipal	53	Taylorsville	1.00	724.46					724.46
Claude E Young & Ivy M Young	28.10	54	Mill Race	0.50	362.23	1.00	485.95			848.18
W H Dolphin	153.40	54	Mill Race	0.73	528.86	1.47	714.35			1,243.20
H C Neer and Eva M Neer	110.00	54	Mill Race	1.00	724.46	0.60	291.57			1,016.03
Lloyd E Hardgrave & John A Hardgrave	233.70	54	Mill Race	1.52	1,101.18	1.03	500.53			1,601.71
Lloyd E Hardgrave & John A Hardgrave	24.30	54	Mill Race	0.15	108.67	0.30	145.79			254.45
Colburn J Smith and Wilma T Smith	167.90	54	Mill Race	0.75	543.35	1.65	801.82			1,345.17
Samuel F Brown, Hazel Brown and Fletcher L Brown	298.10	54	Mill Race	1.00	724.46	2.70	1,312.07			2,036.53
Lee G Johnson	370.80	54	Mill Race	1.00	724.46	3.60	1,749.42			2,473.88
S S Openshaw, Gerald Openshaw and Gene Openshaw	693.40	54	Mill Race	1.00	724.46	7.60	3,693.22			4,417.69
Paul Sobrero & Helen Sobrero	144.50	54	Mill Race	0.67	485.39	1.13	549.12			1,034.51
Samuel F Brown and Hazel Brown	230.60	54	Mill Race	0.50	362.23	2.40	1,166.28			1,528.51
Samuel F Brown and Hazel Brown	249.20	54	Mill Race	1.00	724.46	2.10	1,020.50			1,744.96
T L Hannon & H S Hannon	78.80	54	Mill Race	0.32	231.83	0.70	340.17			571.99
George F Osmeyer & Jane Osmeyer	6.20	54	Mill Race	0.01	7.24	0.07	34.02			41.26
L E Wheelock & Nellie Wheelock	123.50	54	Mill Race	0.50	362.23	1.00	485.95			848.18
Albert A Toscani, Ernest J Toscani, Chester M Toscani, and Arthur F Toscani	345.60	54	Mill Race	1.00	724.46	2.70	1,312.07	0.60	291.57	2,328.10
A J Sheehan & C J Sheehan	68.70	54	Mill Race			0.20	144.89	0.65	315.87	460.76
David R Strong	57.40	54	Mill Race			0.20	144.89	0.55	267.27	412.17
B B Gregory & Estella E Gregory	32.40	54	Mill Race			0.20	144.89	0.20	97.19	242.08
J E Cardoza & Marion Cardoza	72.40	54	Mill Race					2.15	1,044.79	1,044.79
S S Openshaw, Gerald Openshaw and Gene Openshaw	238.50	55	Snyder			0.40	289.79	3.00	1,457.85	1,747.64
H C Neer and F C Neer	200.00	57A	Neer Pump					2.50	1,811.16	1,811.16
Mrs. A L Gorbet	46.50	58A	Gorbet Pump					0.60	434.68	434.68
A J Sheehan & C J Sheehan	32.00	58B	Sheehan Pump					0.40	289.79	289.79
Subtotal, Schedule 6 - Indian Creek in Genesee and Indian Valleys Group	5,033.80			20.60	14,923.93	54.08	26,518.71	10.65	6,010.17	47,452.81
Schedule 7, "Special Class" Rights on Indian Creek Stream System										
Marian A Flood Norma A Flood	Domestic and resort	125	Hamblin Springs	0.06	43.47					43.47
Fred Prasun & Medie Prasun	6.00	125A	Hamblin Springs Collecting	0.15	108.67					108.67
Alford S Calais & Nellie A Calais	See Schedule 3	127	Short Spring	0.10	72.45					72.45
Bidwell Water Company	Municipal	129	Buckeye Ravine Pipeline	Entire Flow						0.00
Forest Lodge Resort	Domestic and resort	130	Clark Ravine	0.50	362.23					362.23

							Allotments			
Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Total Allotments, Face Value (AF)
Wolf Creek Timber Company, Inc.	Domestic	130A, 130B	Western Pacific Pipeline	0.08	54.33					54.33
A O Lewis	Domestic	131	Schieser Spring Pipeline	0.02	14.49					14.49
Wesley T Wheeler & Idella C Wheeler	Domestic	131	Schieser Spring Pipeline	0.01	7.24					7.24
W B Perry, R L Perry, Ivy Mae Heald, and Susie Perry	48.80	132	Perry Springs	0.55	398.45					398.45
L E Wheelock & Eva Neer	5.40	132	Perry Springs	0.05	36.22					36.22
United States of America in Trust	20.00	133	Hickerson West Springs	0.65	470.90					470.90
T L Hannon & H S Hannon	58.40	134, 134A	Hickerson East Springs, Hickerson Lower Spring	0.95	688.24					688.24
W B Perry, R L Perry, Ivy Mae Heald, and Susie Perry	Domestic	133	Hickerson West Springs	0.05	36.22					36.22
United States of America in Trust	22.30	135	Chico Springs	0.62	449.17					449.17
John F Davidson & Lena Davidson	12.90	136	Leggett Springs	0.10	72.45					72.45
James T Freeman & Elma L Freeman	Domestic	139A	Remick Pipeline	0.02	14.49					14.49
J B Peter	Domestic	96A	Peter Pipeline	Entire Flow						0.00
J LaRue Robinson & Elizabeth Evans Robinson	Domestic	143	School Spring Pipeline	0.001	0.72					0.72
John Davis & Evelyn Cunningham	2.00	106	Davis Spring	0.15	108.67					108.67
Willoughby T Grace & Helen M Grace	Domestic	48A	Hosselkus Spring Pipeline	Entire Flow						0.00
S S Openshaw, Gerald Openshaw, and Gene Openshaw	66.70	137	Snyder Spring	0.45	326.01					326.01
United States of America	Domestic	107A	Taylorsville Suppression Camp Pipeline	0.01	7.24					7.24
Burr J Sherick & Edith R Sherick	0.90	108	Hotel Pipe	0.025	18.11					18.11
G R Clark	Domestic	109	Clark Pipe	0.02	14.49					14.49
Mabel Taresh	0.20	109	Clark Pipe	0.02	14.49					14.49

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Allotments Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Total Allotments, Face Value (AF)
A E Viacava	34.60	110, 111, 112	Viacava Upper, Viacava Middle, Viacava Lower	0.50	362.23					362.23
United States of America in Trust	6.00	112A	Smith & Jenkins	0.23	166.63					166.63
S S Openshaw, Gerald Openshaw, and Gene Openshaw	269.70	113, 114	Hough Creek Upper, Hough Creek Lower	3.40	2,463.17					2,463.17
Plumas Unified School District	Domestic	108	Hotel Pipe	0.025	18.11					18.11
J E Cardoza and Marion Cardoza	42.50	114A, 114B	Cardoza	0.55	398.45					398.45
J E Cardoza and Marion Cardoza	99.10	115 & 115A	Cardoza Springs	1.00	724.46					724.46
August C Frohlich	8.90	123	Crescent	0.15	108.67					108.67
H C Neer	1.00	123	Crescent	0.02	14.49					14.49
Sorsoli Water Company	Municipal	123	Crescent	0.13	94.18					94.18
B B Gregory & Estella E Gregory	2.00	123A	Domestic Spring Pipeline	0.05	36.22					36.22
Margaret Frizzie, Frances Frizzie, and Theresa Frizzie	Domestic & Industrial	118	Frizzie	1.50	1,086.69					1,086.69
Dawn Institute of Science & Art	Domestic	119	Indian Falls	0.01	8.69					8.69
Subtotal, Schedule 7 - "Special Class" Rights Group	707.40			12.148	8,800.77					8,800.77
Schedule 8, "Surplus Class" Rights on Indian Creek Stream System										
Jack W Humphrey	90.00	9A	Humphrey Last Chance					0.65	275.90	275.90
George Humphrey	245.00	23, 25, 26, 27	Clover Lower, Spring Channel Lower, Crocker Creek, Crocker Old Channel					1.75	742.81	742.81
Westover Company	320.00	11, 12, 27 1/2	Dixie Upper West, Dixie Upper East, Crocker Lower					2.30	976.26	976.26
R H Conklin	398.00	16, 29	Guidici Dixie, Guidici Clover					3.00	1,273.39	1,273.39

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Allotments Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Total Allotments, Face Value (AF)
W E Cooper, Ed Cooper & J A Ritchy	Mining	85C	Proposed Cooper					0.50	212.23	212.23
S S Openshaw, Gerald Openshaw, and Gene Openshaw	15.60	95A	Proposed Lights Creek					0.125	53.06	53.06
C H Taresh and H W Awbrey Lumber Company	17.00	104	Taresh Mill Pump					0.125	53.06	53.06
William F Masters	76.20	51, 52A	Barnes East, Proposed Barnes Pump					0.76	322.59	322.59
E T Kunzler & Edna M Kunzler	36.00	--	Proposed					0.24	101.87	101.87
Almanor Lumber Company	8.40	--	Proposed					0.06	25.47	25.47
Subtotal, Schedule 8 - "Surplus Class" Rights	1,206.20							9.51	4,036.64	4,036.64
Special Class Claimants										
Bidwell Water Company	Municipal	64	Round Valley Reservoir		4,800.00	Winter season				
K R Doyle and Murray Doyle	Domestic, Stockwater, Irrigation	7F	Doyle Reservoir		45.00	Winter Season				
Subtotal, Special Class Claimants					4,845.00					
Surplus Class Claimants										
J LaRue Robinson & Elizabeth Evans Robinson	Domestic, Stockwater	1	Taylor Lake		200.00					
Charles H Bryson Sr and Estate of Kathryn Bryson	Domestic, Resort	117	Avrit Pipe Line	0.02	11.59	Continuous, Year-long				
Dawn Institute of Science & Art	Domestic, Resort	120	Jackson Springs Pipe Line	1.25	905.58	Continuous, Year-long				
Subtotal, Surplus Class Claimants				1.27	1,117.17					

Summary of Indian Creek Adjudication	Acreage to be supplied	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Total Allotments, Face Value (AF)
Schedule 3 - Wolf Creek Group	1,838.70	8.38	5,837.26	10.90	5,296.86	3.35	1,627.93	12,762.05
Schedule 4 - Lights Creek Group	2,131.70	6.90	4,998.79	18.98	9,220.91	1.85	899.01	15,118.71
Schedule 5 - Upper Tributaries Group	2,081.60	5.80	4,201.88	13.25	5,624.13	0.00	0.00	9,826.02
Schedule 6 - Indian Creek in Genesee & Indian Valleys Group	5,033.80	20.60	14,923.93	54.08	26,518.71	10.65	6,010.17	47,452.81
Schedule 7 - Special Class Group	707.40	12.148	8,800.774	0.000	0.000	0.000	0.000	8,800.774
Schedule 8 - Surplus Class Group	1,206.20	0.00	0.00	0.00	0.00	9.51	4,036.64	4,036.64
Subtotal, Special Class Claimants								4,845.00
Subtotal, Surplus Class Claimants								1,117.17
Total Face Value (AF), Indian Creek Decree	12,999.40	53.83	38,762.64	97.21	46,660.61	25.36	12,573.75	103,959.17

Middle Fork Feather River (and Its Tributaries Above Beckwith) Decree
County of Plumas, Case No. 3095

Seasons of Use

Continuous, regardless of season	365.25	days
March 1 through October 31	245.00	days
March 15 through September 30	200.00	days

				Allotments													
Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Fifth Priority Class (cfs)	Fifth Priority Face Value (AF)	Total Allotments, Face Value (AF)	Check, total CFS
Schedule 3, Claimants from Last Chance Creek and Its Tributaries above Adams Neck															
C C Rowland & Ida May Rowland	180.40	1, 2, 3	Rowland Upper North and South, Rowland Lower South, Rowland Lower North	2.30	912.40									912.40	2.30
C C Rowland & Ida May Rowland	57.70	4	Rowland South Creek	0.70	277.69									277.69	0.70
Alessio Ramelli & Adelina Ramelli	151.40	5, 6, 7	Ramelli, Hall & Ramelli, Ramelli Spring Channel	1.90	753.72									753.72	1.90
Marietta Hall	15.40	6, 7	Hall & Ramelli, Ramelli Spring Channel	0.25	99.17									99.17	0.25
Elsie Herz Golden	16.00	8	Trosi Last Chance	0.28	111.07									111.07	0.28
Elsie Herz Golden	7.00	8A	Trosi Dooley Canyon	0.12	47.60									47.60	0.12
Elsie Herz Golden	11.50	9	Trosi Dixie Creek	0.20	79.34									79.34	0.20
Elsie Herz Golden	57.60	11, 11A	Trosi Grigsby Creek, Trosi Cabin	0.45	178.51	0.50	198.35							376.86	0.95
Charles A Galeppi, Fred E Galeppi, Leo B Galeppi, and Rosa Galeppi	257.80	10, 12	Galeppi Upper Last Chance, Galeppi Lower Last Chance	3.25	1,289.26									1,289.26	3.25
Charles A Galeppi, Fred E Galeppi, Leo B Galeppi, and Rosa Galeppi	78.70	11A, 248, 249	Galeppi Grigsby Creek & Trosi Cabin, Galeppi North Springs, Galeppi South Springs	1.00	396.69									396.69	1.00
Elsie Herz Golden	111.10	13, 18	Trosi Camp, Trosi Spring Creek	1.60	634.71									634.71	1.60
Elsie Herz Golden	41.00	20	Trosi Frenchman Creek	0.70	277.69									277.69	0.70
Fred P Giudici and Myrtle W Giudici	103.30	14, 15	Giudici Upper Spring Creek, Giudici Lower Spring Creek	1.30	515.70									515.70	1.30
Charles A Galeppi, Fred E Galeppi, Leo B Galeppi, and Rosa Galeppi	161.10	15, 17	Galeppi Spring Creek, Galeppi Creek	2.00	793.39									793.39	2.00
Emilio Ramelli	76.20	19	Ramelli and Dotta Frenchman Creek	1.00	396.69									396.69	1.00

Middle Fork Feather River (and Its Tributaries Above Beckwith) Decree
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March 15 through September 30	200.00	days

				Allotments											
Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Fifth Priority Class (cfs)	Fifth Priority Face Value (AF)	Total Allotments, Face Value (AF)	Check, total CFS
Frank Dotta	64.90	19	Ramelli and Dotta Frenchman Creek	0.80	317.36									317.36	0.80
Frank Dotta	10.00	250, 251	Dotta Frenchman Creek Spring, Galeppi and Dotta Spring	0.15	59.50									59.50	0.15
Subtotal, Schedule 3 - Last Chance Creek Group	1,401.10			18.00	7,140.50	0.50	198.35	0.00	0.00	0.00	0.00	0.00	0.00	7,338.84	18.50
Schedule 4, Claimants from Last Chance Creek and Its Tributaries below Frenchman Creek															
Fred P Giudici and Myrtle W Giudici	285.40	21, 22	F P Giudici Upper, F P Giudici Lower	4.80	1,904.13		0.00		0.00		0.00		0.00	1,904.13	4.80
Mauricilio Giudici & Julie Giudici	62.30	21,22	F P Giudici Upper, F P Giudici Lower	0.95	376.86							0.60		376.86	1.55
Alex E Giudici	180.00	23	A E Giudici Dams	2.00	793.39	1.00	396.69							1,190.08	3.00
Guy Sobrio & Carmelinia Sobrio	187.10	24, 25	Sobrio Upper Dam, Sobrio Lower Dam	1.00	396.69	1.40	555.37					0.60		952.07	3.00
Elsie Herz Golden	146.80	23, 26, 27, 28	A E Giudici Dams, Trosi Upper, Trosi Middle, Trosi Lower			1.70	674.38	0.15	59.50					733.88	1.85
Frank Dotta	370.00	28, 29, 30, 31	Trosi Lower, F V Dotta Upper, F V Dotta Middle, F V Dotta Lower			2.70	1,071.07			0.85	337.19	0.85		1,408.26	4.40
Emilio Ramelli	81.20	31, 32	F V Dotta Lower, Ramelli North Channel			1.05	416.53							416.53	1.05
Emilio Ramelli	21.50	32, 57	Ramelli North Channel, M B Humphrey West Side			0.25	99.17							99.17	0.25
Philip E Ede & Sophia L Ede	220.20	31, 33, 34	F V Dotta Lower, Ede Schoolhouse, Ede Lower					2.75	1,090.91					1,090.91	2.75
Edmond J Goble & Ida C Goble	251.00	35, 36, 37	Goble Upper North Channel, Goble Middle North Channel, Goble Lower North Channel					2.65	1,051.24	0.50	198.35			1,249.59	3.15
Daniel M Scott & Gemma Solari Scott	126.60	37, 38	Goble Lower North Channel, Solari North Channel					1.65	654.55					654.55	1.65
C D Laffranchini & Marie C Laffranchini	132.70	39	Laffranchini North Channel					0.60	238.02	1.20	476.03			714.05	1.80

Middle Fork Feather River (and Its Tributaries Above Beckwith) Decree
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March 15 through September 30	200.00	days

				Allotments											
Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Fifth Priority Class (cfs)	Fifth Priority Face Value (AF)	Total Allotments, Face Value (AF)	Check, total CFS
Jennie F Huntley	410.90	39, 40, 41, 42	Laffranchini North Channel, Huntley Upper North Channel, Huntley Middle North Channel, Huntley Lower North Channel							3.05	1,209.92	1.80	714.05	1,923.97	4.85
Josephine Roberti	200.90	43, 44, 45	Wherity North, Wherity South, Wherity Upper Dam							1.65	654.55	0.35	138.84	793.39	2.00
C D Laffranchini & L A Laffranchini	259.70	43 ,44, 46	Wherity North, Wherity South, Wherity Lower Dam							1.65	654.55	0.95	376.86	1,031.40	2.60
J A Bonta & S A Bonta	260.10	47, 48, 49	Bonta North, Bonta South, Bonta Meadow							1.00	396.69	1.60	634.71	1,031.40	2.60
C D Laffranchini & L A Laffranchini	171.00	50, 51	Dedmon North, Dedmon South									1.70	674.38	674.38	1.70
L D Maddalena	70.90	52, 53	Maddalena South, Maddalena North									0.70	277.69	277.69	0.70
M B Humphrey	68.40	56, 57	M B Humphrey East Side, M B Humphrey West Side			4.60	1,824.79	0.40	158.68			0.85	337.19	2,320.66	5.85
Emilio Ramelli	72.30	58	Ramelli Vinton			1.10	436.36					0.05	19.83	456.20	1.15
Emilio Ramelli	42.00	59, 60	Ramelli Railroad Dam, Ramelli Lower Dam					0.45	178.51			0.10	39.67	218.18	0.55
Alessio Ramelli & Adelina Ramelli	166.40	57, 58	M B Humphrey West Side, Ramelli Vinton					1.70	674.38			0.40	158.68	833.06	2.10
Alessio Ramelli & Adelina Ramelli	142.50	59, 60	Ramelli Railroad Dam, Ramelli Lower Dam					1.80	714.05					714.05	1.80
Edmond J Goble & Ida C Goble	21.00	57, 58	M B Humphrey West Side, Ramelli Vinton					0.25	99.17					99.17	0.25

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March 1 through October 31	245.00	days
March 15 through September 30	200.00	days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotments First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Fifth Priority Class (cfs)	Fifth Priority Face Value (AF)	Total Allotments, Face Value (AF)	Check, total CFS
Daniel M Scott & Gemma Solari Scott	188.10	61, 62, 63	Solari Upper East Channel, Solari Middle East Channel, Solari Lower East Channel					1.85	733.88			0.50	198.35	932.23	2.35
C D Laffranchini & Marie C Laffranchini	305.00	64, 65, 66	Laffranchini Upper East Channel, Laffrancini Middle East Channel, Laffranchini East Channel Division					1.35	535.54	1.95	773.55	0.50	198.35	1,507.44	3.80
Jennie F Huntley	288.80	65, 66, 68, 71, 72	Laffranchini Middle East Channel, Laffranchini East Channel Division, Roberti Upper, Huntley Upper East Channel Huntley Lower East Channel							2.55	1,011.57	1.10	436.36	1,447.93	3.65
M B Humphrey	288.30	67, 70, 72	Dicen Division, Roberti Lower Channel, Huntley Lower East Channel							2.50	991.74	1.10	436.36	1,428.10	3.60
Josephine Roberti	311.70	67, 68, 69, 70	Dicen Division, Roberti Upper, Roberti Lower, Roberti Lower Channel							2.90	1,150.41	1.00	396.69	1,547.11	3.90
Bernard E Giudici & Rudolph E Giudici	141.30	73, 98	Dicen Dam, Giudici East Dam									2.35	932.23	932.23	2.35
Subtotal, Last Chance Creek below Frenchman Creek Group	5,474.10			8.75	3,471.07	13.80	5,474.38	15.60	6,188.43	19.80	7,854.55	17.10	5,970.25	28,958.68	75.05
Schedule 5, Claimants from Last Chance Creek Below Adams Neck															
Philip E Ede & Sophia L Ede	212.00	31, 33	F V Dotta Lower, Ede Schoolhouse			0.45	178.51	0.45	178.51					357.02	0.90
Edmond J Goble & Ida C Goble	650.70	35	Goble Upper North Channel			0.70	277.69	1.40	555.37					833.06	2.10
Daniel M Scott & Gemma Solari Scott	120.30	38	Solari North Channel			0.50	198.35							198.35	0.50

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Seasons of Use

Continuous, regardless of season	365.25	days
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March 15 through September 30	200.00	days

				Allotments											
Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Fifth Priority Class (cfs)	Fifth Priority Face Value (AF)	Total Allotments, Face Value (AF)	Check, total CFS
C D Laffranchini & Marie C Laffranchini	447.90	39, 64, 67	Laffranchini North Channel, Laffranchini Upper East Channel, Dicen Division			0.35	138.84	1.20	476.03					614.88	1.55
Jennie F Huntley	123.50	39, 65	Laffranchini North Channel, Laffranchini Middle East Channel			0.45	178.51							178.51	0.45
J A Bonta & S A Bonta	203.30	47, 48, 49	Bonta North, Bonta South, Bonta Meadow	1.75	694.21	0.10	39.67							733.88	1.85
C D Laffranchini & L A Laffranchini	60.00	50, 51	Dedmon North, Dedmon South	0.60	238.02									238.02	0.60
L D Maddalena	69.00	52, 53	Maddalena South, Maddalena North	0.40	158.68	0.10	39.67							198.35	0.50
Westover Company	45.00	54, 55	Noble North, Noble South	0.45	178.51									178.51	0.45
Alessio Ramelli & Adelina Ramelli	31.50	60	Ramelli Lower Dam					0.15	59.50					59.50	0.15
M B Humphrey	380.00	67, 70, 72	Dicen Division, Roberti Lower Channel, Huntley Lower East Channel			1.60	634.71							634.71	1.60
Smithneck Creek**		67, 73	Dicen Division, Dicen Dam					3.50						0.00	3.50
Antone E Dotta	45.10	67, 108	Dicen Division, A E Dotta East Channel			0.20	79.34							79.34	0.20
Amelia Ramelli	135.80	70	Roberti Lower Channel			0.55	218.18							218.18	0.55
Louisa Scolari, Ida A Scolari, Celia D Fallon, P R Scolari, R A Scolari, Olivia R Roberti, Lydia H Westover	51.50	70	Roberti Lower Channel			0.20	79.34							79.34	0.20
James L Humphrey	16.40	70	Roberti Lower Channel			0.10	39.67							39.67	0.10
Josephine Roberti	11.00	70	Roberti Lower Channel			0.05	19.83							19.83	0.05
Bernard E Giudici & Rudolph E Giudici	113.00	73	Dicen Dam			0.35	138.84	0.25	99.17					238.02	0.60
Subtotal, Last Chance Creek Group Below Adams Neck	2,716.00			3.20	1,269.42	5.70	2,261.16	6.95	1,368.60	0.00	0.00	0.00	0.00	4,899.17	15.85
Schedule 6, Claimants from Smithneck Creek and Tributaries															
Eddie John Trosi & Dolly Conradt	73.00	77A	Trosi Mountain	1.20	869.36									869.36	1.20
Clover Valley Lumber Company	70.30	77, 78	Mountain Ranch West Side, Mountain Ranch East Side	1.20	869.36									869.36	1.20

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Clover Valley Lumber Company	180.70	88, 89	Cobb, Mill Pond Dam	1.40	1,014.25							0.25	99.17	1,113.42	1.65
Mary C Laffranchini	46.40	79, 80	Lombardi West, Lombardi East	0.70	507.12									507.12	0.70
Mary C Laffranchini	154.70	84, 85, 252	Turner South, Turner North, Lombardi Canyon	2.20	1,593.82									1,593.82	2.20
Caesar P Lombardi	Domestic	81	Upper Concrete Dam	0.04	28.98									28.98	0.04
Clover Valley Lumber Company	164.70	81, 82, 83	Upper Concrete Dam, Middle East, Turner Channel	1.30	941.80	1.00	724.46			0.45	178.51			1,844.78	2.75
First National Bank of Nevada	151.80	82, 87	Middle East, Lewis Bros. East	0.20	144.89	1.05	760.69					0.35	138.84	1,044.42	1.60
J S Rees	30.40	86, 253	Lewis Bros. West, Loyalton Pipe	0.50	362.23									362.23	0.50
J S Rees	182.20	87, 89	Lewis Bros. East, Mill Pond Dam	1.30	941.80	0.40	158.68					0.45	178.51	1,278.99	2.15
J S Rees	Municipal	253	Loyalton Pipe	0.60	434.68									434.68	0.60
Max Dory & May Dory	60.40	90, 91	Division Dams, Dory East Channel			0.95	376.86							376.86	0.95
Max Dory & May Dory	46.90	110	Dory West	0.30	217.34	0.15	59.50							276.84	0.45
Ode Grandi	18.00	90	Division Dams									0.10	39.67	39.67	0.10
Louis S Lombardi	34.70	110	Dory West									0.20	79.34	79.34	0.20
Sierra Valley Bank	58.20	110	Dory West									0.25	99.17	99.17	0.25
Alice Giudici, Frances Giudici, & Stephen Giudici	83.30	92	Giudici East Channel			1.05	760.69							760.69	1.05
Leon F Dotta	87.80	92	Giudici East Channel			0.50	362.23	0.60	238.02					600.25	1.10
Raffaele Dotta	120.00	92	Giudici East Channel			0.65	470.90	0.70	277.69					748.59	1.35
Raffaele Dotta	118.00	94, 95	R Dotta West, R Dotta Main Dam			1.30	515.70							515.70	1.30
May Dory & Cora V Keyes	66.00	93	Keyes East			0.85	337.19							337.19	0.85
Albert C Dotta & Caesar Dotta	160.00	94, 95	R Dotta West, R Dotta main Dam			1.80	714.05							714.05	1.80
Albert C Dotta & Caesar Dotta	299.80	96, 97	A & C Dotta East, A & C Dotta East Dam			3.40	1,348.76							1,348.76	3.40
Bernard E Giudici & Rudolph E Giudici	140.30	98,99,106	Giudici East Dam, Junction Dam, Lower Middle Channel			1.60	634.71							634.71	1.60
Alice Giudici, Frances Giudici, & Stephen Giudici	62.00	100	Giudici Middle			0.85	337.19							337.19	0.85
May Dory & Cora V Keyes	94.00	100, 101	Giudici Middle, Keyes Middle			1.15	456.20							456.20	1.15

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March 15 through September 30	200.00	days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotments First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Fifth Priority Class (cfs)	Fifth Priority Face Value (AF)	Total Allotments, Face Value (AF)	Check, total CFS
Julio Genasci & Angie Genasci	410.60	102, 103	upper Dotta Genasci, Lower Dotta Genasci			3.70	1,467.77	0.60	238.02			0.15	59.50	1,765.29	4.45
Albert C Dotta & Caesar Dotta	345.50	102, 103, 104, 105	upper Dotta Genasci, Lower Dotta Genasci, A & C Dotta Middle, A & C Dotta			3.25	1,289.26	1.05	416.53					1,705.79	4.30
Bernard E Giudici & Rudolph E Giudici	86.40	99, 106	Home Ranch Junction Dam, Lower Middle Channel			0.75	297.52	0.25	99.17					396.69	1.00
Attilio R Genasci & Louis Genasci	298.60	111, 112	Genasci Upper Field, Genasci Lower Field			2.95	2,137.17	0.80	317.36					2,454.52	3.75
Perpetum Genasci	60.00	110	Dory West									0.24	95.21	95.21	0.24
Perpetum Genasci	5.10	111	Genasci Upper Field			0.06	43.47							43.47	0.06
Amelia D Ramelli	579.30	110, 113, 114	Dory West, Ramelli Flood, Ramelli Division			2.85	1,130.58	1.30	515.70			0.65	257.85	1,904.13	4.80
Albert C Dotta & Caesar Dotta	254.50	115	A & C Dotta West Channel			2.05	813.22	0.80	317.36					1,130.58	2.85
Antone E Dotta	78.70	115, 116	A & C Dotta West Channel, A E Dotta Upper West Channel			0.80	317.36							317.36	0.80
The Federal Land Bank of Berkeley	198.20	114, 116, 117	Ramelli Division, A E Dotta pper West Channel, A E Dotta Lower Channel					2.20	872.73					872.73	2.20
Albert C Dotta & Caesar Dotta	85.90	104	Last Chance Dam					1.05	416.53					416.53	1.05
Antone E Dotta	59.60	108	A E Dotta East Channel					0.70	277.69					277.69	0.70
Charles W Ede	38.00	108	A E Dotta East Channel					0.45	178.51					178.51	0.45
The Federal Land Bank of Berkeley	74.00	108, 109	A E Dotta East Channel, A E Dotta Lower					0.80	317.36					317.36	0.80
M B Humphrey	94.20	114	Ramelli Division					0.30	119.01			0.25	99.17	218.18	0.55
M B Humphrey	355.00	118	Ede Lake					1.60	634.71	2.40	952.07				4.00
Charles W Ede	157.90	108, 118	A E Dotta East Channel, Ede Lake							1.75	694.21			694.21	1.75
Francis A Bradley, Jr.	130.60	119	Ede Lake Cut							1.50	595.04			595.04	1.50
Antone E Dotta	70.90	119	Ede Lake Cut							0.90	357.02			357.02	0.90
Subtotal, Claimants from Smithneck Creek and Its Tributaries Group	5,886.60			10.94	7,925.62	33.11	15,514.15	13.20	5,236.36	7.00	2,776.86	2.89	1,146.45	31,012.66	67.14

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Schedule 7, Claimants from West Side Canal and its Tributaries (Hamlin, Miller and Turner Creeks)

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotments First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Fifth Priority Class (cfs)	Fifth Priority Face Value (AF)	Total Allotments, Face Value (AF)	Check, total CFS
Henry Dotta	431.80	158, 159, 161, 162, 261	H Dotta Upper South, H Dotta Lower South, H Dotta North Channel, H Dotta South Channel, H Dotta Springs	2.00	1,448.93	3.05	1,209.92	0.90	357.02	0.20	79.34			3,095.21	6.15
A E Strang	555.60	160, 161, 163, 164	H Dotta Old Power, H Dotta North Channel, Strang Upper, Strang Lower	1.00	724.46	4.60	1,824.79	1.20	476.03	0.20	79.34			3,104.63	7.00
Delia R Martinetti	29.60	165	Martinetti & Miller			0.40	158.68							158.68	0.40
Delia R Martinetti	238.00	165, 166	Martinetti & Miller, Miller Hamlin	0.10	72.45	0.90	357.02	0.75	297.52	0.85	337.19			1,064.18	2.60
A E Strang	86.50	167	Miller - Strang	0.40	289.79	0.80	317.36							726.99	2.60
A E Strang	24.00	170, 167	Miller - Strang, Strang & Martinetti Lower Field			0.35	138.84							138.84	0.35
Delia R Martinetti	60.00	167	Miller - Strang			0.80	317.36							317.36	0.80
Delia R Martinetti	274.10	168, 169, 170	Martinetti Upper East Channel, Martinetti Middle East Channel, Strang & Martinetti Lower Field	0.50	362.23	3.00	1,190.08							1,552.31	3.50
Delia R Martinetti	74.40	171, 173	Martinetti Upper West Channel, Martinetti Middle West Channel			0.95	376.86							376.86	0.95
Delia R Martinetti	20.00	174	Martinetti Lower West Channel					0.25	99.17					99.17	0.25
Delia R Martinetti	199.20	172	Cavitt Miller Creek	0.30	217.34	2.20	872.73							1,090.07	2.50
B F Myers and C B Myers	20.00	174	Martinetti Lower West Channel					0.25	99.17					99.17	0.25
B F Myers and C B Myers	147.20	202	Turner Mounds	0.10	72.45	0.40	289.79	1.35	535.54					897.77	1.85
Kate L Devine	74.90	174, 175	Martinetti Lower West Channel Miller Creek Mounds Channel	0.10	72.45			0.40	158.68					231.12	0.50
Albert B Church	105.00	175	Miller Creek Mounds Channel	0.10	72.45			1.20	476.03					548.48	1.30

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				Allotments											
Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Fifth Priority Class (cfs)	Fifth Priority Face Value (AF)	Total Allotments, Face Value (AF)	Check, total CFS
M O Binninger, J M Binninger, & Ardis L Binninger	117.00	175	Miller Creek Mounds Channel	0.10	72.45			1.35	535.54					607.98	1.45
Frank R Turner, Earl Turner, and Gene Turner	42.20	175, 187	Miller Creek Mounds Channel, Church Lower Turner Creek Meadow	0.10	72.45			0.40	158.68					231.12	0.50
Frank R Turner, Earl Turner, and Gene Turner	80.00	175, 202	Miller Creek Mounds Channel, Turner Mounds	0.10	72.45			0.90	357.02					429.47	1.00
Horace G Adams	120.00	176	Adams Mounds	0.10	72.45	0.40	158.68	1.00	396.69					627.82	1.50
Delia R Martinetti	29.40	177	Martinetti Spring Brook	0.43	311.52									311.52	0.43
Delia R Martinetti	64.00	177	Martinetti Spring Brook, Cavitt Spring Brook	0.20	144.89	0.90	357.02							501.92	1.10
Delia R Martinetti	30.00	262	Cavitt Foothill Springs		0.00	0.45	178.51							178.51	0.45
Delia R Martinetti	37.70	184, 185	Church, Cavitt Turner Creek	0.20	144.89	0.45	178.51							323.40	0.65
Frank W Freeman	117.50	180	Freeman	0.60	434.68	1.20	476.03							910.71	1.80
Frank W Freeman	88.90	188	Freeman Lower Meadow	0.10	72.45			1.00	396.69					469.14	1.10
T K Turner, Earl Turner, Frank R Turner, & Gene Turner	0.20	180	Freeman	0.02	14.49									14.49	0.02
Frank R Turner, Earl Turner, and Gene Turner	78.60	181, 182	Turner West, Turner East	0.60	434.68	0.65	257.85							692.53	1.25
Frank R Turner, Earl Turner, and Gene Turner	25.00	183	Turner Canyon			0.40	158.68							158.68	0.40
Frank R Turner, Earl Turner, and Gene Turner	21.90	184, 185	Church, Cavitt Turner Creek			0.35	138.84							138.84	0.35
Frank R Turner, Earl Turner, and Gene Turner	109.40	187	Church Lower Turner Creek Meadow			0.15	59.50	0.25	99.17	1.00				158.68	1.40
Albert B Church	58.30	184	Church			0.80	317.36							317.36	0.80
Albert B Church	148.90	186	Church Upper Turner Creek	0.20	144.89	1.60	634.71							779.60	1.80
Albert B Church	134.10	187	Church Lower Turner Creek Meadow	0.20	144.89			1.50	595.04					739.93	1.70
Samuel Devine, Kate L Devine, Same H Devine, Allen B Devine, and Bradley & Wooding Trustees, Royal Union Fund	200.80	189	Clark Turner Creek Meadow	0.20	144.89			1.30	515.70	1.00	396.69			1,057.29	2.50
Estate of C W Toomey & Estate of Virginia McLean	200.00	189, 190	Clark Turner Creek meadow, Toomey Meadow	0.20	144.89					1.80	714.05	0.50	198.35	1,057.29	2.50
Isolina Pasquetti	184.70	189, 191, 202	Clark Turner Creek Meadow, Pasquetti Turner, Turner Mounds	0.20	144.89					0.80	317.36	1.30	515.70	977.95	2.30

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				First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Fifth Priority Class (cfs)	Fifth Priority Face Value (AF)	Total Allotments, Face Value (AF)	Check, total CFS
Isolina Pasquetti	302.20	204, 205	Pasquetti Upper Westside, Pasquetti Lower Westside			0.50	362.23	2.10	833.06	1.15	456.20			1,651.49	3.75
Frank R Turner, Earl Turner, and Gene Turner	109.90	202	Turner Mounds	0.20	144.89	0.30	217.34	0.90	357.02						
George A Henderson	120.00	176, 203	Adams Mounds, Henderson Westside			0.50	362.23	1.00	396.69					758.93	1.50
Battista Pasquetti	189.00	176, 204	Adams Mounds, Pasquetti Upper West Side			0.50	362.23	1.50	595.04	0.40	158.68			1,115.95	2.40
F E Humphrey, Jr.	742.30	205, 206, 207, 208, 209	Pasquetti Lower West Side, Humphrey O'Hara, Humphrey Upper, Humphrey Lower, Humphrey Home			1.50	1,086.69	5.30	2,102.48	1.60	634.71			3,823.88	8.40
F E Humphrey, Jr.	411.50	210, 214	Humphrey Division, Humphrey Freeman			0.75	543.35	2.50	991.74	1.35	535.54			2,070.62	4.60
F E Humphrey, Jr.	160.00	212, 214	Humphrey-Newman, Humphrey Division			0.50	362.23	1.10	436.36	0.30	119.01			917.60	1.90
F E Humphrey, Jr.	270.60	219, 220	Humphrey Mercer, Albini & Humphrey							3.00	1,190.08			1,190.08	3.00
John B Matley & Annie M Matley	134.30	211, 214	Matley, Humphrey Division			0.50	362.23	0.60	238.02	0.60	238.02			838.26	1.70
Fred Berry & Lillian Berry	121.20	213, 215	Berry West Side, Berry Meadow Dams			0.25	181.12			1.25	495.87			676.98	1.50
Fred Berry & Lillian Berry	110.80	214	Humphrey Division							0.90	357.02	0.50	198.35	555.37	1.40
E F Ghidossi	349.40	213, 216	Berry West Side, Ghidossi Upper Field Dams			0.25	181.12			2.55	1,011.57	1.60	634.71	1,827.40	4.40
E F Ghidossi	114.10	218	Ghidossi Lower West Side Dams			0.25	181.12			1.00	396.69	0.15	59.50	637.31	1.40
A A Viscia	158.90	216, 217	Ghidossi upper Field Dams, Casey Westside Dams			0.25	181.12			0.95	376.86	0.80	317.36	875.33	2.00
Henry Albini	61.80	220	Albini & Humphrey							0.80	317.36			317.36	0.80
James L Humphrey	127.50	220 239	Albini & Humphrey							0.80	317.36	0.60	238.02	555.37	1.40
Subtotal Schedule 7 - Claimants from West Side Canal and its Tributaries (Hamlin, Miller and Turner Creeks)	7,712.40			8.35	6,049.26	30.85	14,352.12	29.00	11,504.13	22.50	8,528.93	5.45	2,161.98	41,997.02	96.15

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March 15 through September 30	200.00	days

				Allotments											
Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Fifth Priority Class (cfs)	Fifth Priority Face Value (AF)	Total Allotments, Face Value (AF)	Check, total CFS
Schedule 8, Claimants from Fletcher Creek and Spring Channels															
Davies-Joihnson Lumber Company	134.80	192, 193, 197	Davies-Johnson House, Davies-Johnson Spring Challen	0.85	615.79	0.85	337.19							952.98	1.70
Davies-Joihnson Lumber Company	Industrial	196	Davies-Johnson Meadow Calpine Pipe											0.00	0.00
Estate of William Freeman, Frank W Freeman, Administrator	53.80	194, 198	Freeman Spring Channel, Freeman Fletcher Creek Meadow	0.10	72.45	0.60	238.02							310.46	0.70
Samuel Devine & Kate L Devine	195.10	195, 199	Devine Spring Channel, Devine Meadow	0.40	289.79	1.00	396.69	0.35	138.84					825.32	1.75
Samuel Devine, Kate L Devine, Sam H Devine Allen B Devine, and Bradley & Wooding, Trustees Royal Union Fund	200.10	199, 200	Devine Meadow Clarke Fletcher Creek Meadow	0.20	144.89	1.45	575.21	0.28	111.07					831.17	1.93
Subtotal Schedule 8, Claimants from Fletcher Creek and Spring Channels	583.80			1.55	1,122.92	3.90	1,547.11	0.63	249.92	0.00	0.00	0.00	0.00	2,919.94	6.08

Schedule 9, Allocations to Shareholders in Sierra Valley Water Company for Rediversion From Little Truckee River Water Conveyed Into Middle Fork of Feather River Stream System	No. of Shares	Allotment, cfs	Face Value Amount
Anna B Miller	700.00	7	2,697.52
G Maddalena	200.00	2	769.59
Dell L Johnson	200.00	2	769.59
Francesca G Bony & Marcel J Bony	200.00	2	769.59
Fred P Alpers	200.00	2	769.59
Ken Torri	300.00	3	1,158.35
Wilson	200.00	2	769.59
Small	125.00	1	483.97
Mabel Eur	200.00	2	769.59
Russel	750.00	7	2,887.93
Van Vleck	200.00	2	769.59
Van Vleck	100.00	1	388.76
Mello	100.00	1	388.76
Alice Vanetti	200.00	2	769.59
A Hillio	200.00	2	769.59
Russel	200.00	2	769.59
George Filippini	300.00	3	1,158.35
Russel	500.00	6	2,407.93
Russel	200.00	2	769.59
Francis A Bradley, Jr	125.00	1	483.97
S J Carmichael	525.00	4	1,527.27
Wiley (97), Howes (3)	100.00	1	404.63
Bryce Euer	150.00	1	579.17
Paul Noble	200.00	2	769.59
Subtotal, Schedule 9	6,175.00	60	23,801.65

Middle Fork Feather River (and Its Tributaries Above Beckwith) Decree
County of Plumas, Case No. 3095

Seasons of Use

Continuous, regardless of season	365.25	days
March 1 through October 31	245.00	days
March 15 through September 30	200.00	days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotments First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Fifth Priority Class (cfs)	Fifth Priority Face Value (AF)	Total Allotments, Face Value (AF)	Check, total CFS		
Schedule 10, Claimants from Middle Fork of Feather River, and Tributaries Cold, Webber, Town and Perry Creeks	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Fifth Priority Class (cfs)	Fifth Priority Face Value (AF)	Sixth Priority Class (cfs)	Sixth Priority Face Value (AF)	Total Allotments, Face Value (AF)	Check, total CFS
S C Linebaugh	6.00	127	Treasure and Camp Springs	0.04	28.98	0.08	31.74									60.71	0.12
S C Linebaugh	1.30	134	Town Pumps	0.02	14.49											14.49	0.02
John Amodei & Anna Amodei	144.60	155	Amodei	1.50	1,086.69	1.00	396.69									1,483.39	2.50
James W Morgan	67.70	156, 157	Morgan East Channel, Morgan West Channel	1.10	796.91											796.91	1.10
James W Morgan	16.90	133	Morgan, Johnson & Adams	0.10	72.45			0.18	71.40							143.85	0.28
Dell L Johnson	50.50	128, 128A	, Hohnson Cold Creek, Cook	0.20	144.89			0.80	317.36							462.25	1.00
Dell L Johnson	146.70	131, 132, 145, 258	Johnson Webber Creek, Johnson Town Creek, Webber, Diltz & Johnson, Hobo Springs	0.20	144.89	2.00	793.39	0.25	99.17							1,037.45	2.45
Dell L Johnson	60.70	133	Morgan, Johnson & Adams	0.20	144.89			0.80	317.36							462.25	1.00
Kelso N Dellera & Columbine Dellera	181.60	129	Miller-Dillera	0.50	362.23	1.35	535.54			0.45	178.51					1,076.28	2.30
Anna B Miller	129.60	129, 258A	Miller-Dellera, Miller Spring	0.50	362.23	1.35	535.54									897.77	1.85
Anna B Miller	20.00	133	Morgan, Johnson & Adams	0.27	195.60											195.60	0.27
Randolph Water Company	12.80	130	Randolph	0.50	362.23											362.23	0.50
Annie Dora Adams	2.90	133	Morgan, Johnson & Adams	0.04	28.98											28.98	0.04
Thomas E Miller	9.90	134	Town Pumps	0.04	28.98			0.15	59.50							88.48	0.19
C D Johnson	13.40	134	Town Pumps	0.05	36.22			0.20	79.34							115.56	0.25
John A McIntosh	1.00	134	Town Pumps	0.02	14.49											14.49	0.02
Fred Dolley	0.50	134	Town Pumps	0.01	7.24											7.24	0.01
Carmichael	5.40	135	Wilson Dam	0.10	72.45			0.50	198.35							270.79	0.60
Francesca G Bony & Marcel J Bony	388.70	136, 137, 138, 139	Bony Upper Dam, Bony Division Dam, Bony Middle Concrete Cam, Bony Lower Dam	0.50	362.23			5.05	2,003.31							2,365.54	5.55
Fred P Alpers & Christina Alpers	173.80	140	Alpers Lower Field	0.20	144.89			2.00	793.39							938.28	2.20
Fred P Alpers & Christina Alpers	80.00	256	Alpers Springs	0.20	144.89	0.80	317.36									462.25	1.00
Giulio Torri	321.90	142, 143, 255	Torri Upper, Torri Lower, Henderson Springs	0.20	144.89			3.80	1,507.44							1,652.33	4.00
Anna B Miller	236.00	137	Bony Division Dam	0.20	144.89					1.90	753.72	0.90	357.02			1,255.64	3.00
Anna B Miller	251.80	146	Miller Upper	0.50	362.23			2.60	1,031.40					1.00	396.69	1,790.33	4.10
Anna B Miller	132.50	147	Miller Schoolhouse					1.90	753.72							753.72	1.90

Middle Fork Feather River (and Its Tributaries Above Beckwith) Decree
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March 15 through September 30	200.00	days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotments First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Fifth Priority Class (cfs)	Fifth Priority Face Value (AF)	Total Allotments, Face Value (AF)	Check, total CFS		
Anna B Miller	326.00	149, 152	Perry Creek Division, Miller Lower Perry Creek							2.00	793.39	2.00	793.39			1,586.78	4.00
William A Diltz	8.00	145	Webber & Diltz & Johnson	0.05	36.22			0.10	39.67							75.89	0.15
Mary Ella Webber	7.00	145	Webber & Diltz & Johnson	0.05	36.22			0.10	39.67							75.89	0.15
Francesca G Bony & Marcel J Bony	91.60	147, 148A	Miller Schoolhouse, Bony Perry Dam							1.30	515.70					515.70	1.30
Horace G Adams	157.80	148	Adams	0.50	362.23			1.19	472.07	0.31	122.98					957.27	2.00
Seth Law & Florence M Law	150.00	148	Adams	0.50	362.23			1.19	472.07	0.21	83.31					917.60	1.90
Seth Law & Florence M Law	123.00	149	Perry Creek Division							1.55	614.88					614.88	1.55
Seth Law & Florence M Law	119.40	150, 151	Webber Upper, Webber Lower							1.45	575.21					575.21	1.45
George A Henderson	156.80	144, 154	Henderson Town Creek, Henderson Perry Creek	0.20	144.89					1.80	714.05					858.94	2.00
Battista Pasquetti	232.20	221	Pasquetti Dam	0.20	144.89					2.15	852.89			0.25	99.17	1,096.96	2.60
Robert L Henderson	134.70	222	East Side Slough	0.20	144.89					1.30	515.70					660.60	1.50
Alice Vanetti	227.40	222, 223	East Side Slough, Vanetti Slough	0.20	144.89					2.05	813.22					958.12	2.25
F E Humphrey Jr	1,309.70	224, 225, 226, 227, 228, 229	Humphrey Upper River, Humphrey North River, East Side, Humphrey Lower Concrete Dam, Humphrey Lower River Dam, Robbins Dam	0.70	507.12	0.80	579.57			5.20	2,062.81	3.70	1,467.77	2.70	1,071.07	5,688.35	13.10
Perpetua Genasci & Raffaele Dotta	143.10	226, 229	East Side, Robbins Dam							0.85	337.19	0.60	238.02			575.21	1.45
Cesare C Dotta	184.70	225	Humphrey North River											2.40	952.07	952.07	2.40
Cesare C Dotta	122.80	226, 230, 231	East Side, Dotta Meadow Dams, Dotta Pump			0.40	289.79			1.40	555.37					845.16	1.80
Julius Filippini	158.40	226	East Side									1.05	416.53	0.95	376.86	793.39	2.00
Julius Filippini	364.80	232, 233	Filippini Upper Meadow Dams, Filippini Lower Meadow Dams			0.50	362.23			2.30	912.40			0.85	337.19	1,611.82	3.65
M B Humphrey	222.90	226	East Side									2.20	872.73			872.73	2.20
M B Humphrey	698.70	235, 236	Mickey Meadow, Mickey East Side Dam							3.20	1,269.42	2.30	912.40	1.50	595.04	2,776.86	7.00

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Amelia D Ramelli	102.30	226	East Side									1.05	416.53			416.53	1.05
A A Viscia	40.00	234	Filippini Middle							0.40	158.68					158.68	0.40
F E Humphrey Jr	78.50	234	Filippini Middle									0.75	297.52			297.52	0.75
Francis A Bradley, Jr.	65.00	237	Ede River Dam							0.30	119.01	0.35	138.84			257.85	0.65
James L Humphrey	1,052.40	238, 239, 240	Humphrey Dam East, Humphrey Dam West, Humphrey Lower Field Dams							1.30	515.70	7.60	3,014.88	1.60	634.71	4,165.29	10.50
Louisa Scolari, Ida A Scolari, Celia D Fallon, P R Scolari, R A Scolari, Olivia R Riberti, Lydia H Westover	124.40	238	Humphrey Dam East									1.25	495.87			495.87	1.25
Antone E Dotta	109.80	238, 119	Humphrey Dam East, Ede Lake Cut									1.10	436.36	0.30	119.01	555.37	1.40
Henry Albani	80.00	239	Humphrey Dam West									0.80	317.36			317.36	0.80
M B Humphrey	302.60	241, 242	M B Humphrey Tognazini Ranch									1.90	753.72	1.10	436.36	1,190.08	3.00
L D Maddalena	32.50	242, 52	L D Maddalena River, Maddalena South									0.20	79.34	0.15	59.50	138.84	0.35
Westover Company	432.70	243,244,245, 263, 54, 55	Noble East, Noble West, Noble Dam, Noble Reservoir, Noble North, Noble South									2.50	991.74	2.00	793.39	1,785.12	4.50
Giacomo Falchi	144.40	246	Decker Dam									0.40	158.68	1.05	416.53	575.21	1.45
C Roy Carmichael	85.90	246, 247	Decker Dam, Carmichael Dam											0.85	337.19	337.19	0.85
Subtotal, Schedule 10, Claimants from Middle Fork of Feather River and Tributaries Cold, Webber, Town, and Perry Creeks	10,045.70			9.79	7,092.49	8.28	3,841.83	20.81	8,255.21	31.42	12,464.13	30.65	12,158.68	16.70	6,624.79	50,437.14	117.65

Additional Special Class Claimants, Last Chance Creek Group				cfs	AF	Season
Sam Bonta	Domestic, Stockwater, Irrigation	270	Bonta Creek Ditches	3.15	2,282.06	Continuous
Sam Bonta	Stockwater, Irrigation	271	Bonta East Ditch	0.37	8.07	Apr 10 - Apr 20
A D Maddalena	Domestic, Stockwater, Irrigation	269	Maddalena Pasture Ditches	0.52	376.72	Continuous
L D Maddalena	Domestic, Stockwater		Maddalena Spring Pipe Line	0.02	10.87	Continuous
L D Maddalena	Stockwater, Irrigation	272	L D Maddalena Pasture Ditch	0.47	330.24	Apr 21 - Apr 9
Louis A LaFranchini	Domestic, Stockwater, Irrigation	273	LaFranchini Creek Ditches	3.20	2,318.28	Continuous

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Elsie Herz Golden	Domestic, Stockwater, Irrigation	274, 275	Trosi West Canyon, Trosi Middle Canyon, Trosi East Canyon Ditches	2.25	1,630.04	Continuous									
Fred P Giudici and Myrtle W Giudici	Storage	21, 22	F P Giudici Upper and F P Giudici Lower Ditches	3.50	1,388.43	Irrigation Season									
Mauricilio Giudici & Julie Giudici	Stockwater, Irrigation	Drainage from F P Giudici and M W Giudici	Drainage from F P Giudici and M W Giudici	unspecified	unspecified	Continuous									
Subtotal, Additional Special Class Claimants - Last Chance Creek Group				13.48	8,344.71										
Additional Surplus Class Claimants - Last Chance Creek Group															
Amelia D Ramelli	Domestic, Stockwater, Irrigation	70	Roberti Lower Channel, Last Chance Lake		220.00										
Louisa Scolari, Ida A Scolari, Celia D Fallon, P R Scolari, R A Scolari, Olivia R Riberti, Lydia H Westover	Domestic, Stockwater, Irrigation	70	Roberti Lower Channel, Last Chance Lake		84.00										
James L Humphrey	Domestic, Stockwater, Irrigation	70	Roberti Lower Channel, Last Chance Lake		27.00										
Subtotal, Additional Surplus Class Claimants, Last Chance Creek Group					331.00										
Additional Special Class Claimants, Smithneck Creek Group															
J S Rees and John Caccini	Domestic, Stockwater, Irrigation	74	Parker (Grey) Ditch	0.50	362.23	Continuous									
John Caccini	Domestic, Stockwater, Irrigation	75	Caccini Ditches	1.15	833.13	Continuous									
Leon F Dotta and Raffaele Dotta	Domestic, Stockwater, Irrigation	76	Lower Staverville Channel	0.80	317.36	Irrigation Season									
Odo Grandi	Domestic, Stockwater, Irrigation		Graveyard Creek through the Grandi Ditch	0.50	198.35	Irrigation Season									
Subtotal, Additional Special Class Claimants - Smithneck Creek Group				2.95	1,711.07										
Additional Surplus Class Claimants - Smithneck Creek Group															
Charles W Ede	Domestic, Stockwater, Irrigation	118	Ede Lake		70.00										
M B Humphrey	Domestic, Stockwater, Irrigation	118			70.00										
Clover Valley Lumber Company	Industrial	89	Mill Pond		50.00										
J S Rees	Domestic, Stockwater, Irrigation	87	Lewis (Rees) Reservoir		50.00										
Subtotal, Additional Surplus Class Claimants - Smithneck Creek Group					240.00										
Additional Special Class Claimants, West Side Canal Group															

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				Allotments											
Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Fifth Priority Class (cfs)	Fifth Priority Face Value (AF)	Total Allotments, Face Value (AF)	Check, total CFS
F E Humphrey Jr	Domestic, Stockwater, Irrigation	201	Lower Craycroft Creek Diversion	0.22	87.27	Irrigation Season									
Henry Albini	Domestic, Stockwater, Irrigation	201	Lower Craycroft Creek Diversion	0.18	71.40	Irrigation Season									
James L Humphrey	Domestic, Stockwater, Irrigation	201	Lower Craycroft Creek Diversion	0.60	238.02	Irrigation Season									
James L Humphrey	Domestic, Stockwater, Irrigation	201	Lower Craycroft Creek Diversion	0.20	79.34	Irrigation Season									
F E Humphrey Jr	Domestic, Stockwater, Irrigation	201A	Upper Craycroft Creek Diversion	0.75	297.52	Irrigation Season									
Subtotal, Additional Special Class Claimants, West Side Canal Group				1.95	773.55										
Additional Surplus Class Claimants - Fletcher Creek Group															
Isolina Pasquetti	Domestic, Stockwater, Irrigation		Fletcher Creek and Spring Channels	0.25	99.17	Irrigation Season									
Subtotal, Additional Surplus Class Claimants, Fletcher Creek Group				0.25	99.17										
Additional Special Class Claimants - Middle Fork Feather River Group															
Caesar P Lombardi	Domestic, Stockwater, Irrigation	120, 121, 122	Antelope Upper, Antelope East Channel, Antelope West Channel Ditches	4.00	1,586.78	Irrigation Season									
Julius Filippini and Perpetua Genasci	Domestic, Stockwater, Irrigation		Antelope Creek	2.00	793.39	Irrigation Season									
Anna B Miller	Domestic, Stockwater, Irrigation	123 to 126	Blinman Spring Channel, Lemon East, Lemon West, Lemon Lower Ditches	5.00	3,622.31	Continuous									
Fred P Alpers & Christina Alpers	Domestic, Stockwater, Irrigation		Lemon Creek	2.70	1,956.05	Continuous									
Marie Mattarola and B V Mattarolo	Domestic, Stockwater, Irrigation	257, 258	Campbell Springs, Echo Springs Ditches	0.80	579.57	Continuous									
Frank Carmichael	Domestic, Stockwater, Irrigation	267, 268	Mapes West Meadow, Mapes East Meadow Ditches	5.00	3,622.31	Continuous									
Veste Nelson	Domestic, Stockwater, Irrigation	265	Nelson Ditches	1.30	941.80	Continuous									
Giacomo Falchi and M Falchi	Domestic, Stockwater, Irrigation	266		1.70	1,231.59	Continuous									

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				Allotments												
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Westover Company	Domestic, Stockwater, Irrigation	266		1.80	1,304.03	Continuous									
Westover Company	Domestic, Stockwater	Unnamed Spring	Unnamed Spring	0.01	3.62	Continuous									
John Amodei & Anna Amodei	Domestic, Stockwater, Irrigation	259, 260	Amodei Upper Spring, Amodei Meadow Spring Ditches	1.20	869.36	Continuous									
A E Strang	Domestic, Stockwater, Irrigation	259, 260	Amodei Upper Spring, Amodei Meadow Spring Ditches	0.20	144.89	Continuous									
A E Strang	Irrigation	Amodei Springs	Amodei Meadow Springs	0.80	579.57	Continuous									
Subtotal, Additional Special Class Claimants - Middle Fork Feather River				26.51	17,235.28										
Additional Surplus Class Claimants - Middle Fork Feather River															
Anna B Miller	Domestic, Stockwater, Irrigation	155	Amodei Ditch	3.00	1,190.08	Irrigation Season									
Westover Company	Domestic, Stockwater, Irrigation	243, 244, 245	Noble East, Noble West Ditches	3.30	1,309.09	Irrigation Season									
Westover Company	Domestic, Stockwater, Irrigation	263	Noble Reservoir		200.00										
Frank Carmichael	Domestic, Stockwater, Irrigation	Mapes Creek & Tributaries	Mapes Reservoir		80.00										
Subtotal, Additional Surplus Class Claimants - Middle Fork Feather River Group				6.30	2,779.17										

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				Allotments												
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Summary of Middle Fork of Feather River Adjudication Decree	Total cfs	Total AF													
Subtotal, Schedule 3 - Last Chance Creek Group	18.50	7,338.84													
Subtotal, Schedule 4	75.05	28,958.68													
Schedule 5, Claimants from Last Chance Creek Below Adams Neck	15.85	4,899.17													
Schedule 6, Claimants from Smithneck Creek and Tributaries	67.14	31,012.66													
Schedule 7, Claimants from West Side Canal and its Tributaries (Hamlin, Miller and Turner Creeks)	96.15	41,997.02													
Schedule 8, Claimants from Fletcher Creek and Spring Channels	6.08	2,919.94													
Schedule 9, Allocations to Shareholders in Sierra Valley Water Company for Rediversion From Little Truckee River Water Conveyed Into Middle Fork of Feather River Stream System	60.00	23,801.65													
Schedule 10, Claimants from Middle Fork of Feather River, and Tributaries Cold, Webber, Town and Perry Creeks	117.65	50,437.14													
Subtotal, Schedules 3-10	456.42	191,365.11													
Subtotal, Additional Special Class Claimants - Last Chance Creek Group	13.48	8,344.71													
Subtotal, Additional Special Class Claimants - Smithneck Creek Group	0.00	240.00													
Subtotal, Additional Special Class Claimants, West Side Canal Group	1.95	773.55													
Subtotal, Additional Special Class Claimants - Middle Fork Feather River	26.51	17,235.28													
Subtotal Schedules 3-10 and Special Class Claimants	498.35	217,958.65													
Subtotal, Additional Surplus Class Claimants, Last Chance Creek Group	0.00	331.00													
Subtotal, Additional Surplus Class Claimants - Smithneck Creek Group	0.00	240.00													
Subtotal, Additional Surplus Class Claimants, Fletcher Creek Group	0.25	99.17													
Subtotal, Additional Surplus Class Claimants - Middle Fork Feather River Group	6.30	2,779.17													
Subtotal, All Surplus Class Claimants	6.55	3,449.35													
Grand Total, All Schedules and Classes of Claimants	504.90	221,408.00													

Summary of Pit River Decrees

Pit River Decrees	Face Amount
Ash Creek	66,518.40
Burney Creek	11,308.76
Big Valley of Pit River	102,467.90
Franklin Creek	4,230.48
Hat Creek	93,210.83
Rattlesnake Creek	37,023.47
North Fork Pit River	46,856.17
South Fork Pit River	68,097.30
Roaring Creek	5,289.43
Willow Creek	552.02
Total Pit River Decrees	435,554.75

Modoc County Judgment and
Decree No. 3670

Seasons of Use		
Continuous, regardless of season	365.25	days
April 1 through October 15	198.00	days
March 1 through October 15	229.00	days

				Allotments											
Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority (cfs)	Fourth Priority Face Value (AF)	Fifth Priority (cfs)	Fifth Priority (AF)	Total (cfs)	Total (AF)
Rush Creek Group (Schedule 3)															
Joe F Walker and Elsie D Walker	7.00	61, 62	Walker Upper, Walker Lower	0.18	70.69									0.18	70.69
Thomas J McClure	5.00	63	Higgins	0.12	47.13									0.12	47.13
C L Harper and Neta Harper	35.80	63	Higgins	0.60	235.64									0.60	235.64
Audrey Rice	62.80	64, 65	Audrey Rice, T J Rice	1.05	412.36									1.05	412.36
Erma Harrigan, Lillian Rice, May West, Red Rice, Clarence Rice, Mary Ash, and Rose Bartle	14.00	65	T J Rice	0.25	98.18									0.25	98.18
N S Kresge and Laura Kresge	49.50	66, 67	Kresge-Holbrook, Kresge East	0.85	333.82									0.85	333.82
Joseph H Holbrook, Ervin E Triplett, Henry O Triplett, and Grace Gordon	131.60	66, 68, 69, 70, 71	Kresge-Holbrook, Holbrook-Barrows, Holbrook-East Dams, Holbrook West, Holbrook Lower	2.20	864.00									2.20	864.00
Subtotal, Rush Creek Group	305.70			5.25	2,061.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.25	2,061.82
Butte Creek Group (Schedule 4)															
Herbert S Bath and Anne Bath	53.50	72, 73	H S Bath Upper, H S Bath Lower	0.40	157.09									0.40	157.09
S J Niles and Myrtle Niles	106.50	74, 75, 76, 79 to 83	Niles Upper Meadow, Niles and Auble, Niles Middle Meadow, Niles Lower Meadow Dams	1.60	628.36									1.60	628.36
E M Auble and Ivy Auble	56.40	75, 77, 78	Niles and Auble, Auble Upper, Auble Lower	0.40	157.09									0.40	157.09
E J Schmidt and Emma B Schmidt	75.20	84	Elzea	0.10	39.27	0.90	353.45							1.00	392.73
Subtotal, Butte Creek Group	291.60			2.50	981.82	0.90	353.45	0.00	0.00	0.00	0.00	0.00	0.00	3.40	1,335.27
Willow Creek Group (Schedule 5)															
Alton, P. Avilla, Lloyd Avilla, Irene Totten, Ida D Copper	15.00	85	Avilla Upper Springs							0.15	58.91			0.15	58.91
E V Wing	105.30	88, 89	Avilla West Side, Avilla East Side							0.85	333.82			0.85	333.82
Alice Gray	94.50	90A	Gray							0.80	314.18			0.80	314.18
E B Armstrong and Wilhelmina R Armstrong	70.00	91	Armstrong							0.50	196.36			0.50	196.36
Floyd E Walker	71.20	92	Knight	0.07	50.71	0.63	247.42							0.70	298.13
J E Albaugh	356.90	92	Knight	0.32	231.83	2.88	1,131.05							3.20	1,362.88
Frank Studley and Hattie Studley	355.80	93	Studley Johnson	0.32	231.83	2.88	1,131.05							3.20	1,362.88
R L Holmes and May L Holmes	210.90	93	Studley Johnson	0.16	115.91	1.44	565.53							1.60	681.44
Kasper Weigand and Etta Weigand	153.10	94, 95	Weigand Upper Dams, Weigand Lower Dams	0.10	72.45			1.50	589.09					1.60	661.54
Subtotal, Willow Creek Group	1,432.70			0.97	702.73	7.83	3,075.05	1.50	589.09	2.30	903.27	0.00	0.00	12.60	5,270.15
Ash Creek Group (Schedule 6)															
John T Bath, Alice B Walker, Carrie F Stone	126.60	7, 8	Bath Dam, Bath North Springs	1.95	765.82									1.95	765.82
Robert Fleming and Ora Lee Fleming	131.20	9	Fulstone Springs	2.00	785.45									2.00	785.45
John T Bath, Alice B Walker, Carrie F Stone	219.10	10	Bath (West Ranch)	3.30	1,296.00									3.30	1,296.00
John T Bath, Alice B Walker, Carrie F Stone	13.50	10	Bath	0.20	78.55									0.20	78.55
John T Bath, Alice B Walker, Carrie F Stone, Robert Fleming, Mary Fleming, and Ora Lee Fleming	142.20	10, 10A	Bath, Bath North	2.20	864.00									2.20	864.00
G H Perkins and Eltha A Perkins	263.30	11, 12	Perkins Springs, Perkins	3.90	1,531.64									3.90	1,531.64
T A Barrows and Lulu M Barrows	305.10	13, 13A, 14, 14A	Barrows Upper, Barrows Dam #2, Barrows Slough, Barrows Lower Dams	4.70	1,845.82									4.70	1,845.82
John A Kresge and May E Kresge	28.00	15	John A Kresge Dam	0.45	176.73									0.45	176.73
R E Clark and Donnie Clark	23.90	None	Subirrigation	0.35	158.98									0.35	158.98

Modoc County Judgment and Decree No. 3670

Seasons of Use

Continuous, regardless of season	365.25	days
April 1 through October 15	198.00	days
March 1 through October 15	229.00	days

				Allotments											
Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority (cfs)	Fourth Priority Face Value (AF)	Fifth Priority (cfs)	Fifth Priority (AF)	Total (cfs)	Total (AF)
J E Yowell, Addie Yowell, F E Yowell and Dorothy Yowell	24.50	17	Vogt	0.35	158.98									0.35	158.98
Louise Vogt and John Vogt	353.50	17, 18	Vogt, Vogt Lower Dam	5.45	2,475.47									5.45	2,475.47
W H Hunt Estate Co.	739.10	19	Clarke Co Upper Support Dams, New Canal Swamp Head	8.80	3,997.09							0.95	431.50	9.75	4,428.60
A J Weeks and Mary A Weeks	93.20	19	Clarke Co Upper Support Dams							1.45	658.61			1.45	658.61
J C Lane and Nora Lane	278.20	20, 21, 22, 48	North Slough, New Canal Swamp Head, Cannon Box, Lane Death Slough Dam					1.00	454.21			1.10	499.64	2.10	953.85
A L Cannon	110.00	22	Cannon Box					1.40	635.90					1.40	635.90
Indian Allotment	61.80	22	Cannon Box					0.80	363.37					0.80	363.37
W H Hunt Estate Co.	1,997.90	21, 22, 23, 24, 46, 47, 48, 49, 50, 51	New Canal Swamp Head, Cannon Box, Jenkins-Cannon, Death Slough Head Box, North Branch South Channel Lower, Island Taps, Lane Death Slough Dams, Death Slough, Death Slough South Bypass, Death Slough North					25.00	11,355.37			0.10	45.42	25.10	11,400.79
W H Hunt Estate Co.	88.00	23	Jenkins-Cannon			0.50	362.23	0.60	272.53					1.10	634.76
A L Cannon	88.00	22, 23	Cannon Box, Jenkins-Cannon			0.50	362.23	0.60	272.53					1.10	634.76
Wm Kramer and Rachel R Kramer	25.00	22, 23	Cannon Box, Jenkins-Cannon							0.30	136.26			0.30	136.26
W H Hunt Estate Co.	1,855.00	25, 26, 27, 28, 29, 32., 36, 37, 38, 42, 43, 44, 45	South Channel Head Box, Big Valley Drainage Canal, North Branch South Channel, Middle Branch South Channel, Chisholm Upper Dam, Wayman Support Dam, C W Clarke Co Upper South Channel Dam, C W Clarke Co Middle South Channel Dam, C W Clarke Co Lower South Channel Dam, Weigand-Gerig Dam, Gerig Swamp Dam, South Branch South Channel Dam, Middle Branch South Channel Dam					23.20	10,537.79					23.20	10,537.79
Wm H Bean	38.90	25, 29, 30	South Channel Head Box, Chisholm Upper Dam, Chisholm Lower Dam					0.50	227.11					0.50	227.11
M D Wayman and Alice M Wayman	232.90	25, 26, 31, 32, 33	South Channel Head Box, Big Valley Drainage Canal, Wayman Upper Dam, Wayman Support Dam, Wayman Lower Dam					2.90	1,317.22					2.90	1,317.22
R L Holmes and May L Holmes	94.00	25, 34, 35	South Channel Head Box, Holmes Upper Dam, Holmes Lower Dam					1.20	545.06					1.20	545.06
J P Miller and Clara Miller	172.40	25, 39, 40, 41	South Channel Head Box, Miller Upper Dam, Miller Middle Dam, Miller Lower Dam					2.15	976.56					2.15	976.56
Kasper Weigand and Etta Weigand	141.10	25, 42	South Channel Head Box, Weigand-Gerig Dam					1.75	794.88					1.75	794.88
Charles A Gerig	200.70	25, 42, 43	South Channel Head Box, Weigand-Gerig Dam, Gerig Swamp Dam					2.50	1,135.54					2.50	1,135.54
W H Hunt Estate Co.	97.90	26	Big Valley Drainage Canal							1.25	567.77			1.25	567.77
W H Hunt Estate Co.	38.00	52, 53	Gerig, Mouth of Ash Creek							0.20	90.84			0.20	90.84
James A Hollenbeak and Lela Hollenbeak	207.00	52, 54, 55	Gerig, Watson, Hollenbeak Swale							1.15	522.35			1.15	522.35
Ardella Babcock and Estate of Andrew Babcock	12.00	52, 54	Gerig, Watson							0.07	31.80			0.07	31.80
Arad Babcock	91.00	52, 54	Gerig, Watson							0.50	227.11			0.50	227.11

Modoc County Judgment and Decree No. 3670

Seasons of Use		
Continuous, regardless of season	365.25	days
April 1 through October 15	198.00	days
March 1 through October 15	229.00	days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotments First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority (cfs)	Fourth Priority Face Value (AF)	Fifth Priority (cfs)	Fifth Priority (AF)	Total (cfs)	Total (AF)
Lester A Babcock and Frances B Babcock	259.00	52, 54	Gerig, Watson							1.45	658.61			1.45	658.61
Oral Lester Babcock	4.00	52, 54	Gerig, Watson							0.03	13.63			0.03	13.63
Marjorie M Merritt and McElroy Brown	32.40	52, 54	Gerig, Watson							0.20	90.84			0.20	90.84
Subtotal Ash Creek Group	8,588.40			33.65	14,134.51	1.00	724.46	63.60	28,888.07	6.60	2,997.82	2.15	976.56	107.00	47,721.42
Special Class Claimants on Ash Creek (Schedule 7)															
Robert McGarva and Rhoda McGarva	28.60	56, 57	Steele Upper, Steele Lower	0.60	235.64									0.60	235.64
Robert McGarva and Rhoda McGarva	21.20	58, 59, 60	Johnson Upper, Johnson Middle, Johnson, Lower	0.40	157.09									0.40	157.09
Audrey Rice	4.00	96	Rice Spring Channel	0.05	36.22									0.05	36.22
Alice Gray	94.50	90	Gray Springs	0.80	579.57									0.80	579.57
Robert Fleming and Ora Lee Fleming	818.80	1, 2, 3	Fleming West Springs, Fleming East Springs, Fleming Spreading Dams	9.15	3,593.45									9.15	3,593.45
John T Bath, Alice B Walker, Carrie F Stone	599.90	4, 5, 6, 8	Bath West Springs, Bath Middle Springs, Bath East Springs, Bath North Springs	6.95	2,729.45									6.95	2,729.45
John T Bath, Alice B Walker, Carrie F Stone	36.70	None	Bath Seeps	Entire Flow										0.00	0.00
T A Barrows and Lulu M Barrows	37.20	106, 107	Unnamed, Shane Gulch	0.50	362.23									0.50	362.23
T A Barrows and Lulu M Barrows	Domestic	108	Unnamed	0.50	362.23									0.50	362.23
T A Barrows and Lulu M Barrows	6.00	98	Barrows Spring	0.10	39.27									0.10	39.27
Alta J Wallace and Daisy H Smith	75.00	97	Wallace	1.00	454.21									1.00	454.21
John A Kresge and May E Kresge	134.50	99, 100, 101	Kresge South Springs, Kresge North Springs, Kresge House Spring	1.40	549.82									1.40	549.82
John A Kresge and May E Kresge	7.00	102	Kresge Lower Spring	0.15	108.67									0.15	108.67
J E Yowell, Addie Yowell, F E Yowell and Dorothy Yowell	68.00	103	Clark Springs	1.05	412.36									1.05	412.36
J A Clark, W E Clark, and Donnie Clark	70.80	105	Clark Upper Springs	0.38	147.27									0.38	147.27
W H Hunt Estate Co.	1,263.50	None	Tule Swamp	Entire Flow										0.00	0.00
R L Holmes and May L Holmes	162.50	None	Holmes Pond	Entire Flow										0.00	0.00
R L Holmes and May L Holmes, M D Wayman and Alice M Wayman	125.40	104	Hot Spring Channel	0.50	362.23									0.50	362.23
J C Lane and Nora Lane	92.00	109	Lane-Fleming	Entire Flow										0.00	0.00
Subtotal, Special Class (Schedule 7)	3,645.60			23.53	10,129.74									23.53	10,129.74

Summary of Ash Creek Decree	First Priority Face Value (AF)	Second Priority Face Value (AF)	Third Priority Face Value (AF)	Fourth Priority Face Value (AF)	Fifth Priority Face Value (AF)	Total Face Amount (AF)
Rush Creek Group	2,061.82	0.00	0.00	0.00	0.00	2,061.82
Butte Creek Group	981.82	353.45	0.00	0.00	0.00	1,335.27
Willow Creek Group	702.73	3,075.05	589.09	903.27	0.00	5,270.15
Ash Creek Group	14,134.51	724.46	28,888.07	2,997.82	976.56	47,721.42
Special Class Rights Holders	10,129.74	0.00	0.00	0.00	0.00	10,129.74
Total	28,010.61	4,152.97	29,477.16	3,901.09	976.56	66,518.40

Big Valley Pit River Decree - Between Canby Bridge to Muck Valley
Modoc County Decree No. 6395

Seasons of Use

Continuous, regardless of season	365.25	days
April 1 through September 30	183.00	days
		days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotments First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Total (cfs)	Total (AF)
Tributary Group													
R M Bushey	Domestic	4a	Unnamed Spring	0.05	18.15							0.05	18.15
Merlin Kennedy and Erma Kennedy	50.00	5, 6	Upper Turner Creek	0.72	261.34							0.72	261.34
E W Caldwell and Rose Marie Caldwell	60.00	6a	Hulbert Creek	0.86	312.16							0.86	312.16
Robert Sherer and A F Gerig	80.00	12a	Stone Coal Creek	1.15	417.42							1.15	417.42
W O Gravier	Domestic	11	Stone Coal Creek	--								0.00	0.00
Robert Sherer and A F Gerig	96.00	10a	Tom Deakins Creek	1.36	493.65							1.36	493.65
Gladys Troy	Domestic	14b	Holl Creek			0.07	25.41					0.07	25.41
H S Lorenz and Flora Richards, Executrix	5.00	14c	Holl Creek	0.07	25.41							0.07	25.41
George W Hines, Marvin A Hines, and Mason Hines	80.00	14f	Holl Creek					1.14	413.79			1.14	413.79
J H Duncan and Marian Duncan	40.00	14d	Holl Creek					0.57	206.90			0.57	206.90
Gladys Troy	160.00	15a	Lower Turner Creek	2.28	827.58							2.28	827.58
George W Hines, Marvin A Hines, and Mason Hines	40.00	15b	Lower Turner Creek	0.57	206.90							0.57	206.90
R E Potter, Joe L Potter, L J Potter, and Forrest D Potter	160.00	29b	Egg Lake Slough-Taylor Creek	2.28	827.58							2.28	827.58
Albert W Joiner and Lillian B Joiner	23.00	29c	Egg Lake Slough-Taylor Creek	0.33	119.78							0.33	119.78
R E Potter, Joe L Potter, L J Potter, and Forrest D Potter	85.00	29a	Egg Lake Slough-Taylor Creek					1.22	442.83			1.22	442.83
L W Kramer	130.00	29d	Egg Lake Slough-Taylor Creek					1.86	675.13			1.86	675.13
J H Holl and Kenneth K Holl	204.00	46, 43a	Egg Lake Slough-Taylor Creek							2.92	1,059.89	2.92	1,059.89
Richard Hemsted and Karl Hemsted	400.50	30, 31, 32, 33, 34, 35	Widow Valley Creek	5.72	2,076.22							5.72	2,076.22
W Lee Jr	4.00	31a	Widow Valley Creek	0.06	21.78							0.06	21.78
L W Kramer	200.00	36	Widow Valley Creek					2.86	1,038.11			2.86	1,038.11
L W Kramer	1,075.00	37, 38	Widow Valley Creek			15.40	5,589.82					15.40	5,589.82
W L Gray	1.00	47a	Knox Spring	0.02	7.26							0.02	7.26
W L Gray	Domestic, Stockwater	47b	Knox Spring Channel	0.01	3.63							0.01	3.63
Gerald G Packwood	76.00	53	Bassett Hot Springs	1.08	392.01							1.08	392.01
Charles A Gerig and W L Gray	28.00	53a, 53	Bassett Hot Springs					0.40	145.19			0.40	145.19
Norris Gerig	133.00	28, 43	Bull Run Slough	1.90	689.65							1.90	689.65
Alvin E Watson and Mary V Watson	160.00	54a	Bull Run Slough			2.28	827.58					2.28	827.58
Andrew C Babcock and Dorothy J Babcock	168.00	72	Bull Run Slough					2.40	871.14			2.40	871.14
S J Thompson	40.00	54b	Bull Run Slough							0.57	206.90	0.57	206.90
Frank Iverson	372.50	62	Juniper Creek	5.33	1,934.66							5.33	1,934.66
Subtotal, Tributary Group	3,871.00			23.79	8,635.18	17.75	6,442.81	10.45	3,793.09	3.49	1,266.78	55.48	20,137.86
Big Valley Pit River Group													
Klaus Mohr	37.00	2				0.53	192.38					0.53	192.38
R M Bushey	152.00	3				2.17	787.66					2.17	787.66
Alden Miller	211.00	12				3.02	1,096.19					3.02	1,096.19
Robert Sherer and A F Gerig	100.00	12a				1.43	519.05					1.43	519.05
C M Shaw and R Shaw	134.50	13a				1.92	696.91					1.92	696.91
R A Blair	60.50	13b				0.86	312.16					0.86	312.16
R D Kerley and Angel E Kerley (Criss Ranch)	110.00	13d				1.57	569.87					1.57	569.87
R D Kerley and Angel E Kerley (Home Ranch)	880.00	28, 42, 44				1.94	704.17			10.63	3,858.43	12.57	4,562.60
J H Duncan and Marian Duncan	200.00	13c				2.86	1,038.11					2.86	1,038.11
Kenneth K Gould	84.00	14a				1.20	435.57					1.20	435.57

y required.

Big Valley Pit River Decree - Between Canby Bridge to Muck Valley
Modoc County Decree No. 6395

Seasons of Use		
Continuous, regardless of season	365.25	days
April 1 through September 30	183.00	days
		days

Allotments

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Total (cfs)	Total (AF)
George A Hines, Marvin A Hines, and Mason Hines	508.00	15		15 cubic feet per second to maintain channel storage and supply stock water or such amounts as may be reasonabl		7.26	2,635.20					7.26	2,635.20
Gladys Troy	112.00	14b				1.60	580.76					1.60	580.76
Albert W Joiner and Lillian B Joiner (Upper Ranch)	160.00	29c				2.28	827.58					2.28	827.58
Albert W Joiner and Lillian B Joiner (Miller Ranch)	263.00	17				3.76	1,364.79					3.76	1,364.79
Albert W Joiner and Lillian B Joiner (Home Ranch)	66.00	18				0.94	341.20					0.94	341.20
Ernest C Robinson	178.00	24				1.77	642.47			0.77	279.49	2.54	921.96
L H Monchamp	121.00	22a				1.73	627.95					1.73	627.95
F E Yowell	287.00	22b					0.00	4.10	1,488.20			4.10	1,488.20
H M Roberts	229.00	22b				0.21	76.22	3.06	1,110.70			3.27	1,186.93
Cyril R Mamath	609.00	24				3.83	1,390.20	2.84	1,030.85	2.03	736.84	8.70	3,157.88
D J Leventon (Courtright Ranch)	200.00	25				1.49	540.83	0.85	308.53	0.52	188.75	2.86	1,038.11
D J Leventon (Courtright Ranch)	140.00	25				1.00	362.98	1.00	362.98			2.00	725.95
Cornelius Iest	794.00	25				1.66	602.54	9.68	3,513.60			11.34	4,116.14
E K Brown and Leila A Brown	331.00	23				0.59	214.16	3.85	1,397.45	0.29	105.26	4.73	1,716.87
R E Potter, Joe L Potter, Forrest D Potter, and L J Potter	314.00	27				4.50	1,633.39					4.50	1,633.39
C R Brown, A G Brown, and E K Brown	202.00	26				2.89	1,049.00					2.89	1,049.00
H L Hayes, Jessie Hayes, and Emma Hayes	537.00	23, 24				3.37	1,223.23	1.17	424.68	3.13	1,136.11	7.67	2,784.02
Oral Gerig and Gertrude M Gerig	159.00	27a				2.27	823.95					2.27	823.95
W H Hunt Estate Co.	440.00	23				6.30	2,286.74					6.30	2,286.74
W H Gerig	305.50	23, 39				2.70	980.03			1.66	602.54	4.36	1,582.57
L W Kramer	640.50	28				5.24	1,901.99			3.91	1,419.23	9.15	3,321.22
E J Raehn	61.00	28				0.87	315.79					0.87	315.79
James H Pircen and Verna L Pircen	23.00	28				0.33	119.78					0.33	119.78
Peter Gerig (Knox Ranch)	268.00	28, 43				3.83	1,390.20					3.83	1,390.20
Peter Gerig (Home Ranch)	339.00	23, 43, 39				4.66	1,691.46			0.18	65.34	4.84	1,756.80
E V Wing	146.00	28				2.08	754.99					2.08	754.99
Norris Gerig	27.00	28, 43				0.39	141.56					0.39	141.56
Alvin E Watson and Mary V Watson	15.00	28				0.21	76.22					0.21	76.22
Ralph T Yordy	31.00	28				0.44	159.71					0.44	159.71
Andrew C Babcock and Dorotha J Babcock	12.00	28				0.17	61.71					0.17	61.71
Lester Babcock	268.00	42				2.23	809.43	2.23	809.43			4.46	1,618.87
Arad Babcock	97.00	42				0.81	294.01	0.81	294.01			1.62	588.02
J H Holl and Kenneth K Holl	407.00	28				5.82	2,112.52					5.82	2,112.52
J H Holl and Kenneth K Holl	160.00	45								2.28	827.58	2.28	827.58
Merlin Kennedy	32.50	48				0.47	170.60					0.47	170.60
Aubrey C Bieber and Carmen B Conner	30.00	48a				0.43	156.08					0.43	156.08
W M Snipes	193.00	49				1.61	584.39			1.13	410.16	2.74	994.55
Mary DeMange Kennedy	176.00	49				2.51	911.07					2.51	911.07
Kenneth McArthur and John R McArthur	320.00	49				4.56	1,655.17					4.56	1,655.17
Andrew C Babcock	53.00	49				0.76	275.86					0.76	275.86
Chester Babcock	154.00	49				2.20	798.55					2.20	798.55
R A Babcock	120.00	49				1.71	620.69					1.71	620.69
Ernest G Babcock and Bessie J Babcock	677.00	49				9.67	3,509.97					9.67	3,509.97
King A Stubblefield and Beatrice Stubblefield	160.00	51a				2.28	827.58					2.28	827.58
Estate of Walter Burnham Armstrong	381.00	49				5.44	1,974.59					5.44	1,974.59
Kenneth McArthur and John R McArthur, Anna McArthur	320.00	67				4.56	1,655.17					4.56	1,655.17
Kenneth McArthur and John R McArthur, Anna McArthur	680.00	66				7.58	2,751.35			2.14	776.77	9.72	3,528.12
E J Britten and Thelma Britten	876.00	68, 69				11.23	4,076.21			1.27	460.98	12.50	4,537.19
W L Campbell	120.00	71				1.28	464.61			0.43	156.08	1.71	620.69
S J Thompson	803.50	70, 71								11.50	4,174.21	11.50	4,174.21

Big Valley Pit River Decree - Between Canby Bridge to Muck Valley
Modoc County Decree No. 6395

Seasons of Use		
Continuous, regardless of season	365.25	days
April 1 through September 30	183.00	days
		days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotments First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Total (cfs)	Total (AF)
S J Thompson and W H Thompson	304.00	49				3.21	1,165.15			1.13	410.16	4.34	1,575.31
Subtotal, Big Valley Pit River Group	15,819.00			15.00	5,444.63	154.23	55,981.67	29.59	10,740.44	43.00	15,607.93	241.82	82,330.04

Surplus Class Claimants (in order of priority)	cfs	Acre-feet	Season	
Albert W Joiner and Lillian B Joiner	0.09	28.00	Nov 1 - Apr 1	
Oral Babcock, H W Killebrew, Richard B Keene, Homer C Jack	10.00	892.56	Apr 1 - May 15	
Oral Babcock, H W Killebrew, Richard B Keene, Homer C Jack	11.84	3,600.00	Jan 15 - May 15	
Big Valley Mutual Water Company	8.67	2,635.00	Oct 1 - June 1	
Big Valley Mutual Water Company	0.33	100.00	Oct 1 - June 1	
Big Valley Mutual Water Company	8.60	2,615.00	Oct 1 - June 1	
L W Kramer	6.75	2,476.86	May 1 - Nov 1	
L W Kramer	0.28	86.50	Feb 1 - Apr 1	
L W Kramer	0.09	27.80	Nov 1 - Apr 30	
Russell M Bushey	500 gpd	0.56	Jan 1 - Dec 31	
United States, Modoc Nat'l Forest	1800 gpd	2.02	Apr 1 - Nov 30	
United States, Modoc Nat'l Forest	650 gpd	0.73	May 1 - Oct 30	
Cornelius Iest	4.93	1,500.00	Nov 1 - Mar 31	
United States, Modoc Nat'l Forest	375 gpd	0.42	May 1 - Oct 30	
United States, Modoc Nat'l Forest	650 gpd	0.73	May 15 - Oct 15	
Clinton Peltier and Do-Be Melcon Peltier	0.63	190.00	Nov 1 - Apr 1	
George W Hines, Marvin A Hines and Mason M Hines	0.66	200.00	Oct 1 - May 1	
Alden Miller	0.60	182.00	Oct 1 - Apr 30	
United States, DOI, BLM	0.01	2.23	Oct 1 - May 31	
United States, DOI, BLM	0.00	0.21	Oct 1 - May 31	
California Dept of Water Resources	263.19	80,000.00	Jan 1 - Dec 31	Stone Coal Reservoir project for Big Valley Irrigation District
Pit Soil Conservation District	252.00	76,600.00	Oct 1 - Apr 30	
Total, Surplus Water Claims	568.67	171,140.62		

Summary	cfs	Acre-feet
Tributary Group	55.48	20,137.86
Big Valley Pit River Group	241.82	82,330.04
Total Senior Claimant Groups	297.30	102,467.90
Surplus Water Claimants	568.67	171,140.62
Total, Big Valley Pit River Decree Claims	865.97	273,608.52

Burney Creek Decree
Shasta County, Decree No. 5111

Seasons of Use		
Continuous, regardless of season	365.25	days
May 5 through November 1	181.00	days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotment During Irrigation Period	Allotment Face Value (AF)
West Side Users					
Richard W Haynes	376.00		Haynes or Creek Laterals	9.45	1,696.31
J C Erickson	21.00		Erickson	0.60	107.70
John Snooks	18.00		Snooks	0.50	89.75
Timothy Desmond	75.00		Cayton or Natural Channel of Burney Creek	1.88	337.47
Karl Elling	314.00		Cayton or Elling	7.85	1,409.11
Mary Ann Cornaz	150.00		Greer-Cornaz or Natural Channel of Burney Creek	3.75	673.14
Ray Vedder	75.00		Greer-Cornaz or Natural Channel of Burney Creek	1.87	335.67
Subtotal, West Side Users	1,029.00			25.90	4,649.16
East Side Users					
A R Haynes	50.00		A R Haynes	1.25	224.38
Fred Greer	87.00		Greer-Cornaz	2.50	448.76
Mary Ann Cornaz	137.00		Greer-Cornaz	3.42	613.90
Red River Lumber Co.	175.00		Greer-Cornaz	4.33	777.25
Ednah M Black	320.00		Greer-Cornaz	8.80	1,579.64
Karl Elling	200.00		Cayton or Elling	5.00	897.52
Subtotal, East Side Users	969.00			25.30	4,541.45
Surplus Water Users					
Karl Elling	71.00		Cayton or Elling	0.90	323.11
Timothy Desmond	8.00		Cayton or Natural Channel of Burney Creek	0.10	35.90
Fred Greer	10.00		Greer-Cornaz	0.12	43.08
Mary Ann Cornaz	32.00		Greer-Cornaz or Natural Channel of Burney Creek	0.40	143.60
Red River Lumber Co.	150.00		Greer-Cornaz	1.88	674.94
Ednah M Black	137.00		Greer-Cornaz	1.70	610.31
Ray Vedder	64.00		Greer-Cornaz or Natural Channel of Burney Creek	0.80	287.21
Subtotal, Surplus Water Users	472.00			5.90	2,118.15
Total, Burney Creek Decree	2,470.00			31.50	11,308.76

Franklin Creek Decree
Modoc County Decree No. 3118

Seasons of Use		
Continuous, regardless of season	365.25	days
April 1 through September 30	183.00	days
		days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotments									
				First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Total (cfs)	Total Face Value (AF)
Allotments from Franklin Creek													
Earl & Mary Ehrman	15.20		Ehrman	0.18	63.52							0.18	63.52
Ira A & Ida M Hanson	12.80		Hanson North, and/or Hanson Middle			0.16	58.08					0.16	58.08
P Indart	20.55		Indart Main and/or Indart South			0.26	94.37					0.26	94.37
G R Stone	12.80		Stone			0.16	58.08					0.16	58.08
John & Fannie Morrison	20.80		Morrison			0.26	94.37					0.26	94.37
Earl & Bernice Sherer and Bank of America NT&SA	8.00		North Channel			0.10	36.30					0.10	36.30
Paulina Lee	20.80		North Channel			0.26	94.37					0.26	94.37
J G & Mattie M Dawson	20.80		North Channel			0.26	94.37					0.26	94.37
P Indart	50.80		North Channel					0.63	228.67			0.63	228.67
Paulina Lee	52.00		North Channel					1.05	381.12			1.05	381.12
J G & Mattie M Dawson	83.90		North Channel					1.05	381.12			1.05	381.12
Ella M Shartel	10.30		North Channel					0.14	50.82			0.14	50.82
C E & Mary A Crowder	114.20		North Channel					1.43	519.05			1.43	519.05
G R Stone	21.80		Stone					0.28	101.63			0.28	101.63
John & Fannie Morrison	124.60		Morrison, Morrison Middle, and/or Morrison Lower					1.56	566.24			1.56	566.24
Earl & Bernice Sherer and Bank of America NT&SA	8.00		Morrison, Morrison Middle, and/or Morrison Lower					0.10	36.30			0.10	36.30

Franklin Creek Decree
Modoc County Decree No. 3118

Seasons of Use		
Continuous, regardless of season	365.25	days
April 1 through September 30	183.00	days
		days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotments First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Total (cfs)	Total Face Value (AF)
Ira A & Ida M Hanson	9.60		Hanson North, Hanson Middle, and/or Hanson South					0.12	43.56			0.12	43.56
P Indart	30.80		South Channel					0.40	145.19			0.40	145.19
Paulina Lee	79.90		South Channel					0.85	308.53			0.85	308.53
C E & Mary A Crowder	70.50		South Channel					0.88	319.42			0.88	319.42
Ira A & Ida M Hanson	19.50		Hanson North, Hanson Middle, and/or Hanson South							0.25	90.74	0.25	90.74
P Indart	15.60		Indart Main							0.20	72.60	0.20	72.60
Paulina Lee	12.00		Lee Upper							0.15	54.45	0.15	54.45
John & Fannie Morrison	22.50		Morrison and/or Morrison Middle							0.28	101.63	0.28	101.63
Earl & Bernice Sherer and Bank of America NT&SA	51.60		Morrison, Morrison Middle, and/or Morrison Lower							0.65	235.93	0.65	235.93
Total Franklin Creek Allotments	909.35			0.18	63.52	1.46	529.94	8.49	3,081.66	1.53	555.35	11.66	4,230.48

Hat Creek Decree

Shasta County Decree No. 5724	Summer Season		
Shasta County Decree No. 7858	Winter Season		
Seasons of Use			
Continuous, regardless of season		365.25	days
May 1 through October 27		180.00	days
October 28 through April 30		185.25	days

Name of Claimant	Name of Diversion System	Allotments Allotment (cfs)	Allotment (AF)
Summer Season Decree No. 5724			
Upper Users, First Rotation - Schedule I			
Harvey W Wilcox	Harvey Wilcox Upper or Harvey Wilcox Lower	2.13	379.34
Vint W Stevenson	Stevenson	2.38	423.97
Carrie Klots Hall and W P Hall	Hall	2.75	490.91
Alec Brown (Indian)	Alec Brown	0.50	89.26
Charles Hawkins	Hawkins	2.25	401.65
Charles Hawkins	Harry Wilcox Middle	1.88	334.71
Harry M Wilcox	Harry Wilcox Upper	5.63	1,004.13
Harry M Wilcox	Harry Wilcox Middle	8.25	1,472.73
R A Wilcox and Amy Wilcox	Harry Wilcox Upper	1.50	267.77
R A Wilcox and Amy Wilcox	Harry Wilcox Middle	13.00	2,320.66
R A Wilcox and Amy Wilcox	Harry Wilcox Lower	1.00	178.51
R A Wilcox and Amy Wilcox	Rube Wilcox	2.88	513.22
Felice Kelly Davis	Rube Wilcox - Davis	2.13	379.34
Holliday Brown (Indian)	Harry Wilcox Middle	1.13	200.83
William Valentine	Valentine Upper	1.13	200.83
William Valentine	Valentine Lower	0.50	89.26
Charles Heryford	Heryford Upper	1.50	267.77
Charles Heryford	Heryford Middle	0.50	89.26
Charles Heryford	Heryford Lower	1.50	267.77
Edith Snook (Indian)	Edith Snook	0.50	89.26
J S Ratledge	Ratledge-Henry Lonquist	3.50	624.79
J S Ratledge	Ratledge-Opdyke-Forest Service	0.88	156.20
Olive Opdyke	Ratledge-Opdyke-Forest Service	5.88	1,048.76
Perry Opdyke, Percy Opdyke	Opdyke	11.88	2,119.83
Henry Lonquist	Ratledge-Henry Lonquist	1.88	334.71
H Morris	Morris Upper or Morris Lower	16.13	2,878.51
Iva Morris (Mrs A L Doty, Iva Doty)	Morris Upper or Morris Lower	6.13	1,093.39
Clare Brown, Fay Brown	Reiger	3.25	580.17
Charles Sidney Gray	Gray	1.00	178.51
Subtotal, Schedule I, First Rotation		103.50	18,476.03
Upper Users, Second Rotation - Schedule II			
	Harvey Wilcox Upper	0.25	44.63
	Harvey Wilcox Lower	0.25	44.63
	Stevenson	0.25	44.63
	Gray	0.13	22.31
	Hall	0.50	89.26
	Alec Brown	0.13	22.31
	Hawkins	0.25	44.63
	Harry Wilcox Upper	0.75	133.88
	Harry Wilcox Middle	1.00	178.51
	Rube Wilcox - Davis	0.50	89.26
	Harry Wilcox Lower	0.25	44.63
	Valentine Upper	0.25	44.63
	Valentine Lower	0.25	44.63
	Heryford Upper	0.25	44.63
	Heryford Middle	0.25	44.63
	Heryford Lower	0.25	44.63
	Edith Snook	0.13	22.31
	Ratledge-Henry Longquist	0.75	133.88
	Ratledge-Opdyke-Forest Service	0.75	133.88
	Opdyke	1.00	178.51
	Morris Upper	0.75	133.88
	Morris Lower	0.75	133.88
	Rieger (for Clare and Fay Brown)	0.50	89.26
Subtotal, Schedule II, Second Rotation		10.13	1,807.44
Lower Users, First Rotation - Schedule III			
Vernon March	Morris Upper or Morris Lower	13.50	2,409.92
Harry A Lonquist	Harry Lonquist	0.75	133.88
Harry A Lonquist	Rieger	3.75	669.42
Harry A Lonquist	Harry Lonquist-Reynolds-Bidwell	2.50	446.28
Harry A Lonquist	Harry Lonquist-Reynolds-East Side	2.25	401.65
Harry A Lonquist	Harry Lonquist-Reynolds-Middle	0.50	89.26
N Reynolds, A N Reynolds (F Allen)	Harry Lonquist-Reynolds-East Side	1.25	223.14

Hat Creek Decree			
Shasta County Decree No. 5724	Summer Season		
Shasta County Decree No. 7858	Winter Season		
Seasons of Use			
Continuous, regardless of season		365.25	days
May 1 through October 27		180.00	days
October 28 through April 30		185.25	days

Name of Claimant	Name of Diversion System	Allotments	
		Allotment (cfs)	Allotment (AF)
N Reynolds, A N Reynolds (F Allen)	Reynolds Canal	4.00	714.05
N Reynolds, A N Reynolds (F Allen)	Harry Lonquist-Reynolds-Middle	2.50	446.28
N Reynolds, A N Reynolds (F Allen)	Harry Lonquist-Reynolds-Bidwell	3.75	669.42
Henry Lonquist	Henry Lonquist	1.75	312.40
Henry Lonquist	Opdyke	0.13	22.31
Henry Lonquist	Henry & Fritz Lonquist Upper or Henry & Fritz Lonquist Lower	4.50	803.31
Fritz Lonquist	Henry & Fritz Lonquist Upper or Henry & Fritz Lonquist Lower	2.88	513.22
R E Bidwell	Harry Lonquist-Reynolds-Bidwell	8.75	1,561.98
Jeff Bone & Lee Bone (Indians)	Jeff Bone Upper	0.50	89.26
Jeff Bone & Lee Bone (Indians)	Jeff Bone Lower	0.50	89.26
Jeff Bone & Lee Bone (Indians)	Lee Bone	0.50	89.26
Sam Williams (Indian)	Lee Bone	0.50	89.26
Sam Williams (Indian)	Sam Williams	0.75	133.88
Julia Wilson (Indian)	Julia Wilson	2.00	357.02
Joe Wilson (Indian)	Joe Wilson	2.75	490.91
Harry Bob (Indian)	Julia Wilson	3.50	624.79
Ellen Brown (Alan Brown as successor)	Ellen Brown Upper	3.00	535.54
Ellen Brown (Alan Brown as successor)	Ellen Brown Lower	3.25	580.17
Ellen Brown (Alan Brown as successor)	Ellen Brown - W W Brown	4.00	714.05
Ellen Brown (Alan Brown as successor)	Hat Creek (no ditch)	2.00	357.02
W W Brown	Ellen Brown - W W Brown	7.50	1,338.84
W W Brown	Hat Creek (no ditch)	0.50	89.26
Charley Snooks (Indian)	Charley Snooks	0.50	89.26
David Doyel	Doyel	4.50	803.31
David Doyel	Hat Creek (no ditch)	0.50	89.26
David Doyel, Catherine Doyel, Effie May Doyel	Doyel	13.50	2,409.92
David Doyel, Catherine Doyel, Effie May Doyel	Hat Creek (no ditch)	5.75	1,026.45
Bertha Geissner	Bertha Geissner	10.25	1,829.75
Bertha Geissner	Doyel	2.00	357.02
Otto Geissner	Otto Geissner or Hat Creek (No Ditch)	8.00	1,428.10
Subtotal, Schedule III, First Rotation		129.00	23,028.10
Lower Users, Second Rotation - Scheduleee IV			
	Henry Lonquist	0.75	133.88
	Henry & Fritz Lonquist Upper	0.38	66.94
	Henry & Fritz Lonquist Lower	0.38	66.94
	Harry Lonquist	0.25	44.63
	Harry Lonquist-Reynolds-Bidwell	1.00	178.51
	Harry Lonquist-Reynolds-East Side	0.75	133.88
	Harry Lonquist-Reynolds-Middle	0.25	44.63
	Reynolds Canal	0.75	133.88
	Jeff Bone Upper	0.13	22.31
	Jeff Bone Lower	0.13	22.31
	Lee Bone	0.25	44.63
	Julia Wilson	0.25	44.63
	Sam Williams	0.25	44.63
	Joe Wilson	0.25	44.63
	Ellen Brown Upper	0.25	44.63
	Ellen Brown - W W Brown	1.00	178.51
	Ellen Brown Lower	0.25	44.63
	Charley Snooks	0.13	22.31
	Doyel	1.00	178.51
	Bertha Geissner	0.25	44.63
	Otto Geissner	0.50	89.26
Subtotal, Schedule IV, Second Rotation		9.13	1,628.93
Schedule 2 - Decree No. 7858			
Harvey W Wilcox	Harvey Wilcox Upper, Harvey Wilcox Middle, and/or Harvey Wilcox Lower	3.06	1,124.36
Vint W Stevenson	Upper Ranch, Stevenson Channel and/or Stevenson	5.20	1,910.68
Ruby F Hencrat and Charles W Gray	Gray	0.75	275.58
Carrie Klotz Hall and W P Hall	Hall	2.79	1,025.15

Hat Creek Decree

Shasta County Decree No. 5724	Summer Season
Shasta County Decree No. 7858	Winter Season

Seasons of Use

Continuous, regardless of season	365.25	days
May 1 through October 27	180.00	days
October 28 through April 30	185.25	days

		Allotments	
Name of Claimant	Name of Diversion System	Allotment (cfs)	Allotment (AF)
Mrs M H Shearin	Shearin Upper and/or Shearin Lower	0.96	352.74
Alex Brown (Indian)	Alex Brown	0.25	91.86
Estate of Harry M Wilcox and Emma E Wilcox	Hawkins, Harry Wilcox Upper and/or Harry Wilcox Middle	9.40	3,453.92
Gladys Gertrude Smith, Ermyl Roberta Ward, Ida May Wilcox	Harry Wilcox Middle, Wilcox Lower and/or Wilcox Davis	10.54	3,872.80
Holiday Brown (Indian)	Harry Wilcox Middle, and/or Holiday Brown	0.56	205.77
Dessie Snooks (Indian)	Wilcox-Davis	1.06	389.48
William Valentine and Fred Valentine	Valentine Upper and/or Valentine Lower	0.81	297.62
Charles Heryford	Heryford Upper, Herford Middle, and/or Herford Lower	1.75	643.02
Edith Snooks (Indian)	Edith Snooks	0.25	91.86
J S Ratledge and Sabilla J Ratledge	Ratledge-Lonquist and/or Ratledge-Opdyke-Forest Service	2.19	804.69
Perry Opdyke	Opdyke and/or Ratledge-Opdyke-Forest Service	8.88	3,262.85
Henry Lonquist	Ratledge-Lonquist, Henry Lonquist Upper and/or Henry Lonquist Lower	5.56	2,042.96
Iva Doty and Asa L Doty	Morris Upper and/or Morris Lower	11.12	4,085.91
S E Korns	Reiger	1.63	598.92
Vernon March	Morris Upper and/or Morris Lower	6.75	2,480.21
Harry A Lonquist	Harry Lonquist, Reiger, Lonquist-Reynolds-Bidwell, and/or Lonquist Reynolds	4.88	1,793.10
Sofia U Lonquist	Lonquist-Reynolds-Bidwell and/or Reynolds Dam	5.75	2,112.77
R E Bidwell	Lonquist-Reynolds-Bidwell and/or Bidwell	4.98	1,829.84
L H Sullivan and Eva B Sullivan	Reiger	2.30	845.11
Jackson Bone (Indian)	Bone Upper and/or Bone Lower	0.50	183.72
Lee Bone (Indian)	Lee Bone	0.50	183.72
Sam Williams (Indian)	Lee Bone and/or Williams	0.60	220.46
Julia Wilson (Indian)	Julia Wilson	1.00	367.44
Harry Bob (Indian)	Julia Wilson	1.75	643.02
Lorena Wilson Mitchell, Alta Wilson Mullen, Hattie Wilson, Flora Wilson, and Ira Wilson (Indians)	Joe Wilson	1.38	507.06
Alan Brown	Brown Upper, Brown Lower and/or Ellen Brown-W W Brown	6.13	2,252.40
W W Brown	Ellen Brown, W W Brown	4.60	1,690.21
Kate Snooks, Greely Snooks, Cecilia Barnes, and Dessie Snooks (Indians)	Charley Snooks	0.25	91.86
David Doyel, Catherine Doyel and Effie May Doyel	Doyel and/or Doyel East	12.12	4,453.35
Bertha Geissner	Bertha Geissner and/or Doyel	6.12	2,248.72
Otto Geissner	Otto Geissner	4.00	1,469.75
W E Dunwoody	Jones	0.50	183.72
Clara Grant (Indian)	Grant Upper and/or Grant Lower	0.50	183.72
Subtotal, Schedule 2, Decree No. 7858		131.37	48,270.33

Summary			Allotment (AF)
Upper Users, First Rotation - Schedule I	Summer Irrigation, Stockwater, Domestic	103.50	18,476.03
Upper Users, Second Rotation - Schedule II		10.13	1,807.44
Lower Users, First Rotation - Schedule III	Summer Irrigation, Stockwater, Domestic	129.00	23,028.10
Lower Users, Second Rotation - Schedulee IV		9.13	1,628.93
Schedule 2 - Decree No. 7858	Winter Irrigation, Stockwater, Domestic	131.37	48,270.33
Total, Hat Creek Decrees		383.12	93,210.83

North Fork Pit River (and all its
tributaries except for Franklin Creek)
Modoc County Decree No. 4074

Seasons of Use

Continuous, regardless of season	365.25	days
April 1 to September 30	183.00	days
April 15 to September 30	169.00	days

				Allotments											
Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Fifth Priority Class (cfs)	Fifth Priority Face Value (AF)	Total cfs	Total AF
Linville Creek and Its Tributaries Claimants															
Grace F Bonner	4.90	1	Crabtree	0.10	72.45									0.10	72.45
J W Watkins and Dottie Watkins	112.60	2, 3, 4, 5	Watkins Upper, Watkins House, Watkins Middle, Watkins Lower	1.60	1,159.14									1.60	1,159.14
C C Clarke and Belle Clarke	150.70	6, 7, 8, 9, 10	Clarke Pond, Clarke Upper, Clarke House, Clarke Upper Meadow, Clarke Lower Meadow	1.10	796.91	1.10	399.27							2.20	1,196.18
Milan S Renner	70.00	11, 12	Renner House, Page-Renner	1.01	731.71									1.01	731.71
Lake Shore Cattle Company	323.20	12, 148, 149, 150	Page-Renner, Page Upper Collecting, Page, Page Lower Collecting	0.10	72.45	3.29	1,194.19							3.39	1,266.63
Subtotal, Linville Creek Group	661.40			3.91	2,832.65	4.39	1,593.46	0.00	0.00	0.00	0.00	0.00	0.00	8.30	4,426.11
Joseph Creek and its Tributaries Claimants															
Martin Espil and Lucie Espil	80.00	14, 15, 16, 17, 18	Upper Shingle, Lower Shingle, South Couch, Upper Couch, Lower Couch	0.65	470.90					0.50	181.49			1.15	652.39
V L Jacobs and Georgia Jacobs	29.10	19, 152	Jacobs, Jacobs East Spring, Jacobs West Spring	0.40	289.79									0.40	289.79
Irivin K Wilson	89.00	20, 21, 22, 23	Wilson Upper, Wilson House, Wilson Main, Wilson Lower	1.19	862.11					0.09	32.67			1.28	894.78
LeRoy G Black	21.60	22	Wilson Main			0.40	145.19							0.40	145.19
LeRoy G Black	16.40	24	Joseph Creek	0.20	144.89	0.30	108.89							0.50	253.79
Carl William Blac, Mable Sophia Black, Walter Vernon Black, Mildred Black, LeRoy G Black and Capitola Nunn Black	234.20	24, 25	Joseph Creek, Lower Joseph	2.15	1,557.60					1.25	453.72			3.40	2,011.31
United States in Trust	62.80	26	X L Joseph			1.30	471.87							1.30	471.87
Carl William Blac, Mable Sophia Black, Walter Vernon Black, Mildred Black, LeRoy G Black and Capitola Nunn Black	253.50	27, 28, 29, 30	Schoolhouse, Black Upper, Black Middle, Black Lower			1.30	471.87	1.70	617.06	0.55	199.64			3.55	1,288.56
Subtotal, Joseph Creek Group	786.60			4.59	3,325.28	3.30	1,197.82	1.70	617.06	2.39	867.51	0.00	0.00	11.98	6,007.67
Thoms Creek and Its Tributaries Claimants															
Philip W McKenney	2.40	31, 31A, 31B, 32	Wortman 1st East, Wortman 2nd East, Wortman 3rd East, Wortman Lower	0.10	72.45									0.10	72.45
Herman Acty	9.00	38 to 40	Acty	0.20	144.89									0.20	144.89
Robert T Johnstone and Jeane Mary Johnstone	18.90	33, 34, 35, 36	Jones Upper Left, Jones Upper Right, Jones Lower Right, Jones Lower Left	0.10	72.45	0.38	127.38							0.48	199.82
Alfred DeWitt	69.10	37, 41 to 45	DeWitt Thoms, DeWitt Bowlin	0.30	217.34	1.05	351.97							1.35	569.31
Clyde Hays and Ruth Hays	33.20	46, 47 to 53, 57 to 59, 61	Hays Garden, Hays Meadow, Hays Cantrall, Hays Mile	0.27	195.60	0.98	328.50							1.25	524.11
Howard Royce and Pearl Royce	38.40	54, 55 ,56	H Royce Upper, H Royce Middle, H Royce Lower	0.04	28.98	0.42	140.79							0.46	169.77
Clara May DeWitt and Willie DeWitt	4.00	56A	Willie DeWitt			0.06	20.11							0.06	20.11

North Fork Pit River (and all its tributaries except for Franklin Creek)
Modoc County Decree No. 4074

Seasons of Use		
Continuous, regardless of season	365.25	days
April 1 to September 30	183.00	days
April 15 to September 30	169.00	days

				Allotments											
Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Fifth Priority Class (cfs)	Fifth Priority Face Value (AF)	Total cfs	Total AF
J M Royce	14.60	62, 63	Royce Upper Thoms, Royce Lower Thoms			0.10	33.52	0.15	50.28					0.25	83.80
Albert Stiner, Harold A Stiner, and Howard J Stiner	20.00	64, 65	Stiner Upper, Stiner Lower					0.40	134.08					0.40	134.08
C A Spaulding and Elsie Spaulding	42.30	66 to 70	Spaulding					0.84	281.57					0.84	281.57
Rufus S Carter, Charles M Carter, George Carter, Jacob M Carter, Oliver W Carter, Mrs. Jake Rechsteiner, and Mrs T A Read	21.10	69	Spaulding Lower North					0.30	100.56					0.30	100.56
The Federal Land Bank of Berkeley	32.40	71, 72, 73	Baker Upper, Baker North, Baker Lower			0.05	16.76	0.60	201.12					0.65	217.88
W F Dukes	1.30	74	Dukes			0.10	33.52							0.10	33.52
Subtotal, Thoms Creek Group	306.70			1.01	731.71	3.14	1,052.55	2.29	767.62	0.00	0.00	0.00	0.00	6.44	2,551.88
Gleason Creek and Its Tributaries Group															
Ella Russell	64.60	84, 85, 86	Russell Upper, Russell Middle, Russell Lower	0.20	144.89							0.80	290.38	1.00	435.27
Georgia M Jones	133.00	87, 88, 89, 90, 91	Jones North, Jones Upper South, Jones Pasture, Jones Middle South, Jones Lower South			0.20	144.89	1.80						2.00	144.89
J B Faulkner	10.00	86A, 86B, 86C	Faulkner Upper, Faulkner Middle, Faulkner Lower							0.20	72.60			0.20	72.60
United States in Trust	94.30	92	X L Gleason			0.20	144.89			1.15	417.42			1.35	562.31
Subtotal, Gleason Creek Group	301.90			0.20	144.89	0.40	289.79	1.80	0.00	1.35	490.02	0.80	290.38	4.55	1,215.07
Parker Creek and Its Tributaries Claimants															
P D McDowell and L Gayle McDowell	155.00	93, 95, 96, 98	Pepperdine-McDowell, McDowell Upper, McDowell House, McDowell Upper Meadow, McDowell Lower Meadow	0.21	152.14	1.89	686.02			0.15	54.45			2.25	892.61
Wheeler E Pepperdine & Nettie L Pepperdine	46.50	93, 100, 100A, 100B	Pepperdine-McDowell, Pepperdine Upper, Pepperdine Lower, Pepperdine House	0.07	50.71	0.63	228.67							0.70	279.39
W S Trumbo	111.50	101, 102, 103, 110	Trumbo Upper Shields, Trumbo Lower Shields, Trumbo Upper Isle, Trumbo Lower Isle	0.20	144.89	1.50	544.46							1.70	689.36
W S Trumbo	12.40	111, 112	Page Upper, Page Lower			0.20	72.60							0.20	72.60
Martha E Page	135.20	111, 112	Page Upper, Page Lower	0.20	144.89	1.70	617.06							1.90	761.95
Myrtle O Stanton	15.00	111, 112	Page Upper, Page Lower			0.20	72.60							0.20	72.60
Martha E Page	23.00	100, 133	Pepperdine Upper, Plum Canyon Reservoir							0.25	90.74			0.25	90.74
Leland Chester Porter, Floyd Eldon Porter, and Oakley Willis Porter	65.00	134	Plum Creek							0.50	181.49			0.50	181.49
James C Porter, Cleve Smith, and Carlton Porter	40.00	158A	Nikolai	0.10	72.45					0.90	326.68			1.00	399.12
Estate of A R Conklin	72.00	158	Conklin							0.63	228.67			0.63	228.67
G B Dorris	129.00	104, 105, 106	Payne Upper, Payne Noth, Payne Lower	0.20	144.89			1.60	580.76					1.80	725.65

North Fork Pit River (and all its
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Modoc County Decree No. 4074

Seasons of Use

Continuous, regardless of season	365.25	days
April 1 to September 30	183.00	days
April 15 to September 30	169.00	days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotments First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Fifth Priority Class (cfs)	Fifth Priority Face Value (AF)	Total cfs	Total AF
W S Trumbo	100.00	105, 107, 108, 109	Payne North, Trumbo South Parker, Trumbo North Parker, Stanton					1.30	471.87					1.30	471.87
Mytrle O Stanton	110.00	109	Stanton	0.20	144.89			1.40	508.17					1.60	653.06
Electa Fogarty	105.00	113	Fogarty-Porter	0.20	144.89			1.25	453.72					1.45	598.61
Martha E Page	24.00	114	Fogarty Upper					0.35	127.04					0.35	127.04
Electa Fogarty	10.00	115	Fogarty Lower					0.15	54.45					0.15	54.45
Leland Chester Porter, Floyd Eldon Porter, and Oakley Willis Porter	153.00	116, 117, 118, 120, 123, 124	Alice Porter Main, Alice Porter Upper North, Alice Porter Lower North, Parker, Peral Porter, Alice Porter Slough	0.20	144.89			1.78	646.10	0.20	72.60			2.18	863.58
Pearl F Gibson and C C Gibson	159.00	113, 121, 123	Fogarty-Porter, Porter Upper Reservoir Pearl Porter	0.20	144.89			0.63	228.67	0.29	105.26			1.12	478.83
Pearl F Gibson and C C Gibson	33.50	120	Parker					0.50	181.49					0.50	181.49
James C Porter and Estate of Phear E Porter	86.00	120	Parker	0.40	289.79			0.95	344.83					1.35	634.61
United States in Trust	160.00	130, 130A	X L Parker	0.20	144.89			2.77	1,005.44					2.97	1,150.33
Pearl F Gibson and C C Gibson	41.50	125, 126	Arnold P & J Porter Middle					0.65	235.93					0.65	235.93
James C Porter and Estate of Phear E Porter	67.50	127, 129A	Board Dam, Porter West	0.20	144.89			0.95	344.83					1.15	489.72
James C Porter	81.00	129A, 130, 131, 131A, 131B	Porter West, X L Parker, J C Porter Lower					1.30	471.87					1.30	471.87
Subtotal, Parker Creek Group	1,935.10			2.58	1,869.11	6.12	2,221.41	15.58	5,655.15	2.92	1,059.89	0.00	0.00	27.20	10,805.56
North Fork of Pit River Claimants															
M R Woody	19.50	13	Woody	0.35	253.56									0.35	253.56
United States in Trust	423.00	135, 136	X L Upper Lauer, Lauer, X L Middle, X L Lower	7.00	5,071.24									7.00	5,071.24
C J Clarke Co	10.30	137, 138	X L Upper Lauer, Lauer, X L Middle, X L Lower	0.20	144.89									0.20	144.89
Frank McArthur	635.20	136	Lauer							3.53	1,281.30			3.53	1,281.30
Charles Bettandorff and Georgie Bettandorff	56.70	139	North Fork			2.00	725.95					0.30	108.89	2.30	834.84
Hans A Hoesch and Margaret M Hoesch	184.20	139	North Fork	0.20	144.89	3.00	1,088.93					0.30	108.89	3.50	1,342.71
A Bolliger and A Keller	55.20	139	North Fork			0.80	290.38					0.30	108.89	1.10	399.27
Sarah Laird, Eda Laird, James R Laird, Mildred (Laird) Kenfield, and Fannie F Laird	136.90	139	North Fork	0.20	144.89	2.12	769.51			0.30	108.89			2.62	1,023.29
Estate of B F Lynip, deceased	550.70	139	North Fork	0.20	144.89	5.08	1,843.91					1.31	475.50	6.59	2,464.30
C A Raker	130.50	139	North Fork			3.20	1,161.52							3.20	1,161.52
A Bolliger and A Keller	236.70	141, 142	Gloster, Hughes					4.00	1,451.90					4.00	1,451.90
John C Noer	10.00	141, 142	Gloster, Hughes					0.16	58.08					0.16	58.08
M J Gloster & Annie G Gloster	68.30	141, 142, 143, 144	Gloster, Hughes, Walls Pump, Walls & Gloster					2.00	725.95					2.00	725.95
Mary E Walls & Eleanor W Asher	85.80	141, 142, 143, 144	Gloster, Hughes, Walls Pump, Walls & Gloster					1.44	522.68					1.44	522.68
Kirk Williams	5.00	141, 142, 143, 144	Gloster, Hughes, Walls Pump, Walls & Gloster					0.40	145.19					0.40	145.19
P S Dorris	1,985.90	142	Hughes							6.33	2,297.63			6.33	2,297.63
G B Dorris and Beryl Parker Dorris	1,626.20	142	Hughes							6.33	2,297.63			6.33	2,297.63
W E Minard	26.50	142	Hughes							0.30	108.89			0.30	108.89
O D Austin and Thelma Austin	132.30	146	Butcher									0.73	264.97	0.73	264.97
Subtotal, North Fork of Pit River Group	6,378.90			8.15	5,904.37	16.20	5,880.20	8.00	2,903.80	16.79	6,094.35	2.94	1,067.15	52.08	21,849.87
Special Class Continuous Usage															
C T Watkins	2.55	1,847.38													

North Fork Pit River (and all its
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Modoc County Decree No. 4074

Seasons of Use		
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April 1 to September 30	183.00	days
April 15 to September 30	169.00	days

				Allotments											
Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Fifth Priority Class (cfs)	Fifth Priority Face Value (AF)	Total cfs	Total AF
Grace F Bonner	0.03	21.73													
Electa Fogarty	1.00	724.46													
United States in Trust	0.10	72.45													
Subtotal, Speclal Class Continuous	3.68	2,666.02													
Surplus Class (Apr 1 - Sep 30)															
James C Porter	1.15	417.42													
Subtotal, Surplus Class	1.15	417.42													
Special Class (Apr 15 - Sep 30)															
J F Kerr	2.40	804.50													
F W Koenig and A H Koenig	0.20	67.04													
F L Wallace and Jane Wallace	2.40	804.50													
Subtotal, Special Class Apr 15-Sep 30	5.00	1,676.03													

North Fork Pit River (and all its
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April 1 to September 30	183.00	days
April 15 to September 30	169.00	days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotments First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Fifth Priority Class (cfs)	Fifth Priority Face Value (AF)	Total cfs	Total AF

Summary	Total cfs	Total AF
Linville Creek Group	8.30	4,426.11
Joseph Creek Group	11.98	6,007.67
Thoms Creek Group	6.44	2,551.88
Gleason Creek Group	4.55	1,215.07
Parker Creek Group	27.20	10,805.56
North Fork Pit River Group	52.08	21,849.87
Special Class Continuous Group	3.68	2,666.02
Surplus Class Group	1.15	417.42
Special Class Apr 15-Sep 30 Group	5.00	1,676.03
Total, All Groups	110.55	46,856.17

Rattlesnake Creek Decree (Pit River in Hot Springs Valley)
Modoc County Decree Recorded in Book 17, page 171

Seasons of Use

Continuous, regardless of season	365.25	days
April 1 through September 30	183.00	days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotments Allotment (cfs)	Allotment (AF)
Schedule 2, Allotments from Rattlensnake Creek and Pit River					
Spicer Corporation	399.00		Rattlesnake	2.00	725.95
P S Dorris and Bank of Modoc County (Hoy & Christen)	167.00		Butcher	1.15	417.42
Emma Godfrey	71.00		Barnes	0.90	326.68
Emma Godfrey, Estate of J W Cummins, A H Layton, John Strawn	124.00		Cummins	0.20	72.60
Hot Spring Valley Irrigation District, Estate of McBrien and McConnell, John Lybarger	225.00		McBrien	2.45	889.29
James M Edwards, Estate of G C Lindauer, Hot Spring Valley Irrigation District (Lindauer)	521.00		Lindauer Upper	0.80	290.38
Estate of G C Lindauer, Hot Spring Valley Irrigation District	242.00		Lindauer Lower	0.55	199.64
Estate of G C Lindauer, Frank McArthur, John Kelley, C S Baldwin, Hot Springs Valley Irrigation District	492.00		McArthur Upper	0.60	217.79
Frank McArthur	140.00		McArthur Lower	0.45	163.34
Frank McArthur, Bank of Modoc County (Claussen), Federal Land Bank of Berkeley	253.00		Claussen	0.40	145.19
Bank of Modoc County (Claussen), Ira Hulbert, Bank of Modoc County (Connelly), George Fellencer, Katherine E Hazelton, California Joint Stock Land Bank (Fitzhugh)	538.00		Fellencer	0.20	72.60
California Joint Stock Land Bank (Fitzhugh), Bank of Modoc County (Connelly)	273.00		Fitzhugh	0.65	235.93
California Joint Stock Land Bank (Fitzhugh), Bank of Modoc County (Connelly), George Fellencer, Estate of G L Kramer	220.00		Marie Caldwell Upper	0.40	145.19
Estate of G L Kramer	100.00		Marie Caldwell Lower	0.55	199.64
G B Wilcox	166.00		Warren Caldwell	1.10	399.27
G B Wilcox	99.00		Hughes	0.40	145.19
Federal Land Bank of Berkeley	28.00		Howe	0.80	290.38
Federal Land Bank of Berkeley (Howe), Lizzie D Pope	89.00		Lizzie Pope	0.40	145.19
Hot Spring Valley Irrigation District (Shelton)	0.00		No Dam	Stockwater	0.00
Hot Spring Valley Irrigation District (Anklin)	0.00		No Dam		0.00
Hot Spring Valley Irrigation District (Mohr)	0.00		No Dam		0.00
Mary L Elledge	0.00		No Dam		0.00
Dora H Kelley	0.00		No Dam		0.00
Subtotal, Schedule 2	4,147.00			14.00	5,081.65
Schedule 3 Allotments from Pit River and Rattlesnake Creek					
Estate of J M Clark	22.00		Kelley Ditch	0.44	159.71
Emma Godfrey	3.00		Kelley Ditch	0.06	21.78
Estate of J W Cummins	37.00		Kelley Ditch	0.74	268.60
S B and B L Kelley	43.00		Kelley Ditch	0.86	312.16
S B Kelley	4.00		Kelley Ditch	0.08	29.04
Dora B Kelley	82.00		Kelley Ditch	1.64	595.28
A H Layton	1.00		Kelley Ditch	0.02	7.26
T W Lush	15.00		Kelley Ditch	0.30	108.89
Spicer Corporation	35.00		Rattlesnake Canal	0.70	254.08
Pickering Lumber Company	39.00		Rattlesnake Canal	0.78	283.12
Spicer Corporation	364.00		Rattlesnake Creek and/or Rattlesnake Canal	7.28	2,642.46
Bank of Modoc County	4.00		Rattlesnake Creek and/or Rattlesnake Canal	0.08	29.04
P S Dorris	39.00		Butcher Dam	0.78	283.12
Bank of Modoc County	128.00		Butcher Dam	2.56	929.22
Emma Godfrey	71.00		Barnes Dam	1.42	515.42
Estate of J W Cummins	35.00		Barnes Dam, Cummins Dam, and/or Kelley Ditch	0.70	254.08

Rattlesnake Creek Decree (Pit River in Hot Springs Valley)
Modoc County Decree Recorded in Book 17, page 171

Seasons of Use		
Continuous, regardless of season	365.25	days
April 1 through September 30	183.00	days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotments Allotment (cfs)	Allotment (AF)
A H Layton	32.00		Barnes Dam, Cummins Dam, and/or Kelley Ditch	0.64	232.30
Emma Godfrey	57.00		Barnes Dam, Cummins Dam, and/or Kelley Ditch	1.14	413.79
John Strawn	3.00		Barnes Dam, Cummins Dam, and/or Kelley Ditch	0.06	21.78
Hot Spring Valley Irrigation District	179.00		McBrien Dam	3.58	1,299.45
Estates of McBrien and McConnell	30.00		McBrien Dam	0.60	217.79
John Lybarger	16.00		McBrien Dam	0.32	116.15
James M Edwards	44.00		Lindauer Upper Dam	0.88	319.42
Estate of G C Lindauer	136.00		Lindauer Upper Dam	2.72	987.29
Hot Spring Valley Irrigation District	83.00		Lindauer Upper Dam	1.66	602.54
Estate of G C Lindauer	59.00		Lindauer Upper and/or Lower Dam	1.18	428.31
Hot Spring Valley Irrigation District	441.00		Lindauer Upper and/or Lower Dam	8.82	3,201.44
Estate of G C Lindauer	20.00		Lindauer Upper Dam, Lindauer Lower Dam, and/or McArthur Upper Dam	0.40	145.19
Frank McArthur	542.00		McArthur Upper and/or Lower Dam	10.84	3,934.65
John Kelley	12.00		McArthur Upper and/or Lower Dam	0.24	87.11
C S Baldwin	47.00		McArthur Upper and/or Lower Dam	0.94	341.20
Hot Spring Valley Irrigation District	65.00		McArthur Upper and/or Lower Dam	1.30	471.87
Frank McArthur	122.00		McArthur Upper Dam, McArthur Lower Dam, and/or Claussen Dam	2.44	885.66
Federal Land Bank of Berkeley	37.00		Claussen Dam	0.74	268.60
Bank of Modoc County	65.00		Claussen Dam, and/or Fellencer Dam	1.30	471.87
Katherine E Hazelton	94.00		Fellencer Dam	1.88	682.39
George Fellencer	259.00		Fellencer Dam	5.18	1,880.21
Bank of Modoc County	107.00		Fellencer Dam	2.14	776.77
Ira Hulbert	23.00		Fellencer Dam	0.46	166.97
California Joint Stock Land Bank	50.00		Fellencer Dam and/or Fitzhugh Dam	1.00	362.98
California Joint Stock Land Bank	228.00		Fitzhugh Dam	4.56	1,655.17
Bank of Modoc County	25.00		Fitzhugh Dam	0.50	181.49
California Joint Stock Land Bank	4.00		Marie Caldwell Upper Dam	0.08	29.04
Bank of Modoc County	73.00		Marie Caldwell Upper Dam	1.46	529.94
George Fellencer	54.00		Marie Caldwell Upper Dam	1.08	392.01
Estate of G L Kramer	89.00		Marie Caldwell Upper Dam	1.78	646.10
Estate of G L Kramer	100.00		Marie Caldwell Lower Dam	2.00	725.95
G B Wilcox	166.00		Warren Caldwell Dam	3.32	1,205.08
G B Wilcox	10.00		Hughes Dam	0.20	72.60
Annie Hughes	89.00		Hughes Dam	1.78	646.10
Federal Land Bank of Berkeley	28.00		Howe Dam	0.56	203.27
Federal Land Bank of Berkeley	25.00		Lizzie Pope Dam	0.50	181.49
Lizzie D Pope	64.00		Lizzie Pope Dam	1.28	464.61
Subtotal Schedule 3	4,400.00			88.00	31,941.82

Summary	Allotment (cfs)	Allotment (AF)
Schedule 2	14.00	5,081.65

Rattlesnake Creek Decree (Pit River in Hot Springs Valley)
Modoc County Decree Recorded in Book 17, page 171

Seasons of Use

Continuous, regardless of season	365.25	days
April 1 through September 30	183.00	days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotments Allotment (cfs)	Allotment (AF)
Schedule 3	88.00	31,941.82			
Total	102.00	37,023.47			

Roaring Creek Decree
Shasta County, Decree No. 83723

Seasons of Use		
Continuous, regardless of season	365.25	days
April 1 through November 1	215.00	days
November 1 through April 1	150.25	days

				Allotments									
Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Total cfs	Total AF
Schedule 3, Roaring Creek Claimants													
Reich, Walter H and Annabel	16.00	3								0.75	319.83	0.75	319.83
Vopat, Frank	10.00	3								0.47	200.43	0.47	200.43
Parham, Eugene and Linda et al	19.00	3								0.89	379.54	0.89	379.54
Epperson, Ronald T and Theresa M	4.00	3								0.19	81.02	0.19	81.02
Henry, Lynn and Christine	15.00	5		0.75	319.83							0.75	319.83
Carroll, Jerry T and Charlene C	25.00	5		1.26	537.32							1.26	537.32
Miller, Jack O and Helen	2.00	6								0.12	51.17	0.12	51.17
Leonard, Vernon I and Leona J	10.00	6								0.60	255.87	0.60	255.87
Caldwell, F B III and Easton, R B	5.00	6								0.30	127.93	0.30	127.93
Easton, Robert B and Constance C	3.00	6								0.18	76.76	0.18	76.76
Cantrell, Gloria	2.00	6								0.12	51.17	0.12	51.17
Bay Histology Service	2.00	2								0.12	51.17	0.12	51.17
Meckley, Chester and Mary J	Domestic	6								0.36	153.52	0.36	153.52
Terry, Eugene F and Marsha P	Domestic									0.01	7.24	0.01	7.24
Van Steene, Jack L and Doris A	Domestic									0.01	7.24	0.01	7.24
Nipper, Jack J and Grace M	Domestic									0.01	7.24	0.01	7.24
Reddick, Arthur C and Sally	Domestic									0.01	7.24	0.01	7.24
Sivain, Susan Marie Wimbler	Domestic									0.01	7.24	0.01	7.24
Garnett, Bernard E and Ruth M	Domestic									0.01	7.24	0.01	7.24
Close, James and Lucille	1.00	1								0.06	25.59	0.06	25.59
Wilson, Thomas E and Gayle A	Domestic									0.01	7.24	0.01	7.24
Richard, Charles L and Evelyn A	3.00	3								0.18	76.76	0.18	76.76
Roderick, James C and Delores J	5.00	5						0.15	63.97			0.15	63.97
Subtotal, Schedule 3, Roaring Creek Claimants	122.00			2.01	857.16	0.00	0.00	0.15	63.97	4.41	1,901.49	6.57	2,822.61
Schedule 4, Jake Creek Claimants													
Reich, Walter H and Annabel	16.00	4				0.75	319.83					0.75	319.83
Vopat, Frank	10.00	4				0.47	200.43					0.47	200.43
Parham, Eugene and Linda et al	19.00	4				0.89	379.54					0.89	379.54
Epperson, Ronald T and Theresa M	4.00	4				0.19	81.02					0.19	81.02
Subtotal, Schedule 4, Jake Creek Claimants	49.00			0.00	0.00	2.30	980.83	0.00	0.00	0.00	0.00	2.30	980.83
Schedule 5, Browns Creek Claimants													
Parham, Eugene and Linda et al	19.00					0.89	379.54					0.89	379.54
Epperson, Ronald T and Theresa M	4.00					0.19	81.02					0.19	81.02
Parham, Eugene and Linda et al	2.00							0.04	17.06			0.04	17.06
Henry, Lynn and Christine	15.00			0.75	319.83							0.75	319.83
Carroll, Jerry T and Charlene C	25.00									1.26	537.32	1.26	537.32
Subtotal, Schedule 5, Browns Creek Claimants	65.00			0.75	319.83	1.08	460.56	0.04	17.06	1.26	537.32	3.13	1,334.78
Schedule 6, Miscellaneous Claimants													
U S Forest Service				1500 gpd								0.00	0.00

Roaring Creek Decree
Shasta County, Decree No. 83723

Seasons of Use

Continuous, regardless of season	365.25	days
April 1 through November 1	215.00	days
November 1 through April 1	150.25	days

				Allotments									
Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Total cfs	Total AF
U S Forest Service				0.06	43.47							0.06	43.47
Roseberg Lumber Co				0.05	36.22							0.05	36.22
Subtotal, Schedule 6, Miscellaneous Claimants	0.00			0.11	79.69	0.00	0.00	0.00	0.00	0.00	0.00	0.11	79.69
Paragraph 19: Winter Season Domestic and Stockwater Entitlement													
Schedule 3, Roaring Creek Claimants													
Reich, Walter H and Annabel	16.00	3		0.01	2.98								
Vopat, Frank	10.00	3		0.01	2.98								
Parham, Eugene and Linda et al	19.00	3		0.01	2.98								
Epperson, Ronald T and Theresa M	4.00	3		0.01	2.98								
Henry, Lynn and Christine	15.00	5		0.01	2.98								
Carroll, Jerry T and Charlene C	25.00	5		0.01	2.98								
Miller, Jack O and Helen	2.00	6		0.01	2.98								
Leonard, Vernon I and Leona J	10.00	6		0.01	2.98								
Caldwell, F B III and Easton, R B	5.00	6		0.01	2.98								
Easton, Robert B and Constance C	3.00	6		0.01	2.98								
Cantrell, Gloria	2.00	6		0.01	2.98								
Bay Histology Service	2.00	2		0.01	2.98								
Meckley, Chester and Mary J	Domestic	6											
Terry, Eugene F and Marsha P	Domestic												
Van Steene, Jack L and Doris A	Domestic												
Nipper, Jack J and Grace M	Domestic												
Reddick, Arthur C and Sally	Domestic												
Sivain, Susan Marie Wimbler	Domestic												
Garnett, Bernard E and Ruth M	Domestic												
Close, James and Lucille	1.00	1		0.01	2.98								
Wilson, Thomas E and Gayle A	Domestic												
Richard, Charles L and Evelyn A	3.00	3		0.01	2.98								
Roderick, James C and Delores J	5.00	5		0.01	2.98								
Subtotal, Schedule 3, Roaring Creek Claimants	122.00			0.15	44.70								
Schedule 4, Jake Creek Claimants													
Reich, Walter H and Annabel	16.00	4		0.01	2.98								
Vopat, Frank	10.00	4		0.01	2.98								
Parham, Eugene and Linda et al	19.00	4		0.01	2.98								
Epperson, Ronald T and Theresa M	4.00	4		0.01	2.98								
Subtotal, Schedule 4, Jake Creek Claimants	49.00			0.04	11.92								
Schedule 5, Browns Creek Claimants													
Parham, Eugene and Linda et al	19.00			0.01	2.98								
Epperson, Ronald T and Theresa M	4.00			0.01	2.98								
Parham, Eugene and Linda et al	2.00			0.01	2.98								
Henry, Lynn and Christine	15.00			0.01	2.98								
Carroll, Jerry T and Charlene C	25.00			0.01	2.98								

Roaring Creek Decree
Shasta County, Decree No. 83723

Seasons of Use		
Continuous, regardless of season	365.25	days
April 1 through November 1	215.00	days
November 1 through April 1	150.25	days

				Allotments									
Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Total cfs	Total AF
Subtotal, Schedule 5, Browns Creek Claimants	65.00			0.05	14.90								
Subtotal, Winter Season Domestic & Stockwater Allotments	236.00			0.24	71.52								

Summary	Total cfs	Total AF
Subtotal, Schedule 3, Roaring Creek Claimants	6.57	2,822.61
Subtotal, Schedule 4, Jake Creek Claimants	2.30	980.83
Subtotal, Schedule 5, Browns Creek Claimants	3.13	1,334.78
Subtotal, Schedule 6, Miscellaneous Claimants	0.11	79.69
Subtotal, Winter Season Domestic & Stockwater Allotments	0.24	71.52
Total, Roaring Creek Stream System Decree Claims	12.35	5,289.43

South Fork Pit River Decree
Modoc County Decree No. 3273

Seasons of Use

Continuous, regardless of season	365.25	days
April 1 to June 30	91.00	days
April 1 to October 15	198.00	days
July 1 to July 21	21.00	days
July 22 to August 11	21.00	days
August 12 to October 15	65.00	days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotments First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Total cfs	Total AF
Schedule 2, Fitzhugh Creek and Its Tributaries Claimants									
John Blevins, Cecil Blevins, and Willetta L Blevins (Bowman)	67.50	124	North Fitzhugh Creek	0.60	235.64			0.60	235.64
Cornelia A Hershey, Davidella Hershey, Grace H Hershey, D N Hershey, and Florence F Hershey	104.50	125	North Fitzhugh Creek	1.00	392.73	0.60	235.64	1.60	628.36
Minnie Derevan	20.10	126, 127	North Fitzhugh Creek	0.50	362.23			0.50	362.23
Walter Cantrall, Elsie A Cantrall, A E Sweeney, and Frances E Sweeney	77.40	128 to 131	Middle and South Fitzhugh Creeks	0.50	362.23	0.70	274.91	1.20	637.14
Minnie Derevan	46.50	132 to 135	South Fitzhugh Creek			0.70	274.91	0.70	274.91
George M Clark and J E Clark	322.00	137 to 141	Fitzhugh Creek	0.60	434.68	4.40	1,728.00	5.00	2,162.68
Frank McArthur and Ethel M McArthur	316.50	142	Fitzhugh Creek	0.20	144.89	4.70	1,845.82	4.90	1,990.71
W E Armstrong	30.00	142	Fitzhugh Creek	0.20	144.89	0.30	117.82	0.50	262.71
Subtotal, Schedule 2, Fitzhugh Creek Claimants	984.50			3.60	2,077.29	11.40	4,477.09	15.00	6,554.38

South Fork Pit River Decree
Modoc County Decree No. 3273

Seasons of Use

Continuous, regardless of season	365.25	days
April 1 to June 30	91.00	days
April 1 to October 15	198.00	days
July 1 to July 21	21.00	days
July 22 to August 11	21.00	days
August 12 to October 15	65.00	days

				Allotments					
Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Total cfs	Total AF
Schedule 3, South Fork of Pit River and Its Tributaries Claimants									
John McGarva, Peter B McGarva, and Phyllis McGarva	121.80	40 to 46	North and South Forks of Parsnip Creek	0.85	615.79	0.90	162.45	1.75	778.24
J C Van Loan	572.20	47, 48, 49	West Valley Creek	3.65	2,644.29	4.50	812.23	8.15	3,456.52
Frank McArthur and Ethel M McArthur	293.30	1	Mill Creek	1.90	746.18			1.90	746.18
John Blevins, Cecil Blevins, and Willetta L Blevins			Mill Creek	0.44	318.76			0.44	318.76
A J Cantrall and Ida Cantrall	152.30	5, 6, 7, 9	Mill Creek	0.85	615.79	1.65	297.82	2.50	913.61
W S Brooks and Ada H Brooks	22.00	5, 6, 7, 9	Mill Creek					0.00	0.00
Walter Cantrall, Elsie A Cantrall	176.50	2, 3, 4, 7, 8, 9	Mill Creek	0.85	615.79	1.85	333.92	2.70	949.71
W S Brooks and Ada H Brooks	10.50	2, 3, 4, 7, 8, 9	Mill Creek					0.00	0.00
W S Brooks and Ada H Brooks	114.20	10 to 13	Mill Creek	0.85	615.79	1.15	207.57	2.00	823.36
Bessie Whitman and Della Johnson	24.20	21, 22	Soup Creek					0.00	0.00
Arthur Flournoy	91.90	4	Mill Creek	0.85	615.79	1.15	207.57	2.00	823.36
Bessie Whitman and Della Johnson	48.80	4	Mill Creek					0.00	0.00
Felice Leoni	148.00	2, 3, 4	Mill Creek	0.85	615.79	1.25	225.62	2.10	841.41
Bessie Whitman and Della Johnson	10.20	14	Mill Creek			0.15	27.07	0.15	27.07
Arthur Flournoy	178.10	23, 24	Mill Creek			2.80	505.39	2.80	505.39
Bessie Whitman and Della Johnson	19.30	23, 24	Mill Creek					0.00	0.00
George Campbell	52.40	27 to 32	East Creek	0.85	615.79	0.25	45.12	1.10	660.92
Arthur Flournoy	23.70	27 to 32	East Creek					0.00	0.00
Arthur Flournoy	1,736.50	27, 30, 33 to 39	East Creek	5.00	3,622.31	19.80	3,573.82	24.80	7,196.13
Verdi Lumber Company	73.00	50	South Fork of Pit River	0.25	181.12	1.53	276.16	1.78	457.27
Royal E Williams, Marion G Williams and Ann Eliza Duke	150.00	50	South Fork of Pit River			0.70	126.35	0.70	126.35
Arthur Flournoy	56.70	50	South Fork of Pit River	0.40	289.79			0.40	289.79
Arthur Flournoy	80.00	50	South Fork of Pit River	0.33	239.07	1.27	229.23	1.60	468.30
A T Coffman and Eppa W Coffman	171.70	50	South Fork of Pit River	0.18	130.40	1.90	342.94	2.08	473.35
A L Stinson, and Mary E Stinson	7.00	50	South Fork of Pit River	0.08	57.96			0.08	57.96
Douglas McGarva and Margaret McGarva	33.00	50	South Fork of Pit River	0.50	362.23			0.50	362.23
Town of Likely		50	South Fork of Pit River	0.06	43.47			0.06	43.47
Verdi Lumber Company	97.00	51	South Fork of Pit River	0.40	289.79	0.80	144.40	1.20	434.18
Homer Blevins	93.00	51	South Fork of Pit River	0.40	289.79	0.80	144.40	1.20	434.18
John Blevins, Cecil Blevins, and Willetta L Blevins	101.20	51	South Fork of Pit River	0.40	289.79	0.80	144.40	1.20	434.18

South Fork Pit River Decree
Modoc County Decree No. 3273

Seasons of Use

Continuous, regardless of season	365.25	days
April 1 to June 30	91.00	days
April 1 to October 15	198.00	days
July 1 to July 21	21.00	days
July 22 to August 11	21.00	days
August 12 to October 15	65.00	days

				Allotments					
Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Total cfs	Total AF
Dolph E Van Loan and Eva Van Loan	1.00	51	South Fork of Pit River					0.00	0.00
W H Flournoy and Gladys W Flournoy	160.50	52	South Fork of Pit River	0.17	123.16	1.28	231.03	1.45	354.19
Gary Williams and Theresa Williams	286.30		South Fork of Pit River	0.51	369.48	3.84	693.10	4.35	1,062.58
J A Hughes and Willie W Hughes	426.60		South Fork of Pit River	0.68	492.63	5.12	924.14	5.80	1,416.77
Frank McArthur and Ethel M McArthur	515.50		South Fork of Pit River	0.68	492.63	5.12	924.14	5.80	1,416.77
Dolph E Van Loan and Eva Van Loan	111.00	53	South Fork of Pit River	0.25	181.12	1.35	243.67	1.60	424.79
Dolph E Van Loan and Eva Van Loan	345.00		South Fork of Pit River	0.75	543.35	4.05	731.01	4.80	1,274.36
W H Flournoy and Gladys W Flournoy	294.10		South Fork of Pit River	0.50	362.23	2.70	487.34	3.20	849.57
Arthur Flournoy	10.00		South Fork of Pit River					0.00	0.00
Arthur Flournoy	400.00	54	South Fork of Pit River	1.50	1,086.69	3.50	631.74	5.00	1,718.43
F E Humphrey, V F Christensen and Charlotte E Christensen	400.00		South Fork of Pit River			5.00	902.48	5.00	902.48
Gary Williams and Theresa Williams	170.10	55	South Fork of Pit River			2.15	388.07	2.15	388.07
Frank McArthur and Ethel M McArthur	3,414.80	56, 58, 59, 61 to 77, 87 to 91	East Side Canal	1.25	905.58	43.55	7,860.60	44.80	8,766.17
Frank McArthur and Ethel M McArthur	230.60	92 to 96, 98	East Side Canal			3.00	541.49	3.00	541.49
S J Vaughon	17.30	92 to 96, 98	East Side Canal			0.25	45.12	0.25	45.12
Dolph E Van Loan and Eva Van Loan	480.00	57	East Side Canal	0.25	181.12	6.05	1,092.00	6.30	1,273.12
Mrs Katie H Nelson	526.30	60	East Side Canal	0.25	181.12	6.65	1,200.30	6.90	1,381.41
W E Armstrong	206.00	78 to 86	East Side Canal	0.25	181.12	2.45	442.21	2.70	623.33
W E Armstrong	144.60	97	East Side Canal			1.90	342.94	1.90	342.94
F E Humphrey, V F Christensen and Charlotte E Christensen	122.30	99	West Side Canal	0.10	72.45	1.45	261.72	1.55	334.17
Dolph E Van Loan and Eva Van Loan	140.00	99	West Side Canal	0.10	72.45	1.65	297.82	1.75	370.26
Frank McArthur and Ethel M McArthur	161.80	99	West Side Canal	0.10	72.45	1.95	351.97	2.05	424.41
F E Humphrey, V F Christensen and Charlotte E Christensen	1,251.10	100 to 104	West Side Canal	0.90	652.02	14.95	2,698.41	15.85	3,350.43
John McGarva, Peter B McGarva, and Phyllis McGarva	219.50	105	West Side Canal	0.15	108.67	2.65	478.31	2.80	586.98
R J Gaustad and Nellie Gaustad	175.00	106, 107	West Side Canal	0.15	108.67	2.05	370.02	2.20	478.69
R O Gaustad	77.00	106, 107	West Side Canal	0.05	36.22	0.95	171.47	1.00	207.69
R O Gaustad	75.00	108	West Side Canal	0.05	36.22	0.90	162.45	0.95	198.67
Raymond Stepp Bertha L Stepp, Lena Graham and Herbie Graham	90.00	108	West Side Canal	0.10	72.45	1.05	189.52	1.15	261.97
Frank McArthur and Ethel M McArthur	1,161.20	109 to 123	West Side Canal	0.80	579.57	13.90	2,508.89	14.70	3,088.46
Subtotal, Schedule 3, South Fork Pit River and Tributaries Claimants	16,271.10			29.48	20,074.85	182.71	30,279.99	196.34	50,354.84
Schedule 3, Surplus Rotational Allotments for Second Priority Class Claimants, July 1 through July 21									

South Fork Pit River Decree
Modoc County Decree No. 3273

Seasons of Use

Continuous, regardless of season	365.25	days
April 1 to June 30	91.00	days
April 1 to October 15	198.00	days
July 1 to July 21	21.00	days
July 22 to August 11	21.00	days
August 12 to October 15	65.00	days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotments First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Total cfs	Total AF
John McGarva, Peter B McGarva, and Phyllis McGarva	121.80	40 to 46	North and South Forks of Parsnip Creek			0.90	37.49		
J C Van Loan	572.20	47, 48, 49	West Valley Creek			4.50	187.44		
Frank McArthur and Ethel M McArthur	293.30	1	Mill Creek						
John Blevins, Cecil Blevins, and Willetta L Blevins			Mill Creek						
A J Cantrall and Ida Cantrall	152.30	5, 6, 7, 9	Mill Creek			1.65	68.73		
W S Brooks and Ada H Brooks	22.00	5, 6, 7, 9	Mill Creek						
Walter Cantrall, Elsie A Cantrall	176.50	2, 3, 4, 7, 8, 9	Mill Creek			1.85	77.06		
W S Brooks and Ada H Brooks	10.50	2, 3, 4, 7, 8, 9	Mill Creek						
W S Brooks and Ada H Brooks	114.20	10 to 13	Mill Creek			1.15	47.90		
Bessie Whitman and Della Johnson	24.20	21, 22	Soup Creek						
Arthur Flournoy	91.90	4	Mill Creek			1.15	47.90		
Bessie Whitman and Della Johnson	48.80	4	Mill Creek						
Felice Leoni	148.00	2, 3, 4	Mill Creek			1.25	52.07		
Bessie Whitman and Della Johnson	10.20	14	Mill Creek			0.15	6.25		
Arthur Flournoy	178.10	23, 24	Mill Creek			2.80	116.63		
Bessie Whitman and Della Johnson	19.30	23, 24	Mill Creek						
George Campbell	52.40	27 to 32	East Creek			0.25	10.41		
Arthur Flournoy	23.70	27 to 32	East Creek						
Arthur Flournoy	1,736.50	27, 30, 33 to 39	East Creek			19.80	824.73		
Subtotal, July 1 to 21 Surplus Rotation Claimants	3,795.90					35.45	1,476.60		
Schedule 3, Surplus Rotational Allotments for Second Priority Class Claimants, July 22 through August 11									
Verdi Lumber Company	73.00	50	South Fork of Pit River			1.53	63.73		
Royal E Williams, Marion G Williams and Ann Eliza Duke	150.00	50	South Fork of Pit River			0.70	29.16		
Arthur Flournoy	56.70	50	South Fork of Pit River						
Arthur Flournoy	80.00	50	South Fork of Pit River			1.27	52.90		
A T Coffman and Eppa W Coffman	171.70	50	South Fork of Pit River			1.90	79.14		
A L Stinson, and Mary E Stinson	7.00	50	South Fork of Pit River						
Douglas McGarva and Margaret McGarva	33.00	50	South Fork of Pit River						
Town of Likely		50	South Fork of Pit River						
Verdi Lumber Company	97.00	51	South Fork of Pit River			0.80	33.32		
Homer Blevins	93.00	51	South Fork of Pit River			0.80	33.32		

South Fork Pit River Decree
Modoc County Decree No. 3273

Seasons of Use

Continuous, regardless of season	365.25	days
April 1 to June 30	91.00	days
April 1 to October 15	198.00	days
July 1 to July 21	21.00	days
July 22 to August 11	21.00	days
August 12 to October 15	65.00	days

				Allotments					
Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Total cfs	Total AF
John Blevins, Cecil Blevins, and Willetta L Blevins	101.20	51	South Fork of Pit River			0.80	33.32		
Dolph E Van Loan and Eva Van Loan	1.00	51	South Fork of Pit River						
W H Flournoy and Gladys W Flournoy	160.50	52	South Fork of Pit River			1.28	53.32		
Gary Williams and Theresa Williams	286.30		South Fork of Pit River			3.84	159.95		
J A Hughes and Willie W Hughes	426.60		South Fork of Pit River			5.12	213.26		
Frank McArthur and Ethel M McArthur	515.50		South Fork of Pit River			5.12	213.26		
Dolph E Van Loan and Eva Van Loan	111.00	53	South Fork of Pit River			1.35	56.23		
Dolph E Van Loan and Eva Van Loan	345.00		South Fork of Pit River			4.05	168.69		
W H Flournoy and Gladys W Flournoy	294.10		South Fork of Pit River			2.70	112.46		
Arthur Flournoy	10.00		South Fork of Pit River						
Arthur Flournoy	400.00	54	South Fork of Pit River			3.50	145.79		
F E Humphrey, V F Christensen and Charlotte E Christensen	400.00		South Fork of Pit River			5.00	208.26		
Gary Williams and Theresa Williams	170.10	55	South Fork of Pit River			2.15	89.55		
Frank McArthur and Ethel M McArthur	3,414.80	56, 58, 59, 61 to 77, 87 to 91	East Side Canal			43.55	1,813.98		
Frank McArthur and Ethel M McArthur	230.60	92 to 96, 98	East Side Canal			3.00	124.96		
S J Vaughon	17.30	92 to 96, 98	East Side Canal			0.25	10.41		
Dolph E Van Loan and Eva Van Loan	480.00	57	East Side Canal			6.05	252.00		
Mrs Katie H Nelson	526.30	60	East Side Canal			6.65	276.99		
W E Armstrong	206.00	78 to 86	East Side Canal			2.45	102.05		
W E Armstrong	144.60	97	East Side Canal			1.90	79.14		
F E Humphrey, V F Christensen and Charlotte E Christensen	122.30	99	West Side Canal			1.45	60.40		
Dolph E Van Loan and Eva Van Loan	140.00	99	West Side Canal			1.65	68.73		
Frank McArthur and Ethel M McArthur	161.80	99	West Side Canal			1.95	81.22		
F E Humphrey, V F Christensen and Charlotte E Christensen	1,251.10	100 to 104	West Side Canal			14.95	622.71		
John McGarva, Peter B McGarva, and Phyllis McGarva	219.50	105	West Side Canal			2.65	110.38		
R J Gaustad and Nellie Gaustad	175.00	106, 107	West Side Canal			2.05	85.39		
R O Gaustad	77.00	106, 107	West Side Canal			0.95	39.57		
R O Gaustad	75.00	108	West Side Canal			0.90	37.49		

South Fork Pit River Decree
Modoc County Decree No. 3273

Seasons of Use		
Continuous, regardless of season	365.25	days
April 1 to June 30	91.00	days
April 1 to October 15	198.00	days
July 1 to July 21	21.00	days
July 22 to August 11	21.00	days
August 12 to October 15	65.00	days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotments First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Total cfs	Total AF
Raymond Stepp Bertha L Stepp, Lena Graham and Herbie Graham	90.00	108	West Side Canal			1.05	43.74		
Frank McArthur and Ethel M McArthur	1,161.20	109 to 123	West Side Canal			13.90	578.98		
Subtotal, July 22 to August 11 Rotations Claimants	12,475.20					147.26	6,133.80		

Surplus Class Claimants, South Fork Pit River and Tributaries - Rotation Schedule from Paragraph 38 from August 12 to October 15	Cubic Feet per Second	Acre-Feet
Mill Creek Ditches	3.00	386.78
East Creek Ditches	3.20	412.56
Parsnip Creek Ditches	0.50	64.46
West Valley Creek Ditches	1.35	174.05
Masters Ditch	2.00	257.85
Jackson Ditch	1.00	128.93
Corporation Ditch	4.00	515.70
Van Loan Ditch	2.00	257.85
Flournoy Ditch	2.00	257.85
Williams Ditch	0.70	90.25
East and West Side Canals	8.00	1,031.40
Subtotal, August 12 to October 15 Rotations Claimants	27.75	3,577.69

South Fork Pit River Decree
Modoc County Decree No. 3273

Seasons of Use

Continuous, regardless of season	365.25	days
April 1 to June 30	91.00	days
April 1 to October 15	198.00	days
July 1 to July 21	21.00	days
July 22 to August 11	21.00	days
August 12 to October 15	65.00	days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotments First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Total cfs	Total AF
Summary	Cubic Feet per Second	Acre-Feet							
Subtotal, Schedule 2, Fitzhugh Creek Claimants	15.00	6,554.38							
Subtotal, Schedule 3, South Fork Pit River and Tributaries Claimants	196.34	50,354.84							
Subtotal, Basic South Fork Claimants Before Surplus Rotations	211.34	56,909.22							
Subtotal, July 1 to 21 Surplus Rotation Claimants	35.45	1,476.60							
Subtotal, July 22 to August 11 Rotations Claimants	147.26	6,133.80							
Subtotal, August 12 to October 15 Rotations Claimants	27.75	3,577.69							
Grand Total, All Claimants, Basic Plus Surplus Rotations	421.80	68,097.30							

Willow Creek Decree
Shasta County, Decree No. 87524

Seasons of Use

Continuous, regardless of season	365.25	days
April 1 through November 1	215.00	days
		days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Use	Allotments First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Total cfs	Total AF
Schedule 3, Willow Creek Claimants									
Buffington, John L Jr		1	Domestic	Entire Flow of Spring					
Buffington, John L Jr	8.00	2	Domestic, Irrigation	Entire Flow of Spring					
Buffington, John L Jr		3	Domestic	Entire Flow of Spring					
Bull, Charles E	10.00	21	Domestic, Irrigation, Fire	Entire Flow of Spring					
Stanbro, Phillip W and Sharon A		5	Domestic, Stockwater	0.01	7.24			0.01	7.24
Stanbro, Phillip W and Sharon A	8.00	5	Irrigation			0.13	55.44	0.13	55.44
Colbert, Louis E and Wilma C	15.00	6	Irrigation			0.15	63.97	0.15	63.97
Gates, Robert L and Marjorie S		7, 8	Domestic	0.01	7.24			0.01	7.24
Gates, Robert L and Marjorie S	6.00	9	Irrigation, Recreation			0.06	25.59	0.06	25.59
Gabriele, Julius and Linda		11	Domestic, Irrigation	0.01	7.24			0.01	7.24
Gabriele, Julius and Linda	30.00	11				0.30	127.93	0.30	127.93
Pacific Gas & Electric Co		22	Stockwater	350 gpd	0.39				0.39
Bertagna, Joseph and Marian L		12	Domestic	0.01	7.24			0.01	7.24
Bertagna, Joseph and Marian L	10.00		Irrigation, Stockwater			0.10	42.64	0.10	42.64
Harber, Virgil and Pauline		15	Domestic	0.01	7.24			0.01	7.24
	1.00		Irrigation			0.01	4.26	0.01	4.26
Subtotal, Schedule 3 Willow Creek Claimants	88.00			0.05	36.62	0.75	319.83	0.80	356.45
Schedule 4, Minnow and Dunn Creeks Claimants									
Bertagna, Joseph and Marian L	10.00	13	Irrigation			0.10	42.64	0.10	42.64
Bertagna, Joseph and Marian L		14	Domestic	0.01	7.24			0.01	7.24
Bertagna, Joseph and Marian L	10.00	14	Irrigation			0.10	42.64	0.10	42.64
Bertagna, Paul J and Mary E	4.00	13	Irrigation			0.04	17.06	0.04	17.06
Webb, Joyce J		16	Domestic	0.01	7.24			0.01	7.24
Webb, Joyce J	2.00	16	Irrigation			0.02	8.53	0.02	8.53
Subtotal, Schedule 4 Minnow and Dunn Creeks Claimants	26.00			0.02	14.49	0.26	110.88	0.28	125.37
Schedule 5, Post-1914 Appropriative Water Rights									
Puhlman, Albert E and Carol J		4	Stockwater		2.30				

Willow Creek Decree
Shasta County, Decree No. 87524

Seasons of Use		
Continuous, regardless of season	365.25	days
April 1 through November 1	215.00	days
		days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Use	Allotments First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Total cfs	Total AF
Gates, Robert L and Marjorie S	2.00		Irrigation, Domestic, Stockwater		10.00				
Lincoln, Richard G and Michele L	10.00		Irrigation, Domestic, Stockwater		20.00				
Gabriele, Julius and Linda	30.00		Irrigation, Domestic, Stockwater		14.40				
Wheeler, Ernest L			Stockwater		10.00				
Shaw, Veldon et al			Stockwater		10.00				
Klein, Frederick & Phyllis	3.00		Irrigation, Domestic		3.00				
Truman, John C and Helen G			Recreation, Fire		0.50				
Subtotal, Post-1914 Appropriative Water Rights	45.00			0.00	70.20				

Summary	Total cfs	Total AF
Subtotal, Schedule 3 Willow Creek Claimants	0.80	356.45
Subtotal, Schedule 4 Minnow and Dunn Creeks Claimants	0.28	125.37
Subtotal, Post-1914 Appropriative Water Rights		70.20
Total, Willow Creek Decree Claimants	1.08	552.02

Willow Creek Decree
Shasta County, Decree No. 87524

Seasons of Use

Continuous, regardless of season	365.25	days
April 1 through November 1	215.00	days
		days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Use	Allotments					
				First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Total cfs	Total AF
Schedule 3, Willow Creek Claimants									
Buffington, John L Jr		1	Domestic	Entire Flow of Spring					
Buffington, John L Jr	8.00	2	Domestic, Irrigation	Entire Flow of Spring					
Buffington, John L Jr		3	Domestic	Entire Flow of Spring					
Bull, Charles E	10.00	21	Domestic, Irrigation, Fire	Entire Flow of Spring					
Stanbro, Phillip W and Sharon A		5	Domestic, Stockwater	0.01	7.24			0.01	7.24
Stanbro, Phillip W and Sharon A	8.00	5	Irrigation			0.13	55.44	0.13	55.44
Colbert, Louis E and Wilma C	15.00	6	Irrigation			0.15	63.97	0.15	63.97
Gates, Robert L and Marjorie S		7, 8	Domestic	0.01	7.24			0.01	7.24
Gates, Robert L and Marjorie S	6.00	9	Irrigation, Recreation			0.06	25.59	0.06	25.59
Gabriele, Julius and Linda		11	Domestic, Irrigation	0.01	7.24			0.01	7.24
Gabriele, Julius and Linda	30.00	11				0.30	127.93	0.30	127.93
Pacific Gas & Electric Co		22	Stockwater	350 gpd	0.39				0.39
Bertagna, Joseph and Marian L		12	Domestic	0.01	7.24			0.01	7.24
Bertagna, Joseph and Marian L	10.00		Irrigation, Stockwater			0.10	42.64	0.10	42.64
Harber, Virgil and Pauline		15	Domestic	0.01	7.24			0.01	7.24
	1.00		Irrigation			0.01	4.26	0.01	4.26
Subtotal, Schedule 3 Willow Creek Claimants	88.00			0.05	36.62	0.75	319.83	0.80	356.45
Schedule 4, Minnow and Dunn Creeks Claimants									
Bertagna, Joseph and Marian L	10.00	13	Irrigation			0.10	42.64	0.10	42.64
Bertagna, Joseph and Marian L		14	Domestic	0.01	7.24			0.01	7.24
Bertagna, Joseph and Marian L	10.00	14	Irrigation			0.10	42.64	0.10	42.64
Bertagna, Paul J and Mary E	4.00	13	Irrigation			0.04	17.06	0.04	17.06
Webb, Joyce J		16	Domestic	0.01	7.24			0.01	7.24
Webb, Joyce J	2.00	16	Irrigation			0.02	8.53	0.02	8.53
Subtotal, Schedule 4 Minnow and Dunn Creeks Claimants	26.00			0.02	14.49	0.26	110.88	0.28	125.37
Schedule 5, Post-1914 Appropriative Water Rights									
Puhlman, Albert E and Carol J		4	Stockwater		2.30				
Gates, Robert L and Marjorie S	2.00		Irrigation, Domestic, Stockwater		10.00				
Lincoln, Richard G and Michele L	10.00		Irrigation, Domestic, Stockwater		20.00				
Gabriele, Julius and Linda	30.00		Irrigation, Domestic, Stockwater		14.40				
Wheeler, Ernest L			Stockwater		10.00				
Shaw, Veldon et al			Stockwater		10.00				
Klein, Frederick & Phyllis	3.00		Irrigation, Domestic		3.00				
Truman, John C and Helen G			Recreation, Fire		0.50				
Subtotal, Post-1914 Appropriative Water Rights	45.00			0.00	70.20				

Willow Creek Decree
Shasta County, Decree No. 87524

Seasons of Use

Continuous, regardless of season	365.25	days
April 1 through November 1	215.00	days
		days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Use	Allotments First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Total cfs	Total AF

Summary	Total cfs	Total AF
Subtotal, Schedule 3 Willow Creek Claimants	0.80	356.45
Subtotal, Schedule 4 Minnow and Dunn Creeks Claimants	0.28	125.37
Subtotal, Post-1914 Appropriative Water Rights		70.20
Total, Willow Creek Decree Claimants	1.08	552.02

Deer Creek Decree
Tehama County Suit No. 2449
Stanford Vina Ranch, plaintiff

	Cubic Feet Per Second	Acre-feet	Source
Total Diversions in Decree	150	108,669	Deer Creek, thence Sacramento River

These rights were subsequently deeded over to Deer Creek Irrigation District in the late 1920s.

Source: Deer Creek Irrigation District

Appendix D

Section D.4
Consumptive Statements of Diversion and Use

Trinity River Watershed - Consumptive Statements of Diversion and Use

Application ID	Holder Name	Highest Amount Claimed	Water Right Type Claimed	Year of First Use	Season	Purpose of Use	County	Source
S012967	Dept of Fish and Game	109,500.00	Riparian	1963	All	Fish Culture	Trinity	TRINITY RIVER
	Dept of Fish and Game Total	109,500.00						
S013092	EDGAR MURRISON	724.46	Pre-14	1900	All	Irrigation, Stockwater	Trinity	BIG CREEK
S013093	EDGAR MURRISON	1,224.00	Pre-14	1900	All	Irrigation, Stockwater	Trinity	BIG CREEK
S013094	EDGAR MURRISON	2,408.00	Pre-14	1900	All	Irrigation, Stockwater, Hydropower	Trinity	BIG CREEK
	EDGAR MURRISON Total	4,356.46						
S002528	KEITH L GROVES	2,400.00	Pre-14	1866	All	Irrigation, Stockwater, Domestic	Trinity	HALLS GULCH
	KEITH L GROVES Total	2,400.00						
S010724	ROGER P ECKART	2,062.00	Riparian	1875	All	Irrigation, Stockwater, Domestic, Hydropower	Trinity	DYER CREEK
S010725	ROGER P ECKART	12,000.00	Riparian/Pre-14	1875	All	Irrigation, Stockwater, Domestic, Hydropower	Trinity	BELL CREEK
S010726	ROGER P ECKART	265.00	Riparian	1875	All	Irrigation, Stockwater, Domestic, Hydropower	Trinity	UNST AKA GOODWIN CREEK
S012609	ROGER P ECKART	270.00	Riparian	1875	All	Irrigation, Stockwater, Domestic, Hydropower	Trinity	ROBARDS CREEK
S013923	ROGER P ECKART	1,700.00	Pre-14	1875	All	Irrigation, Stockwater, Domestic, Hydropower	Trinity	DIXIE CREEK
	ROGER P ECKART Total	16,297.00						
S000327	WEAVERVILLE COMMUNITY SERVICES DISTRICT	777.29	Pre-14	1891	All	Irrigation, Stockwater, Domestic	Trinity	WEST WEAVER CREEK
S000361	WEAVERVILLE COMMUNITY SERVICES DISTRICT	753.72	Pre-14	1852	All	Domestic	Trinity	EAST WEAVER CREEK
	WEAVERVILLE COMMUNITY SERVICES DISTRICT Total	1,531.01						
	Grand Total	134,084.47						

Application ID	Holder Name	Highest Claimed Amt	Claim Type	Year of First Use	Season	Purpose of Use	County	Source
S001453	ALBERT E PUHLMAN JR	466.00	Pre-14	1884	All	Irrigation, Stockwatering, Domestic	Shasta	NORTH FORK MONTGOMERY CREEK
S001454	ALBERT E PUHLMAN JR	466.00	Pre-14	1884	All	Irrigation, Stockwatering, Domestic	Shasta	SOUTH FORK MONTGOMERY CREEK
S001455	ALBERT E PUHLMAN JR	466.00	Pre-14	1884	All	Irrigation, Stockwatering, Domestic	Shasta	SAWDUST CREEK
	ALBERT E PUHLMAN JR Total	1,398.00						
S002265	CLIFFORD K OILAR	490.00	Riparian/Pre-14	1873	All	Irrigation, Stockwatering	Modoc	OILAR SPRINGS
S002266	CLIFFORD K OILAR	493.00	Riparian/Pre-14	1873	All	Irrigation, Stockwatering, Domestic	Modoc	UNST
S010786	CLIFFORD K OILAR	470.00	Riparian/Pre-14	1873	All	Irrigation, Stockwatering, Domestic	Modoc	UNSP
S010814	CLIFFORD K OILAR	490.00	Riparian/Pre-14	1873	All	Irrigation, Stockwatering	Modoc	OILAR SPRINGS
S010815	CLIFFORD K OILAR	100.00	Riparian/Pre-14	1957	May-Dec	Irrigation, Stockwatering	Modoc	UNST
S010816	CLIFFORD K OILAR	200.00	Riparian/Pre-14	1940	May-Oct	Irrigation, Stockwatering, Domestic	Modoc	WHIPPLE SPRINGS
	CLIFFORD K OILAR Total	2,243.00						
S008735	CRAIG MCARTHUR	19,528.00	Riparian/Pre-14	1875	All	Irrigation, Stockwatering, Domestic	Shasta	TULE RIVER
S008912	CRAIG MCARTHUR	1,130.00	Riparian/Pre-14	1875	All	Irrigation, Stockwatering, Domestic	Shasta	PEACOCK CREEK
S015104	CRAIG MCARTHUR	7,242.00	Pre-14	1911	All	Irrigation, Stockwatering, Domestic	Shasta	LEE DRAIN CANAL
	CRAIG MCARTHUR Total	27,900.00						
S014558	Dennis Hoffman	1,135.49	Riparian	1995	Mar-Oct	Irrigation	Lassen	PIT RIVER
S014731	Dennis Hoffman	1,150.83	Riparian	2003	Apr-Sept	Irrigation	Shasta	PIT RIVER
	Dennis Hoffman Total	2,286.32						
S004691	Dept of Fish and Game	1,464.00	Pre-14	1904	All	Fish Culture, Domestic	Modoc	PINE CREEK
S012964	Dept of Fish and Game	36,135.00	Riparian	1965	All	Recreation, Fishing	Shasta	ROCK CREEK SPRINGS
	Dept of Fish and Game Total	37,599.00						
S009112	DIXIE VALLEY RANCH	4,000.00	Riparian	1873	All	Irrigation, Stockwatering	Lassen	DAVIS CREEK
S009113	DIXIE VALLEY RANCH	5,000.00	Riparian/Pre-14	1873	All	Irrigation, Stockwatering	Lassen	INDIAN CREEK
S009114	DIXIE VALLEY RANCH	4,000.00	Riparian	1977	All	Irrigation, Stockwatering	Lassen	UNST
S009115	DIXIE VALLEY RANCH	2,000.00	Riparian/Pre-14	1873	All	Irrigation, Stockwatering	Lassen	LITTLE DAVIS CREEK
S009116	DIXIE VALLEY RANCH	2,000.00	Riparian/Pre-14	1873	All	Irrigation, Stockwatering	Lassen	RUSSEL DAIRY SPRING
S009133	DIXIE VALLEY RANCH	5,000.00	Riparian/Pre-14	1873	All	Irrigation, Stockwatering	Lassen	BIG JACK LAKE
S009138	DIXIE VALLEY RANCH	2,173.39	Riparian/Pre-14	1873	All	Irrigation, Stockwatering	Lassen	BIG SPRING
	DIXIE VALLEY RANCH Total	24,173.39						
S008053	ED DEVAUL	1,620.00	Riparian	1949	All	Irrigation, Stockwatering, Domestic	Shasta	UNST
	ED DEVAUL Total	1,620.00						
S013170	EDWARD A BOSWORTH JR	0.00	Pre-14	1885	All	Irrigation, Stockwatering	Shasta	CAYTON CREEK
S013171	EDWARD A BOSWORTH JR	2,421.17	Pre-14	1885	All	Irrigation, Stockwatering, Domestic	Shasta	NORTH FORK CLARK CREEK
S013172	EDWARD A BOSWORTH JR	4,824.34	Pre-14	1885	All	Irrigation, Stockwatering, Domestic	Shasta	CLARK CREEK
	EDWARD A BOSWORTH JR Total	7,245.51						
S000798	ELLEN E TAYLOR	1,451.90	Pre-14	1913	Apr-Nov	Irrigation, Stockwatering	Shasta	LOST CREEK
	ELLEN E TAYLOR Total	1,451.90						

Application ID	Holder Name	Highest Claimed Amt	Claim Type	Year of First Use	Season	Purpose of Use	County	Source
S014380	Glenn A Nader	2,279.00	Riparian	1876	Apr-Sept	Irrigation, Stockwatering	Modoc	WITCHER CREEK
S014381	Glenn A Nader	1,505.00	Pre-14	1873	Jun-Oct	Irrigation, Stockwatering	Modoc	WITCHER CREEK
S014382	Glenn A Nader	2,334.00	Riparian/Pre-14	1876	Mar-Oct	Irrigation, Stockwatering	Modoc	WITCHER CREEK
S014383	Glenn A Nader	420.00	Riparian	1876	Apr-Oct	Irrigation, Stockwatering	Modoc	WITCHER CREEK
S014384	Glenn A Nader	1,021.00	Pre-14	1876	Nov-Mar	Irrigation, Stockwatering	Modoc	WITCHER CREEK
	Glenn A Nader Total	7,559.00						
S013765	JOSEPH SCOTT VERMILYEA	8,789.00	Riparian	1983	All	Irrigation, Domestic	Shasta	BAKER CREEK
S013766	JOSEPH SCOTT VERMILYEA	2,076.00	Pre-14	1914	Mar-Nov	Irrigation, Stockwatering, Domestic	Shasta	STUMP CREEK
S013767	JOSEPH SCOTT VERMILYEA	720.00	Pre-14	1914	All	Irrigation, Stockwatering, Domestic	Shasta	LITTLE SHOTGUN CREEK
	JOSEPH SCOTT VERMILYEA Total	11,585.00						
S001050	KNOCH INC	19,560.00	Riparian/Pre-14	1909	All	Irrigation, Stockwatering	Shasta	FALL RIVER
	KNOCH INC Total	19,560.00						
S008540	LOWELL L NOVY	0.00	Riparian/Pre-14	1890	All	Irrigation, Stockwatering	Lassen	TULE LAKE RESERVOIR AKA MOON LAKE
S012914	LOWELL L NOVY	2,920.00	Riparian/Pre-14	1900	All	Irrigation, Stockwatering	Lassen	CEDAR CREEK
	LOWELL L NOVY Total	2,920.00						
S008627	MILANO LAND AND CATTLE CO LLC	2,500.00	Pre-14	1902	May-Oct	Irrigation, Stockwatering	Modoc	DUNCAN RESERVOIR
	MILANO LAND AND CATTLE CO LLC Total	2,500.00						
S014308	Outfitter Properties LLC-Oasis Springs	850.00	Riparian	1890	Apr-Sept	Irrigation, Stockwatering	Tehama	UNSP
S014309	Outfitter Properties LLC-Oasis Springs	195.00	Riparian	1900	Apr-Oct	Irrigation	Shasta	SPRING CREEK
S014310	Outfitter Properties LLC-Oasis Springs	500.00	Riparian	1900	Apr-Oct	Irrigation	Shasta	SPRING CREEK
S014311	Outfitter Properties LLC-Oasis Springs	1,700.00	Riparian	1875	Apr-Oct	Irrigation	Shasta	UNSP (AKA VINEYARD SPRING)
	Outfitter Properties LLC-Oasis Springs Total	3,245.00						
S002509	R HAMBY	1,600.00	Pre-14	1898	All	Irrigation, Stockwatering, Domestic	Shasta	EAST FORK NELSON CREEK
	R HAMBY Total	1,600.00						
S016096	Raymond J Paige	1,000.00	Riparian/Pre-14	1986	Mar-Oct	Irrigation	Shasta	LITTLE TULE RIVER TO FALL RIVER
S016097	Raymond J Paige	600.00	Riparian/Pre-14	1896	Mar-Oct	Irrigation	Shasta	LITTLE TULE RIVER TO FALL RIVER
	Raymond J Paige Total	1,600.00						
S014780	RICHARD L JENNINGS	5,250.00	Riparian/Pre-14	1885	Apr-Oct	Irrigation, Stockwatering	Modoc	PIT RIVER
S014781	RICHARD L JENNINGS	5,250.00	Riparian/Pre-14	1900	Apr-Oct	Irrigation, Stockwatering	Modoc	PIT RIVER
S014782	RICHARD L JENNINGS	2,800.00	Riparian/Pre-14	1870	Apr-Oct	Irrigation, Stockwatering	Modoc	RALSTON GULCH
S014783	RICHARD L JENNINGS	4,500.00	Riparian/Pre-14	1912	Apr-Oct	Irrigation, Stockwatering	Modoc	CANYON CREEK
S014784	RICHARD L JENNINGS	4,500.00	Riparian/Pre-14	1900	Apr-Sept	Irrigation, Stockwatering	Modoc	PIT RIVER
	RICHARD L JENNINGS Total	22,300.00						
S014913	Western Agricultural Services (River Butte Ranch)	150.00	Riparian	1965	Apr-Sept	Irrigation	Shasta	FALL RIVER
S014914	Western Agricultural Services (River Butte Ranch)	400.00	Riparian	1965	Apr-Sept	Irrigation	Shasta	FALL RIVER
	Western Agricultural Services (River Butte Ranch) Total	550.00						
S014193	Western Agricultural Services (Fall River Ranch)	375.00	Riparian	1900	Apr-Oct	Irrigation, Stockwatering	Shasta	FALL RIVER
S014194	Western Agricultural Services (Fall River Ranch)	60.00	Riparian	1900	Apr-Oct	Irrigation, Stockwatering	Shasta	FALL RIVER
	Western Agricultural Services (Fall River Ranch) Total	435.00						
S014937	Western Agricultural Services (River Ranch L P)	485.00	Riparian	1930	Apr-Oct	Irrigation	Shasta	FALL RIVER

Application ID	Holder Name	Highest Claimed Amt	Claim Type	Year of First Use	Season	Purpose of Use	County	Source
S014938	Western Agricultural Services (River Ranch L P)	15.00	Riparian	1872	All	Stockwatering, Domestic	Shasta	FALL RIVER
S014939	Western Agricultural Services (River Ranch L P)	550.00	Riparian	1920	Apr-Oct	Irrigation	Shasta	FALL RIVER
S014940	Western Agricultural Services (River Ranch L P)	75.00	Riparian	1950	Apr-Sept	Irrigation	Shasta	FALL RIVER
S014941	Western Agricultural Services (River Ranch L P)	15.00	Riparian	1900	All	Stockwatering, Domestic	Shasta	FALL RIVER
S014942	Western Agricultural Services (River Ranch L P)	15.00	Riparian	1870	All	Stockwatering	Shasta	FALL RIVER
S014943	Western Agricultural Services (River Ranch L P)	425.00	Riparian	1920	Apr-Oct	Irrigation, Stockwatering	Shasta	FALL RIVER
S014944	Western Agricultural Services (River Ranch L P)	70.00	Riparian	1950	Apr-Oct	Irrigation	Shasta	FALL RIVER
S014945	Western Agricultural Services (River Ranch L P)	1,200.00	Riparian	1870	Apr-Oct	Irrigation, Stockwatering	Shasta	FALL RIVER
	Western Agricultural Services (River Ranch L P) Total	2,850.00						
S012933	ROBERT G BAIRD	1,149.00	Pre-14	1872	Apr-Nov	Irrigation, Stockwatering	Modoc	TOMS CREEK
	ROBERT G BAIRD Total	1,149.00						
S012446	ROBERT H MACKEY & SONS INC	570.00	Riparian	1871	Apr-Oct	Irrigation, Stockwatering	Modoc	CANYON CREEK
S012447	ROBERT H MACKEY & SONS INC	570.00	Riparian	1890	Apr-Oct	Irrigation, Stockwatering	Modoc	CANYON CREEK
S014303	ROBERT H MACKEY & SONS INC	720.00	Riparian	1880	All	Irrigation, Stockwatering, Domestic	Modoc	UNSP
	ROBERT H MACKEY & SONS INC Total	1,860.00						
S004672	RONALD L SCHLUTER	1,500.00	Pre-14	1906	May-Oct	Irrigation, Stockwatering	Modoc	BIG DOBIE SOUTH
S004673	RONALD L SCHLUTER	900.00	Pre-14	1906	Apr-Sept	Irrigation	Modoc	BIG DOBIE NORTH
	RONALD L SCHLUTER Total	2,400.00						
S000106	S X RANCH INC	1,000.00	Riparian	1947	Apr-Sept	Irrigation	Lassen	PIT RIVER
S000107	S X RANCH INC	340.00	Riparian	1947	Apr-Oct	Irrigation, Stockwatering	Lassen	PIT RIVER
	S X RANCH INC Total	1,340.00						
S015534	SX Lowry Ranch	2,000.00	Pre-14	1897	Nov-Apr	Irrigation, Stockwatering	Modoc	SALISBURY GULCH AKA UNST
	SX Lowry Ranch Total	2,000.00						
S002877	WILLIAM K HAGGE	525.00	Riparian	1964	May-Sept	Irrigation, Stockwatering	Modoc	PIT RIVER
S002879	WILLIAM K HAGGE	150.00	Riparian	1947	May-Sept	Irrigation, Stockwatering	Modoc	PIT RIVER
S002880	WILLIAM K HAGGE	1,140.00	Riparian/Pre-14	1880	May-Sept	Irrigation, Stockwatering	Modoc	PIT RIVER
S014183	WILLIAM K HAGGE	380.00	Riparian	1945	May-Sept	Irrigation, Stockwatering	Modoc	PIT RIVER
	WILLIAM K HAGGE Total	2,195.00						
	Grand Total	193,565.12						

Feather River Watershed - Consumptive Statements of Diversion and Use

Application ID	Holder Name	Highest Claim Amt	Water Rights Claim Type	Year of First Use	Season	Purpose of Use	County	Source
S013390	A L HANSEN	2,800.00	Pre-14	1860	Apr-Nov	Irrigation	Plumas	GREENHORN CREEK
	A L HANSEN Total	2,800.00						
S000267	ALBANO P BRESCIANI	700.00	Riparian/Pre-14	1857	All	Stockwater	Plumas	CLEAR STREAM
	ALBANO P BRESCIANI Total	700.00						
S001884	Phillip A Bresciani	300.00	Pre-14	1904	May-Sep	Irrigation, Stockwater	Plumas	SPANISH CREEK
	Phillip A Bresciani Total	300.00						
S001885	ALBANO P BRESCIANI	360.00	Riparian/Pre-14	1878	May-Sep	Stockwater	Plumas	MILL CREEK
S001886	ALBANO P BRESCIANI	300.00	Riparian/Pre-14	1878	Apr-Sep	Stockwater	Plumas	MILL CREEK
S002099	ALBANO P BRESCIANI	350.00	Riparian/Pre-14	1872	Apr-Oct	Stockwater	Plumas	GREENHORN CREEK
S002100	ALBANO P BRESCIANI	540.00	Riparian/Pre-14	1877	May-Oct	Stockwater	Plumas	SPANISH CREEK
S002101	ALBANO P BRESCIANI	150.00	Riparian/Pre-14	1873	May-Sep	Stockwater	Plumas	HAUN CREEK
S002102	ALBANO P BRESCIANI	250.00	Riparian/Pre-14	1877	Apr-Aug	Stockwater	Plumas	MILL CREEK
S002103	ALBANO P BRESCIANI	70.00	Riparian/Pre-14	1877	Apr-Oct	Stockwater	Plumas	MILL CREEK
S002104	ALBANO P BRESCIANI	182.00	Riparian/Pre-14	1877	Apr-Oct	Stockwater	Plumas	MILL CREEK
	ALBANO P BRESCIANI Total	2,202.00						
S010594	BERRY CREEK WATER USERS INCORPORATED	2,477.66	Pre-14	1852	All	Irrigation, Stockwater	Butte	BERRY CREEK
	BERRY CREEK WATER USERS INCORPORATED Total	2,477.66						
S002956	BROOKS WALKER ET AL	60.00	Riparian/Pre-14	1900	May-Jun	Irrigation, Stockwater	Lassen	UNNAMED STREAM
S002957	BROOKS WALKER ET AL	90.00	Riparian/Pre-14	1900	May-Jul	Irrigation, Stockwater	Lassen	HOMER CREEK
S002958	BROOKS WALKER ET AL	30.00	Riparian/Pre-14	1900	May-Jun	Irrigation, Stockwater	Lassen	UNNAMED STREAM
S002960	BROOKS WALKER ET AL	30.00	Riparian/Pre-14	1900	May-Jun	Irrigation, Stockwater	Lassen	UNNAMED STREAM
S002962	BROOKS WALKER ET AL	9,306.00	Riparian/Pre-14	1900	May-Oct	Irrigation, Stockwater	Lassen	GOODRICH CREEK
S002963	BROOKS WALKER ET AL	7,866.00	Riparian/Pre-14	1900	May-Oct	Irrigation, Stockwater	Lassen	GOODRICH CREEK
	BROOKS WALKER ET AL Total	17,382.00						
S002315	DEAN PANFILI	225.00	Riparian/Pre-14	1957	Apr-Sep	Irrigation, Stockwater, Domestic	Plumas	LONG VALLEY CREEK
S002316	DEAN PANFILI	175.00	Riparian/Pre-14	1870	May-Sep	Irrigation	Plumas	LONG VALLEY CREEK
S002317	DEAN PANFILI	0.00	Riparian/Pre-14	1856	Apr-Sep	Irrigation, Stockwater	Plumas	LONG VALLEY CREEK

Feather River Watershed - Consumptive Statements of Diversion and Use

Application ID	Holder Name	Highest Claim Amt	Water Rights Claim Type	Year of First Use	Season	Purpose of Use	County	Source
S002318	DEAN PANFILI	613.78	Riparian/Pre-14	1870	Mar-Sep	Irrigation, Stockwater, Domestic	Plumas	LITTLE LONG VALLEY CREEK
	DEAN PANFILI Total	1,013.78						
S015506	GRAEAGLE LAND & WATER COMPANY	1,279.11	Pre-14	1820	Mar-Oct	Irrigation, Stockwater	Plumas	MOHAWK CREEK
S015913	GRAEAGLE LAND & WATER COMPANY	1,400.64	Pre-14	1820	All	Irrigation, Stockwater, Domestic	Plumas	MOHAWK CREEK
S015914	GRAEAGLE LAND & WATER COMPANY	607.64	Pre-14	1820	Mar-Oct	Irrigation, Stockwater	Plumas	MOHAWK CREEK
	GRAEAGLE LAND & WATER COMPANY Total	3,287.39						
S008734	GRAEAGLE WATER COMPANY A CALIF CORP	990.71	Riparian	1941	All	Irrigation, Stockwater, Domestic	Plumas	GRAY EAGLE CREEK
	GRAEAGLE WATER COMPANY A CALIF CORP Total	990.71						
S013351	MOHAWK VALLEY RANCH, INC	485.80	Pre-14	1880	Mar-Oct	Irrigation, Domestic	Plumas	UNST
S013352	MOHAWK VALLEY RANCH, INC	1,457.72	Riparian	1950	Mar-Oct	Golf Course Irrigation	Plumas	SULPHUR CREEK
S013353	MOHAWK VALLEY RANCH, INC	2,171.85	Riparian	1950	All	Golf Course Irrigation	Plumas	BOULDER CREEK
S013354	MOHAWK VALLEY RANCH, INC	485.96	Pre-14	1880	Mar-Oct	Irrigation	Plumas	BOULDER CREEK
S013355	MOHAWK VALLEY RANCH, INC	485.96	Pre-14	1880	Mar-Oct	Irrigation	Sierra	BOULDER CREEK
S013356	MOHAWK VALLEY RANCH, INC	723.95	Pre-14	1880	All	Golf Course Irrigation	Plumas	UNST
S013357	MOHAWK VALLEY RANCH, INC	1,447.90	Pre-14	1880	All	Golf Course Irrigation	Plumas	UNST
	MOHAWK VALLEY RANCH, INC Total	7,259.15						
S009189	PLUMAS PINES GOLF RESORT	10,700.00	Pre-14	1877	May-Oct	Irrigation	Plumas	JAMISON CREEK
	PLUMAS PINES GOLF RESORT Total	10,700.00						
S002953	RED RIVER FORESTS PARTNERSHIP	894.00	Riparian/Pre-14	1900	May-Oct	Irrigation, Stockwater	Lassen	MOUNTAIN MEADOWS CREEK
S002954	RED RIVER FORESTS PARTNERSHIP	5,660.00	Riparian/Pre-14	1900	May-Oct	Irrigation, Stockwater	Lassen	COTTONWOOD CREEK
	RED RIVER FORESTS PARTNERSHIP Total	6,554.00						

Feather River Watershed - Consumptive Statements of Diversion and Use

Application ID	Holder Name	Highest Claim Amt	Water Rights Claim Type	Year of First Use	Season	Purpose of Use	County	Source
S000262	REID LAND & CATTLE COMPANY	4,346.00	Pre-14	1857	May-Nov	Irrigation, Stockwater	Plumas	GREENHORN CREEK
S000263	REID LAND & CATTLE COMPANY	1,336.00	Pre-14	1857	All	Irrigation, Stockwater, Domestic	Plumas	CHANDLER CREEK
S000264	REID LAND & CATTLE COMPANY	1,217.00	Pre-14	1857	Jun-Nov	Irrigation, Stockwater	Plumas	TAYLOR CREEK
	REID LAND & CATTLE COMPANY Total	6,899.00						
S000544	RICHARD D FRIPP II	0.56	Pre-14	1876	All	Irrigation, Stockwater, Domestic	Plumas	COGSWELL RAVINE
S000545	RICHARD D FRIPP II	1,086.69	Pre-14	1856	All	Irrigation, Stockwater, Domestic	Plumas	LONG VALLEY CREEK
	RICHARD D FRIPP II Total	1,087.25						
S000266	RICHARD D LEONHARDT	970.00	Pre-14	1857	All	Irrigation, Stockwater	Plumas	MILL CREEK
S000268	RICHARD D LEONHARDT	1,200.00	Pre-14	1857	Apr-Oct	Irrigation, Stockwater	Plumas	SPANISH CREEK
S000269	RICHARD D LEONHARDT	240.00	Pre-14	1857	May-Oct	Irrigation, Stockwater	Plumas	FOUR LETTER CREEK
	RICHARD D LEONHARDT Total	2,410.00						
S000378	RICHVALE IRRIGATION DISTRICT	7,560.00	Pre-14	1914	Apr-Sep	Irrigation	Butte	CHEROKEE CANAL
S000379	RICHVALE IRRIGATION DISTRICT	6,000.00	Riparian	1947	Mar-Jan	Irrigation	Butte	LITTLE DRY CREEK
	RICHVALE IRRIGATION DISTRICT Total	13,560.00						
S000925	WESTERN CANAL WATER DISTRICT	348,469.00	Pre-14	1902	Apr-Jan	Irrigation	Butte	FEATHER RIVER
	WESTERN CANAL WATER DISTRICT Total	348,469.00						
S006764	WESTWOOD COMMUNITY SERVICES DISTRICT	0.00	Pre-14	1913	All	Domestic	Lassen	DUCK LAKE
S010000	WESTWOOD COMMUNITY SERVICES DISTRICT	1,053.00	Prescriptive	1924	All	Domestic	Lassen	WALKER SPRINGS
	WESTWOOD COMMUNITY SERVICES DISTRICT Total	1,053.00						
S015240	WILLIAM S KEELER TRUST	1,750.00	Riparian/Pre-14	1900	May-Sep	Irrigation, Stockwater	Lassen	GOODRICH CREEK
	WILLIAM S KEELER TRUST Total	1,750.00						
S013159	WILLIARD H WATTENBURG	0.00					Plumas	UNNAMED SPRING
	WILLIARD H WATTENBURG Total	0.00						
	Grand Total	430,894.94						

Application ID	Holder Name	Highest Amount Claimed	Water Rights Claim Type	Year of First Use	Season	Purpose of Use	County	Source
S017323	City of Folsom	50,712.40	Pre-14	1851	All	Municipal, Industrial	Sacramento	SOUTH FORK OF THE AMERICAN RIVER
S017326	City of Folsom	5,000.00	Pre-14	1851	All	Municipal, Industrial	Sacramento	SOUTH FORK OF THE AMERICAN RIVER
S017490	City of Folsom	22,000.00	Pre-14	1851	All	Municipal, Industrial	Sacramento	SOUTH FORK OF THE AMERICAN RIVER
S017491	City of Folsom	22,000.00	Pre-14	1851	All	Municipal, Industrial	Sacramento	SOUTH FORK OF THE AMERICAN RIVER
S000388	COLOMA-LOTUS RANCH DITCH USERS ASSOC	10,000.00	Pre-14	1853	Apr-Nov	Irrigation, Stockwater, Domestic	El Dorado	SOUTH FORK AMERICAN RIVER
S010717	EL DORADO IRRIGATION DISTRICT	60.75	Pre-14	1875	All	Irrigation, Municipal	El Dorado	SOUTH FORK AMERICAN RIVER
S000972	EL DORADO IRRIGATION DISTRICT	19.80	Pre-14	1856	Dec	Irrigation, Municipal, Industrial, Hydropower	El Dorado	CARPENTER CREEK
S000973	EL DORADO IRRIGATION DISTRICT	95.60	Pre-14	1873	Feb-May	Irrigation, Municipal, Industrial, Hydropower	El Dorado	UNST
S000974	EL DORADO IRRIGATION DISTRICT	678.00	Pre-14	1873	Apr-Oct	Irrigation, Municipal, Industrial, Hydropower	El Dorado	MILL CREEK
S000975	EL DORADO IRRIGATION DISTRICT	232.00	Pre-14	1873	Jan-Jun	Irrigation, Municipal, Industrial, Hydropower	El Dorado	BRYANT CREEK
S000976	EL DORADO IRRIGATION DISTRICT	132.90	Pre-14	1873	Jan-Jun	Irrigation, Municipal, Industrial, Hydropower	El Dorado	ESMERELDA CREEK
S004708	EL DORADO IRRIGATION DISTRICT	5,400.00	Pre-14	1876	Jul-Dec	Irrigation, Municipal, Industrial, Hydropower	Amador	SILVER FORK OF SOUTH FORK AMERICAN RIVER
S009034	EL DORADO IRRIGATION DISTRICT	40,373.00	Pre-14	1873	All	Irrigation, Municipal, Industrial, Hydropower	El Dorado	SOUTH FORK AMERICAN RIVER
S009035	EL DORADO IRRIGATION DISTRICT	360.00	Pre-14	1875	May-Aug	Irrigation, Municipal, Industrial, Hydropower	El Dorado	PYRAMID CREEK
S014323	EL DORADO IRRIGATION DISTRICT	3,968.00	Pre-14	1889	Apr-Oct	Irrigation, Municipal, Industrial, Hydropower	El Dorado	SLAB CREEK
S014968	EL DORADO IRRIGATION DISTRICT	3,373.00	Pre-14	1855	All	Irrigation, Municipal, Industrial, Hydropower	El Dorado	WEBER CREEK
S015937	EL DORADO IRRIGATION DISTRICT	1.55	Pre-14	1872	April	Irrigation, Municipal, Industrial, Hydropower	El Dorado	UNNAMED STREAM
S015938	EL DORADO IRRIGATION DISTRICT	150.60	Pre-14	1872	Dec-Apr	Irrigation, Municipal, Industrial, Hydropower	El Dorado	UNNAMED STREAM
S015939	EL DORADO IRRIGATION DISTRICT	41.64	Pre-14	1872	All	Irrigation, Municipal, Industrial, Hydropower	El Dorado	Stream at Spillway 8
S015940	EL DORADO IRRIGATION DISTRICT	15.20	Pre-14	1872	Feb-May	Irrigation, Municipal, Industrial, Hydropower	El Dorado	BULL CREEK
S015941	EL DORADO IRRIGATION DISTRICT	8,000.00	Pre-14	1872	Jul-Feb	Irrigation, Municipal, Industrial, Hydropower	Alpine	CAPLES LAKE
S014967	EL DORADO IRRIGATION DISTRICT	1,216.00	Pre-14	1852	Apr-Oct	Municipal, Industrial	El Dorado	HANGTOWN CREEK
S014597	GEORGETOWN DIVIDE PUBLIC UTILITY DISTRICT	2,404.00	Pre-14	1850	All	Irrigation, Domestic	El Dorado	MUTTON CANYON

Application ID	Holder Name	Highest Amount Claimed	Water Rights Claim Type	Year of First Use	Season	Purpose of Use	County	Source
S014598	GEORGETOWN DIVIDE PUBLIC UTILITY DISTRICT	2,165.00	Pre-14	1850	All	Irrigation, Domestic	El Dorado	BACON CANYON
S014599	GEORGETOWN DIVIDE PUBLIC UTILITY DISTRICT	850.00	Pre-14	1850	All	Irrigation, Domestic	El Dorado	UNST
S014600	GEORGETOWN DIVIDE PUBLIC UTILITY DISTRICT	1,295.00	Pre-14	1850	All	Irrigation, Domestic	El Dorado	DEEP CANYON
S014601	GEORGETOWN DIVIDE PUBLIC UTILITY DISTRICT	9,552.00	Pre-14	1850	Dec-Oct	Irrigation, Domestic	El Dorado	PILOT CREEK
S010794	NEVADA IRRIGATION DISTRICT	21,085.00	Pre-14	1880	All	Irrigation, Stockwater, Domestic	Placer	COON CREEK, ORR CREEK
S013791	NEVADA IRRIGATION DISTRICT	24,374.00	Pre-14	1853	All	Irrigation, Stockwater, Domestic, Mining	Placer	AUBURN RAVINE
S013790	NEVADA IRRIGATION DISTRICT	7,800.00	Pre-14	1853	Apr-Oct	Irrigation, Stockwater, Mining	Placer	AUBURN RAVINE
S000968	PACIFIC GAS AND ELECTRIC COMPANY	1,220.00	Prescriptive	1917	All	Irrigation, Domestic	Placer	ROCK CREEK
S000969	PACIFIC GAS AND ELECTRIC COMPANY	2,942.00	Prescriptive	1917	All	Irrigation, Domestic	Placer	DRY CREEK
S000959	PLACER COUNTY WATER AGENCY	5,422.00	Pre-14	1864	All	Irrigation, Domestic	Placer	CANYON CREEK
S000967	PLACER COUNTY WATER AGENCY	0.00	Pre-14	1864	All	Irrigation, Domestic	Placer	UNST
S010397	PLACER COUNTY WATER AGENCY	0.00	Pre-14	1896	All	Irrigation, Domestic	Placer	SOUTH FORK DRY CREEK
S010398	PLACER COUNTY WATER AGENCY	0.00	Pre-14	1909	All	Irrigation, Domestic	Placer	NORTH FORK DRY CREEK
S000656	San Juan Water District	33,000.00	Pre-14	1852	All	Domestic	Placer	FOLSOM LAKE
		285,939.44						

Yuba River Watershed - Consumptive Statements of Diversion and Use

Application ID	Holder Name	Highest Claimed Amt	Water Rights Claim Type	Year of First Use	Season	Purpose of Use	County	Source
S000645	BIG LAND DEVELOPMENT CORP	2,730.00	Riparian/Pre-14	1886	Apr-Oct	Irrigation, Stockwater	Butte	SOUTH HONCUT CREEK
	BIG LAND DEVELOPMENT CORP Total	2,730.00						
S010014	CITY OF NEVADA CITY	1,859.80	Pre-14	1910	All	Domestic	Nevada	LITTLE DEER CREEK
	CITY OF NEVADA CITY Total	1,859.80						
S016332	Hallwood Irrigation Company	69,798.00	Pre-14	1909	All	Irrigation	Yuba	Yuba River
	Hallwood Irrigation Company Total	69,798.00						
S001241	LAKE WILDWOOD ASSOCIATION	1,811.16	Pre-14	1861	All	Irrigation	Nevada	NIGGER CREEK
	LAKE WILDWOOD ASSOCIATION Total	1,811.16						
S004716	NEVADA IRRIGATION DISTRICT	94,346.00	Pre-14	1873	All	Hydropower, Irrigation, Domestic, Recreation	Nevada	CANYON CREEK
S004717	NEVADA IRRIGATION DISTRICT	27,007.00	Pre-14	1859	All	Hydropower, Irrigation, Domestic, Recreation	Nevada	CANYON CREEK
S010591	NEVADA IRRIGATION DISTRICT	2.20	Riparian	1967	May-Oct	Recreation	Nevada	DAMFINE SPRING
S010592	NEVADA IRRIGATION DISTRICT	3.20	Riparian	1967	May-Oct	Recreation	Sierra	UNST
S012949	NEVADA IRRIGATION DISTRICT	551.00	Pre-14	1851	Apr-Oct	Irrigation	Nevada	DEER CREEK
S012950	NEVADA IRRIGATION DISTRICT	13,500.00	Pre-14	1851	All	Irrigation, Stockwater, Domestic	Nevada	DEER CREEK
S012951	NEVADA IRRIGATION DISTRICT	7,900.00	Pre-14	1851	All	Irrigation, Domestic, Fire Protection, Recreation	Nevada	DEER CREEK
S012952	NEVADA IRRIGATION DISTRICT	34,300.00	Pre-14	1851	All	Irrigation, Domestic, Fire Protection, Recreation	Nevada	DEER CREEK
S012953	NEVADA IRRIGATION DISTRICT	30,645.00	Pre-14	1857	All	Irrigation, Domestic, Fire Protection, Recreation	Nevada	SOUTH FORK DEER CREEK
S013330	NEVADA IRRIGATION DISTRICT	83,639.00	Pre-14	1854	All	Irrigation, Domestic, Fire Protection, Recreation, Mining, Hydropower	Sierra	MIDDLE YUBA RIVER
S013800	NEVADA IRRIGATION DISTRICT	117,023.50	Pre-14	1872	All	Irrigation, Domestic, Fire Protection, Recreation, Mining, Hydropower	Nevada	CANYON CREEK
S013801	NEVADA IRRIGATION DISTRICT	47,996.00	Pre-14	1872	All	Irrigation, Domestic, Fire Protection, Recreation, Mining, Hydropower	Nevada	CANYON CREEK
S013927	NEVADA IRRIGATION DISTRICT	61,487.00	Pre-14	1874	All	Irrigation, Domestic, Fire Protection, Recreation, Mining, Hydropower	Nevada	SOUTH YUBA RIVER
S013928	NEVADA IRRIGATION DISTRICT	483,867.00	Pre-14	1874	All	Irrigation, Domestic, Fire Protection, Recreation, Mining, Hydropower	Nevada	SOUTH YUBA RIVER
S014353	NEVADA IRRIGATION DISTRICT	47,789.00	Riparian/Pre-14	1851	All	Irrigation, Domestic, Fire Protection, Recreation, Mining, Hydropower	Nevada	DEER CREEK
S016092	NEVADA IRRIGATION DISTRICT	1,279.00	Pre-14	1859	All	Irrigation, Domestic, Fire Protection, Recreation, Mining, Hydropower	Nevada	JACKSON CREEK
	NEVADA IRRIGATION DISTRICT Total	1,051,334.90						
	Grand Total	1,127,533.86						

Application ID	Holder Name	Highest Amount Claimed	Water Rights Claim Type	Year of First Use	Season	Purpose of Use	County	Source
S013809	NEVADA IRRIGATION DISTRICT	69,433.00	Pre-14	1853	All	Irrigation, Domestic	Nevada	BEAR RIVER
S013926	NEVADA IRRIGATION DISTRICT	22,675.00	Pre-14	1859	All	Irrigation, Mining	Nevada	WOLF CREEK
		92,108.00						

East Creeks Water Rights - Statements of Diversion and Use

Application ID	Holder Name	Highest Amount Claimed	Water Rights Claim Type	Year of First Use	Season	Purpose of Use	County	Source
S001115	1990 Johannessen Family Trust	453.72	Pre-14	1880	Apr-Sep	Irrigation, Stockwater	Shasta	DEER CREEK
S013144	1990 JOHANNESSEN FAMILY TRUST	2,759.01	Pre-14	1880	Apr-Oct	Irrigation, Stockwater	Shasta	DEER CREEK
	1990 Johannessen Family Trust Total	3,212.73						
S012313	BATTLE CREEK MEADOWS RANCH INC	350.00	Riparian/Pre-14	1900	Apr-Oct	Irrigation, Stockwater	Tehama	MARTIN CREEK
S012314	BATTLE CREEK MEADOWS RANCH INC	350.00	Riparian/Pre-14	1900	Apr-Oct	Irrigation, Stockwater	Tehama	MARTIN CREEK
S012315	BATTLE CREEK MEADOWS RANCH INC	350.00	Riparian/Pre-14	1900	Apr-Oct	Irrigation, Stockwater	Tehama	MARTIN CREEK
S012316	BATTLE CREEK MEADOWS RANCH INC	350.00	Riparian/Pre-14	1900	Apr-Oct	Irrigation, Stockwater	Tehama	SOUTH FORK BATTLE CREEK
S012318	BATTLE CREEK MEADOWS RANCH INC	350.00	Riparian/Pre-14	1900	Apr-Oct	Irrigation, Stockwater	Tehama	UNST
S012319	BATTLE CREEK MEADOWS RANCH INC	350.00	Riparian/Pre-14	1900	Apr-Oct	Irrigation, Stockwater	Tehama	UNST
S012320	BATTLE CREEK MEADOWS RANCH INC	350.00	Riparian/Pre-14	1900	Apr-Oct	Irrigation, Stockwater	Tehama	UNST
S012321	BATTLE CREEK MEADOWS RANCH INC	350.00	Riparian/Pre-14	1900	Apr-Oct	Irrigation, Stockwater	Tehama	UNST
S012322	BATTLE CREEK MEADOWS RANCH INC	350.00	Riparian/Pre-14	1900	Apr-Oct	Irrigation, Stockwater	Tehama	UNST
S012323	BATTLE CREEK MEADOWS RANCH INC	350.00	Riparian/Pre-14	1900	Apr-Oct	Irrigation, Stockwater	Tehama	UNST
	BATTLE CREEK MEADOWS RANCH INC Total	3,500.00						
S000550	BUTTE SINK WATERFOWL ASSOCIATION	43,800.00	Riparian/Pre-14	1900	All	Irrigation, Habitat	Butte	BUTTE CREEK
	BUTTE SINK WATERFOWL ASSOCIATION Total	43,800.00						
S002387	CLINE C SOULE	3,200.00	Riparian/Pre-14	1885	Apr - Oct	Irrigation, Stockwater	Siskiyou	BUTTE CREEK
	CLINE C SOULE Total	3,200.00						
S000731	DEER CREEK IRRIGATION DISTRICT	20,400.00	Adjudication	1923	Feb-Nov	Irrigation	Tehama	DEER CREEK
	DEER CREEK IRRIGATION DISTRICT Total	20,400.00						
S010988	DOUGLAS H BOSCO	159.17	Pre-14	1900	Apr-Oct	Irrigation, Stockwater	Shasta	NORTH FORK BATTLE CREEK
S010989	DOUGLAS H BOSCO	848.93	Pre-14	1900	Apr-Oct	Irrigation, Stockwater	Shasta	NORTH FORK BATTLE CREEK
S010990	DOUGLAS H BOSCO	159.17	Pre-14	1900	Apr-Oct	Irrigation, Stockwater	Shasta	NORTH FORK BATTLE CREEK
	DOUGLAS H BOSCO Total	1,167.27						
S000736	E J LOUIE & SONS	1,545.60	Pre-14	1872	Apr-Oct	Irrigation	Siskiyou	BUTTE CREEK
S000739	E J LOUIE & SONS	1,932.00	Pre-14	1872	Apr-Oct	Irrigation	Siskiyou	BUTTE CREEK
S000740	E J LOUIE & SONS	1,200.00	Pre-14	1872	Apr-Oct	Irrigation	Siskiyou	BUTTE CREEK
S000748	E J LOUIE & SONS	386.40	Pre-14	1872	Apr-Oct	Irrigation	Siskiyou	BUTTE CREEK
	E J LOUIE & SONS Total	5,064.00						
S009605	MAURICE JOHANNESSEN	2,759.01	Pre-14	1880	Apr-Oct	Irrigation, Stockwater	Shasta	DEER CREEK
	MAURICE JOHANNESSEN Total	2,759.01						
S008459	Paradise Irrigation District	9,251.00	Pre-14	1916	All	Domestic	Butte	LITTLE BUTTE CREEK
	Paradise Irrigation District Total	9,251.00						
S000729	STANFORD VINA RANCH IRRIGATION CO	9,676.50	Riparian/Pre-14	1900	May-Oct	Irrigation, Stockwater	Tehama	DEER CREEK
S000730	STANFORD VINA RANCH IRRIGATION CO	9,676.50	Riparian/Pre-14	1900	May-Oct	Irrigation, Stockwater	Tehama	DEER CREEK
	STANFORD VINA RANCH IRRIGATION CO Total	19,353.00						
S000732	U S BUREAU OF LAND MANAGEMENT	11,615.21	Pre-14	1870	Apr-Nov	Irrigation, Stockwater, Habitat	Tehama	BATTLE CREEK
	U S BUREAU OF LAND MANAGEMENT Total	11,615.21						

Application ID	Holder Name	Highest Amount Claimed	Water Rights Claim Type	Year of First Use	Season	Purpose of Use	County	Source
S009976	WESTERN CANAL WATER DISTRICT	5,045.00	Pre-14	1916	Apr-Jun	Irrigation	Butte	BUTTE CREEK
	WESTERN CANAL WATER DISTRICT Total	5,045.00						
	Grand Total	128,367.21						

West Creeks (Cache and Stony) - Statements of Diversion and Use

Application ID	Holder Name	Highest Amount Claimed	Water Rights Claim Type	Year of First Use	Season	Purpose of Use	County	Source
S015943	PAYNE FARMS - WA PAYNE	1,800.00	Riparian	1990	May-Aug	Irrigation	Yolo	CACHE CREEK
	PAYNE FARMS - WA PAYNE	1,800.00						
S000608	YOLO COUNTY F C & W C DISTRICT	21,006.00	Riparian/Pre-14	1856	Mar-Dec	Irrigation, Domestic, Hydropower	Yolo	CACHE CREEK
S000609	YOLO COUNTY F C & W C DISTRICT	237,206.00	Riparian/Pre-14	1859	Mar-Dec	Irrigation, Domestic, Hydropower	Yolo	CACHE CREEK
S001063	YOLO COUNTY F C & W C DISTRICT	4,775.00	Riparian/Pre-14	1859	Apr-Oct	Irrigation, Domestic, Hydropower	Yolo	CACHE CREEK
S014986	YOLO COUNTY F C & W C DISTRICT	339,976.00	Riparian/Pre-14	1914	All	Irrigation, Municipal, Industrial, Recreation, Hydropower	Lake	CACHE CREEK
	YOLO COUNTY F C & W C	602,963.00						
S006354	U.S. BUREAU OF RECLAMATION	114,300.00	Fed Adjudication	1910	Jan-Nov	Irrigation	Colusa	LITTLE STONY CREEK
S006353	U.S. BUREAU OF RECLAMATION	56,000.00	Fed Adjudication	1910	Oct-Mar	Irrigation	Colusa	STONY CREEK
	U.S. BUREAU OF RECLAMATION	170,300.00						
	Grand Total	775,063.00						

Application ID	Holder Name	Highest Amount Claimed	Water Rights Claim Type	Year of First Use	Season	Purpose of Use	County	Source
S012208	ANDERSON-COTTONWOOD IRRIGATION DISTRICT	162,788.00	Pre-14	1917	Apr-Oct	Irrigation, Stockwater	Shasta	SACRAMENTO RIVER
	ANDERSON-COTTONWOOD IRRIGATION DISTRICT Total	162,788.00						
S013880	CARTER MUTUAL WATER COMPANY	3,829.00	Riparian	1924	May-Feb	Irrigation, Stockwater, Domestic	Colusa	SACRAMENTO RIVER
	CARTER MUTUAL WATER COMPANY Total	3,829.00						
S005221	CHARLES W TUTTLE JR	1,550.00	Riparian	1968	Feb-Sep	Irrigation	Colusa	SACRAMENTO RIVER
S005222	CHARLES W TUTTLE JR	6,050.00	Riparian/Pre-14	1912	Mar-Jan	Irrigation	Colusa	SACRAMENTO RIVER
	CHARLES W TUTTLE JR Total	7,600.00						
S014834	CITY OF SACRAMENTO	74,036.91	Pre-14	1849	All	Municipal	Sacramento	SACRAMENTO RIVER
	CITY OF SACRAMENTO Total	74,036.91						
S017223	Dead Horse LP	348.80	Riparian/Pre-14	1800s	All	Irrigation	Yolo	SACRAMENTO RIVER
S017224	Dead Horse LP	174.40	Riparian/Pre-14	1800s	All	Irrigation	Yolo	SACRAMENTO RIVER
	Dead Horse LP Total	523.20						
S016908	Deadhorse LP	174.40	Riparian/Pre-14	1800s	All	Irrigation	Yolo	SACRAMENTO RIVER
S018494	Deadhorse LP	348.80	Riparian/Pre-14	1800s	All	Irrigation	Yolo	Sacramento River
	Deadhorse LP Total	523.20						
S020061	Edward McDowell	440.00	Riparian/Pre-14	1800s	Apr-Oct	Irrigation	Sacramento	Sacramento River
S020612	Edward McDowell	605.00	Riparian/Pre-14	1800s	Apr-Oct	Irrigation	Sacramento	SACRAMENTO RIVER
S020616	Edward McDowell	605.00	Riparian/Pre-14	1800s	Apr-Oct	Irrigation	Sacramento	SACRAMENTO RIVER
	Edward McDowell Total	1,650.00						
S017096	Elliot Delta Orchards, LLC	376.00	Riparian/Pre-14	1800s	Apr-Oct	Irrigation	Sacramento	SACRAMENTO RIVER
S018886	Elliot Delta Orchards, LLC	444.00	Riparian/Pre-14	1800s	Apr-Oct	Irrigation	Sacramento	Sacramento River
	Elliot Delta Orchards, LLC Total	820.00						
S017093	Elliot Family Co., LLC	200.00	Riparian/Pre-14	1800s	Apr-Oct	Irrigation	Sacramento	SACRAMENTO RIVER
S017383	Elliot Family Co., LLC	352.00	Riparian/Pre-14	1800s	Apr-Oct	Irrigation	Sacramento	SACRAMENTO RIVER
S019707	Elliot Family Co., LLC	300.00	Riparian/Pre-14	1800s	Apr-Oct	Irrigation	Sacramento	SACRAMENTO RIVER
	Elliot Family Co., LLC Total	852.00						
S016915	Elliot Family Revocable Trust	821.00	Riparian/Pre-14	1800s	Apr-Oct	Irrigation	Sacramento	SACRAMENTO RIVER
S018859	Elliot Family Revocable Trust	394.00	Riparian/Pre-14	1800s	Apr-Oct	Irrigation	Sacramento	Sacramento River
	Elliot Family Revocable Trust Total	1,215.00						
S018613	Farmland Reserve, Inc.	1,800.00	Riparian	1950s	Apr-Oct	Irrigation	Butte	SACRAMENTO RIVER
	Farmland Reserve, Inc. Total	1,800.00						
S018603	Faye Properties, Inc.	3,200.00	Riparian	1800s	Mar-Sep	Irrigation	Yolo	SACRAMENTO RIVER
	Faye Properties, Inc. Total	3,200.00						
S007367	GLENN-COLUSA IRRIGATION DISTRICT	925,200.00	Pre-14	1906	All	Irrigation	Glenn	SACRAMENTO RIVER

Application ID	Holder Name	Highest Amount Claimed	Water Rights Claim Type	Year of First Use	Season	Purpose of Use	County	Source
	GLENN-COLUSA IRRIGATION DISTRICT Total	925,200.00						
S018956	Greene & Hemly - Merritt Island Ranch- Greene & Hemly, Inc	137.05	Riparian/Pre-14	1850	Mar-Oct	Irrigation	Yolo	SACRAMENTO RIVER
S018959	Greene & Hemly - Merritt Island Ranch- Greene & Hemly, Inc	589.32	Riparian/Pre-14	1850	Mar-Oct	Irrigation	Yolo	SACRAMENTO RIVER
S020804	Greene & Hemly - Merritt Island Ranch- Greene & Hemly, Inc	370.04	Riparian/Pre-14	1850	Mar-Oct	Irrigation	Yolo	Sacramento River
	Greene & Hemly - Merritt Island Ranch- Greene & Hemly, Inc Total	1,096.41						
S017190	Greene & Hemly - Randall Ranch Greene & Hemly Inc.	354.05	Riparian/Pre-14	1850	Mar-Oct	Irrigation	Sacramento	SACRAMENTO RIVER
S017191	Greene & Hemly - Randall Ranch Greene & Hemly Inc.	5.00	Riparian/Pre-14	1850	Mar-Oct	Irrigation	Sacramento	SACRAMENTO RIVER
	Greene & Hemly - Randall Ranch Greene & Hemly Inc. Total	359.05						
S017193	Greene & Hemly - Wheeler Ranch Greene and Hemly, Inc	753.79	Riparian/Pre-14	1850	Mar-Oct	Irrigation	Sacramento	SACRAMENTO RIVER
	Greene & Hemly - Wheeler Ranch Greene and Hemly, Inc Total	753.79						
S013264	HAROLD ARMSTRONG	2,200.00	Riparian	1895	Feb-Oct	Irrigation	Colusa	SACRAMENTO RIVER
	HAROLD ARMSTRONG Total	2,200.00						
S013717	JOSEPH BORGES RANCHES	1,400.00	Riparian	1922	Apr-Sep	Irrigation	Sacramento	SACRAMENTO RIVER
	JOSEPH BORGES RANCHES Total	1,400.00						
S017264	Joseph T Sanchez	700.00	Riparian/Pre-14	1800s	All	Irrigation	Sacramento	SACRAMENTO RIVER
S019830	Joseph T Sanchez	600.00	Riparian/Pre-14	1800s	All	Irrigation	Sacramento	SACRAMENTO RIVER
	Joseph T Sanchez Total	1,300.00						
S010294	LAUTRUP INVESTMENT PARTNERSHIP	1,000.00	Riparian	1965	Apr-Oct	Irrigation	Yolo	SACRAMENTO RIVER
	LAUTRUP INVESTMENT PARTNERSHIP Total	1,000.00						
S019846	Leary - Dennis Leary Trust 11/19/1990	0.00	Riparian	1800s	All	Irrigation	Sacramento	SACRAMENTO RIVER
	Leary - Dennis Leary Trust 11/19/1990 Total	0.00						
S018049	Leary - M G	349.00	Riparian/Pre-14	1800s	Apr-Nov	Irrigation	Sacramento	SACRAMENTO RIVER
	Leary - M G Total	349.00						
S018046	Leary (Dennis)	582.80	Riparian/Pre-14	1800s	Apr-Nov	Irrigation	Sacramento	SACRAMENTO RIVER
	Leary (Dennis) Total	582.80						
S019868	Leary etal	600.00	Riparian/Pre-14	1800s	All	Irrigation	Sacramento	SACRAMENTO RIVER
	Leary etal Total	600.00						
S018146	MARY CRANE	1,055.66	Riparian	1907	Apr-Oct	Irrigation	Sacramento	SACRAMENTO RIVER
	MARY CRANE Total	1,055.66						
S018012	MCCORMACK WILLIAMSON COMPANY	4,000.00	Riparian	1930	Apr-Sep	Irrigation	Sacramento	Sacramento River
S018018	MCCORMACK WILLIAMSON COMPANY	2,000.00	Riparian	1930	Apr-Sep	Irrigation	Sacramento	Sacramento River
S018021	MCCORMACK WILLIAMSON COMPANY	1,000.00	Riparian	1930	May-Aug	Irrigation	Sacramento	Sacramento River
	MCCORMACK WILLIAMSON COMPANY Total	7,000.00						
S018614	MYERS LAND COMPANY LLP	938.00	Riparian	1903	Apr-Sep	Irrigation	Yolo	SACRAMENTO RIVER
S018617	MYERS LAND COMPANY LLP	131.00	Riparian	1950	Apr-Sep	Irrigation	Yolo	SACRAMENTO RIVER
	MYERS LAND COMPANY LLP Total	1,069.00						
S002064	PACIFIC FRUIT FARMS	356.80	Riparian	1929	All	Irrigation	Sacramento	SACRAMENTO RIVER
S002065	PACIFIC FRUIT FARMS	356.80	Riparian	1929	All	Irrigation	Sacramento	SACRAMENTO RIVER
S002066	PACIFIC FRUIT FARMS	356.80	Riparian	1929	All	Irrigation	Sacramento	SACRAMENTO RIVER
S008159	PACIFIC FRUIT FARMS	356.80	Riparian	1929	All	Irrigation	Sacramento	SACRAMENTO RIVER
S019372	PACIFIC FRUIT FARMS	436.00	Riparian	1929	All	Irrigation	Sacramento	SACRAMENTO RIVER

Application ID	Holder Name	Highest Amount Claimed	Water Rights Claim Type	Year of First Use	Season	Purpose of Use	County	Source
S019375	PACIFIC FRUIT FARMS	85.02	Riparian	1929	All	Irrigation	Sacramento	SACRAMENTO RIVER
S019464	PACIFIC FRUIT FARMS	85.02	Riparian	1929	All	Irrigation	Sacramento	Sacramento River
	PACIFIC FRUIT FARMS Total	2,033.24						
S009896	PARROTT INVESTMENT COMPANY	8,805.67	Riparian	1971	Apr-Oct	Irrigation	Butte	SACRAMENTO RIVER
S009897	PARROTT INVESTMENT COMPANY	8,805.67	Riparian	1918	Apr-Oct	Irrigation	Butte	SACRAMENTO RIVER
S009898	PARROTT INVESTMENT COMPANY	8,805.67	Riparian	1979	Apr-Oct	Irrigation	Butte	SACRAMENTO RIVER
	PARROTT INVESTMENT COMPANY Total	26,417.00						
S001905	Pylman - A & M PYLMAN FARMS	945.71	Riparian	1915	Apr-Oct	Irrigation	Sacramento	SACRAMENTO RIVER
S001908	Pylman - A & M PYLMAN FARMS	1,418.56	Riparian	1915	Mar-Sep	Irrigation	Sacramento	SACRAMENTO RIVER
S001909	Pylman - A & M PYLMAN FARMS	945.71	Riparian	1915	Mar-Sep	Irrigation	Sacramento	SACRAMENTO RIVER
	Pylman - A & M PYLMAN FARMS Total	3,309.98						
S001237	PYLMAN VINEYARDS INC	338.07	Riparian/Pre-14	1910	Apr-Oct	Irrigation	Yolo	SACRAMENTO RIVER
S001867	PYLMAN VINEYARDS INC	338.07	Riparian/Pre-14	1910	Apr-Oct	Irrigation	Sacramento	SACRAMENTO RIVER
S020149	PYLMAN VINEYARDS INC	960.00	Riparian/Pre-14	1910	Apr-Oct	Irrigation	Yolo	Sacramento River
S020153	PYLMAN VINEYARDS INC	610.00	Riparian/Pre-14	1910	Apr-Oct	Irrigation	Yolo	Sacramento River
S020157	PYLMAN VINEYARDS INC	1,000.00	Riparian/Pre-14	1910	Apr-Oct	Irrigation	Yolo	Sacramento River
	PYLMAN VINEYARDS INC Total	3,246.14						
S020641	RECLAMATION DISTRICT #108	40,185.00	Riparian	1800s	Apr-Dec	Irrigation	Colusa	SACRAMENTO RIVER
S020645	RECLAMATION DISTRICT #108	118,058.00	Riparian	1800s	Apr-Dec	Irrigation	Colusa	SACRAMENTO RIVER
S020649	RECLAMATION DISTRICT #108	487.00	Riparian	1800s	Apr-Oct	Irrigation	Colusa	SACRAMENTO RIVER
S020653	RECLAMATION DISTRICT #108	169.00	Riparian	1800s	Apr-Oct	Irrigation	Colusa	SACRAMENTO RIVER
S020657	RECLAMATION DISTRICT #108	2,885.00	Riparian	1800s	May-Sep	Irrigation	Colusa	SACRAMENTO RIVER
S020661	RECLAMATION DISTRICT #108	10,414.00	Riparian	1800s	Apr-Jul	Irrigation	Yolo	SACRAMENTO RIVER
	RECLAMATION DISTRICT #108 Total	172,198.00						
S018031	RIVER GARDEN FARMS COMPANY	356.00	Riparian	1950	Mar-Sep	Irrigation	Yolo	SACRAMENTO RIVER
	RIVER GARDEN FARMS COMPANY Total	356.00						
S017210	Rivermaid Land Company	230.00	Riparian/Pre-14	1800s	All	Irrigation	Sacramento	SACRAMENTO RIVER
S017213	Rivermaid Land Company	330.00	Riparian/Pre-14	1800s	All	Irrigation	Sacramento	SACRAMENTO RIVER
S017222	Rivermaid Land Company	260.00	Riparian/Pre-14	1800s	All	Irrigation	Sacramento	SACRAMENTO RIVER
S017225	Rivermaid Land Company	170.00	Riparian/Pre-14	1800s	All	Irrigation	Sacramento	SACRAMENTO RIVER
S017226	Rivermaid Land Company	234.00	Riparian/Pre-14	1800s	All	Irrigation	Sacramento	SACRAMENTO RIVER
S017228	Rivermaid Land Company	1,300.00	Riparian/Pre-14	1800s	All	Irrigation	Sacramento	SACRAMENTO RIVER

Application ID	Holder Name	Highest Amount Claimed	Water Rights Claim Type	Year of First Use	Season	Purpose of Use	County	Source
S019320	Rivermaid Land Company	191.84	Riparian/Pre-14	1800s	All	Irrigation	Sacramento	SACRAMENTO RIVER
S019360	Rivermaid Land Company	174.40	Riparian/Pre-14	1800s	All	Irrigation	Sacramento	SACRAMENTO RIVER
S019377	Rivermaid Land Company	174.90	Riparian/Pre-14	1800s	All	Irrigation	Sacramento	SACRAMENTO RIVER
S019606	Rivermaid Land Company	261.60	Riparian/Pre-14	1800s	All	Irrigation	Sacramento	Sacramento River
	Rivermaid Land Company Total	3,326.74						
S009950	ROY MORRESCO JR	1,654.00	Riparian	1920	Apr-Jan	Irrigation	Sutter	SACRAMENTO RIVER
	ROY MORRESCO JR Total	1,654.00						
S020145	SACRAMENTO RIVER RANCH II LLC	3,834.40	Riparian	NA	NA	Irrigation	Yolo	Sacramento River
	SACRAMENTO RIVER RANCH II LLC Total	3,834.40						
S016992	Spinella (Art, Janelle)	269.20	Pre-14	1908	Apr-Oct	Irrigation	Sacramento	SACRAMENTO RIVER
	Spinella (Art, Janelle) Total	269.20						
S016993	Spinella (Frankie)	2,642.30	Pre-14	1910	Apr-Oct	Irrigation	Yolo	SACRAMENTO RIVER
S017329	Spinella (Frankie)	350.00	Pre-14	1910	Apr-Oct	Irrigation	Yolo	SACRAMENTO RIVER
	Spinella (Frankie) Total	2,992.30						
S012858	THE ARCHES LTD	1,320.00	Riparian/Pre-14	1800s	May-Aug	Irrigation	Sacramento	SACRAMENTO RIVER
S012860	THE ARCHES LTD	1,000.00	Riparian/Pre-14	1800s	May-Aug	Irrigation	Sacramento	SACRAMENTO RIVER
	THE ARCHES LTD Total	2,320.00						
S019793	TOWNE ENTERPRISES	942.00	Riparian	1996	Jan-Oct	Irrigation	Sacramento	SACRAMENTO RIVER
S019796	TOWNE ENTERPRISES	2,024.00	Riparian	1914	Jan-Sep	Irrigation	Sacramento	SACRAMENTO RIVER
S019799	TOWNE ENTERPRISES	0.00	Riparian	1914	All	Irrigation	Sacramento	SACRAMENTO RIVER
S019802	TOWNE ENTERPRISES	0.00	Riparian	1997	All	Irrigation	Sacramento	SACRAMENTO RIVER
S019808	TOWNE ENTERPRISES	5,942.00	Riparian	1914	Apr-Sep	Irrigation	Sacramento	SACRAMENTO RIVER
	TOWNE ENTERPRISES Total	8,908.00						
	Grand Total	1,433,668.02						

Stanislaus River Watershed - Statements of Diversion and Use

Application ID	Holder Name	Highest Amount Claimed	Water Rights Claim Type	Year of First Use	Season	Purpose of Use	County	Source
S014003	R J Gallo	6,000.00	Riparian	1940	All	Irrigation	Stanislaus	STANISLAUS RIVER
S009333	US Fish & Wildlife Service	2,040.00	Riparian	1950	All	Irrigation	Stanislaus	STANISLAUS RIVER
S004683	OAKDALE IRRIGATION DISTRICT	485,040.00	Pre-14	1913	All	Irrigation, Domestic	Calaveras	STANISLAUS RIVER
S010402	TUOLUMNE UTILITIES DISTRICT	3,668.00	Pre-14	1852	All	Irrigation, Domestic	Tuolumne	MORMON CREEK
S013888	JOSEPH J FRAGUERO	2,850.00	Pre-14	1884	All	Irrigation, Stockwater	Calaveras	ANGELS CREEK
		499,598.00						

Tuolumne River Watershed - Statements of Diversion and Use

Application ID	Holder Name	Highest Amount Claimed	Water Rights Claim Type	Year of First Use	Season	Purpose of Use	County	Source
S002635	CITY AND COUNTY OF SAN FRANCISCO PUC AGM WATER ENTERPRISE	581,280.00	Pre-14	1922	All	Municipal/ Industrial, Hydropower, Fish & Wildlife, Recreation	Tuolumne	TUOLUMNE RIVER
S002637	CITY AND COUNTY OF SAN FRANCISCO PUC AGM WATER ENTERPRISE	541,652.00	Pre-14	1925	All	Municipal/ Industrial, Hydropower, Fish & Wildlife, Recreation	Tuolumne	TUOLUMNE RIVER
S014379	CITY AND COUNTY OF SAN FRANCISCO PUC AGM WATER ENTERPRISE	258,778.00	Pre-14	1918	All	Municipal/ Industrial, Hydropower, Fish & Wildlife, Recreation	Tuolumne	CHERRY CREEK
	CITY AND COUNTY OF SAN FRANCISCO	1,381,710.00						
S014004	Gallo Vineyards Inc	268.22	Riparian	1960	Apr-Oct	Irrigation	Stanislaus	TUOLUMNE RIVER
	Gallo Vineyards Inc Total	268.22						
S011103	James E Coleman	1,520.00	Riparian	1917	Apr-Oct	Irrigation	Stanislaus	TUOLUMNE RIVER
	James E Coleman Total	1,520.00						
S009161	Joseph E Gallo	329.51	Riparian	1978	Mar-Oct	Irrigation	Stanislaus	TUOLUMNE RIVER
S011191	Joseph E Gallo	66.42	Riparian	1976	Mar-Oct	Irrigation	Stanislaus	TUOLUMNE RIVER
	Joseph E Gallo Total	395.93						
S000996	TUOLUMNE UTILITIES DISTRICT	10,167.00	Pre-14	1851	All	Irrigation, Stockwater, Domestic	Tuolumne	SULLIVAN CREEK
S000997	TUOLUMNE UTILITIES DISTRICT	4,815.00	Pre-14	1852	All	Irrigation, Stockwater, Domestic	Tuolumne	SULLIVAN CREEK
S001006	TUOLUMNE UTILITIES DISTRICT	3,808.00	Pre-14	1852	All	Irrigation, Stockwater, Domestic	Tuolumne	UNST (AKA POWER CREEK)
S001007	TUOLUMNE UTILITIES DISTRICT	893.00	Pre-14	1852	All	Irrigation, Stockwater, Domestic	Tuolumne	CURTIS CREEK
S010403	TUOLUMNE UTILITIES DISTRICT	730.00	Pre-14	1852	All	Irrigation, Stockwater, Domestic	Tuolumne	CURTIS CREEK
	TUOLUMNE UTILITIES DISTRICT Total	20,413.00						
S013848	TURLOCK IRRIGATION DISTRICT	1,196,100.00	Pre-14	1900	All	Irrigation, Domestic	Stanislaus	TUOLUMNE RIVER
	TURLOCK IRRIGATION DISTRICT Total	1,196,100.00						
	Grand Total	2,600,407.15						

Merced River Watershed - Statements of Diversion and Use

Application ID	Holder Name	Highest Amount Claimed	Water Rights Claim Type	Year of First Use	Season	Purpose of Use	County	Source
S007654	Gallo Vineyards Inc	360.00	Riparian	1910	Mar-Oct	Irrigation, Frost Protection	Merced	MERCED RIVER
S007655	Gallo Vineyards Inc	170.00	Riparian	1910	Apr-Oct	Irrigation, Frost Protection	Merced	MERCED RIVER
S007656	Gallo Vineyards Inc	1,275.00	Riparian	1910	Mar-Oct	Irrigation, Frost Protection	Merced	MERCED RIVER
S007657	Gallo Vineyards Inc	150.00	Riparian	1910	Mar-Dec	Irrigation, Frost Protection	Merced	MERCED RIVER
S007658	Gallo Vineyards Inc	135.00	Riparian	1910	Mar-Dec	Irrigation, Frost Protection	Merced	MERCED RIVER
S007661	Gallo Vineyards Inc	175.00	Riparian	1910	Mar-Dec	Irrigation, Frost Protection	Merced	MERCED RIVER
S007662	Gallo Vineyards Inc	155.00	Riparian	1910	Mar-Dec	Irrigation, Frost Protection	Merced	MERCED RIVER
S007663	Gallo Vineyards Inc	150.00	Riparian	1910	Mar-Dec	Irrigation, Frost Protection	Merced	MERCED RIVER
S007664	Gallo Vineyards Inc	230.00	Riparian	1910	Apr-Dec	Irrigation, Frost Protection	Merced	MERCED RIVER
S007665	Gallo Vineyards Inc	1,028.00	Riparian	1910	All	Irrigation, Frost Protection, Industrial	Merced	MERCED RIVER
S007666	Gallo Vineyards Inc	115.00	Riparian	1910	All	Irrigation, Frost Protection	Merced	MERCED RIVER
S007667	Gallo Vineyards Inc	180.00	Riparian	1910	Apr-Oct	Irrigation, Frost Protection	Merced	MERCED RIVER
S007668	Gallo Vineyards Inc	300.00	Riparian	1910	Apr-Oct	Irrigation, Frost Protection	Merced	MERCED RIVER
S007669	Gallo Vineyards Inc	200.00	Riparian	1910	Apr-Oct	Irrigation, Frost Protection	Merced	MERCED RIVER
S007670	Gallo Vineyards Inc	270.00	Riparian/Pre-14	1900	Apr-Oct	Irrigation, Frost Protection	Merced	MERCED RIVER
S007671	Gallo Vineyards Inc	210.00	Riparian/Pre-14	1900	Apr-Oct	Irrigation, Frost Protection	Merced	MERCED RIVER
S007672	Gallo Vineyards Inc	375.00	Riparian/Pre-14	1900	Apr-Oct	Irrigation, Frost Protection	Merced	MERCED RIVER
S007673	Gallo Vineyards Inc	210.00	Riparian/Pre-14	1900	Apr-Oct	Irrigation, Frost Protection	Merced	MERCED RIVER
S007710	Gallo Vineyards Inc	375.00	Riparian/Pre-14	1900	Mar-Oct	Irrigation, Frost Protection	Merced	MERCED RIVER
S007711	Gallo Vineyards Inc	5,500.00	Riparian/Pre-14	1900	Mar-Oct	Irrigation, Frost Protection	Merced	MERCED RIVER
S007712	Gallo Vineyards Inc	2,240.00	Riparian/Pre-14	1900	Mar-Oct	Irrigation, Frost Protection	Merced	MERCED RIVER
S007713	Gallo Vineyards Inc	1,050.00	Riparian/Pre-14	1900	Mar-Oct	Irrigation, Frost Protection	Merced	MERCED RIVER
	Gallo Vineyards Inc Total	14,853.00						
S007674	Henry Te Velde	1,205.00	Riparian	1900	Mar-Sep	Irrigation	Merced	MERCED RIVER
	Henry Te Velde Total	1,205.00						
S001496	Kelsey Ranch LP	5,496.00	Pre-14	1858	Apr-Oct	Irrigation, Stockwater, Domestic, Recreation	Merced	MERCED RIVER
S002055	Kelsey Ranch LP	2,649.00	Riparian/Pre-14	1858	All	Irrigation, Domestic	Merced	MERCED RIVER
	Kelsey Ranch LP Total	8,145.00						
S012547	MADERA IRRIGATION DISTRICT	21,457.00	Pre-14	1875	All	Irrigation	Madera	BIG CREEK
	MADERA IRRIGATION DISTRICT Total	21,457.00						
S004718	MERCED IRRIGATION DISTRICT	571,000.00	Pre-14	1911	All	Irrigation	Merced	MERCED RIVER
S004719	MERCED IRRIGATION DISTRICT	3,336.00	Riparian/Pre-14	1888	Apr-Oct	Irrigation	Merced	MERCED RIVER
	MERCED IRRIGATION DISTRICT Total	574,336.00						
	Grand Total	619,996.00						

San Joaquin River Watershed - Statements of Diversion and Use

Application ID	Holder Name	Highest Amount Claimed	Water Rights Claim Type	Year of First Use	Season	Purpose of Use	County	Source
S005469	ARNOLD SOUZA & SONS	1,242.00	Riparian	1963	Apr-Sep	Irrigation	Stanislaus	SAN JOAQUIN RIVER
	ARNOLD SOUZA & SONS Total	1,242.00						
S001073	COLUMBIA CANAL COMPANY	62,879.00	Pre-14	1872	Feb-Dec	Irrigation	Madera	SAN JOAQUIN RIVER
	COLUMBIA CANAL COMPANY Total	62,879.00						
S005005	COSTA VIEW FARMS #2, A CA GEN PARTNERSHIP	19,000.00	Riparian/Pre-14	1903	All	Irrigation, Stockwater	Madera	FRESNO RIVER
	COSTA VIEW FARMS #2, A CA GEN	19,000.00						
S010411	LONE TREE MUTUAL WATER COMPANY	18,376.00	Riparian	1955	All	Irrigation	Merced	SAN JOAQUIN RIVER
	LONE TREE MUTUAL WATER COMPANY Total	18,376.00						
S004978	MADERA IRRIGATION DISTRICT	51,741.00	Pre-14	1873	All	Irrigation	Madera	FRESNO RIVER
S014187	MADERA IRRIGATION DISTRICT	18,148.00	Pre-14	1873	Oct-Jul	Irrigation	Madera	NORTH FORK WILLOW CREEK
	MADERA IRRIGATION DISTRICT Total	69,889.00						
S001915	Mark D McKean	945.00	Riparian/Pre-14	1908	Apr-Oct	Irrigation	Fresno	FRESNO SLOUGH
S001916	Mark D McKean	770.00	Riparian	1908	Mar-Sep	Irrigation	Fresno	FRESNO SLOUGH
S001917	Mark D McKean	860.00	Riparian/Pre-14	1908	Feb-Oct	Irrigation	Fresno	FRESNO SLOUGH
	Mark D McKean Total	2,575.00						
S006296	MENEFEE RIVER RANCH COMPANY	2,105.00	Riparian	1952	Mar-Oct	Irrigation	Merced	FRESNO RIVER
	MENEFEE RIVER RANCH COMPANY Total	2,105.00						
S009320	PATTERSON IRRIGATION DISTRICT	60,200.00	Pre-14	1910	Mar-Sep	Irrigation	Stanislaus	SAN JOAQUIN RIVER
	PATTERSON IRRIGATION DISTRICT Total	60,200.00						
S015523	POINT MILLERTON RANCH LLC	2,100.00	Riparian/Pre-14	2002	All	Irrigation, Stockwater	Madera	FINE GOLD CREEK
	POINT MILLERTON RANCH LLC Total	2,100.00						
S014001	R J GALLO	5,304.00	Riparian	1950	All	Irrigation	Stanislaus	SAN JOAQUIN RIVER
S014002	R J GALLO	813.00	Riparian	1950	All	Irrigation, Stockwater	Stanislaus	SAN JOAQUIN RIVER
	R J GALLO Total	6,117.00						
S001116	ROBERT F FLYNN	4,200.00	Riparian	1926	All	Irrigation, Stockwater	Merced	DUCK SLOUGH
	ROBERT F FLYNN Total	4,200.00						
S009575	U S FISH & WILDLIFE SERVICE	12,976.00	Pre-14	1900	All	Irrigation, Wildlife Management	Merced	DEADMAN CREEK
	U S FISH & WILDLIFE SERVICE Total	12,976.00						
	Grand Total	261,659.00						

Appendix D

Section D.5
Other Pre-1914 Consumptive Water Rights Claims

Feather River Pre-1914 Consumptive Water Rights

1) South Feather Water & Power Agency (Formerly Oroville-Wyandotte Irrigation District) Claims:

Notice Date	Priority Date	Miners' Inches	Cubic Feet Per Second	Acre-feet	Source
	9/25/1852		All water		South Fork Feather River
	4/19/1854		All water		South Fork Feather River
	11/29/1854		All water		South Fork Feather River
	6/21/1862	240	5	3,477	South Fork Feather River
	8/15/1889	3,000	60	43,468	South Fork Feather River at LG Valley
	11/23/1908	5,000	100	72,446	Lost Creek
	11/23/1908	1,000	20	14,489	Lost Creek
	9/10/1910	10,000	200	144,893	South Fork Feather River at LG Valley
	9/10/1910	10,000	200	144,893	South Fork Feather River at LG Valley
	9/10/1910	10,000	200	144,893	South Fork Feather River at LG Valley
	9/29/1910	10,000	200	144,893	South Fork Feather River at LG Valley
	9/29/1910	10,000	200	144,893	South Fork Feather River at LG Valley
	4/22/1911	100	2	1,449	McCabe Creek
	4/22/1911	5,000	100	72,446	South Fork Feather River
	10/22/1914	7,500	150	108,669	Near Rock Creek, South Fork Feather River
	10/26/1914	5,000	100	72,446	Lower South Fork Feather River
			Total Face Value	533,784	(Less redundant claims in 1910 on South Fork Feather in LG Valley)

2) Western Canal Water District

County / Decree	Priority Date		Cubic Feet Per Second	Acre-feet	Source
Sutter/No. 2360	12/15/1924			150,000	Year-round Feather River
				145,000	Below Centerville PowerHouse
			Total Face Value	295,000	

3) Joint Water Districts of Feather River

	Priority Date	Miners' Inches	Cubic Feet Per Second	Acre-feet	Source
	7/29/1902	100,000	2,000	1,448,926	Feather River
	5/12/1903	100,000	2,000	1,448,926	Feather River
	3/29/1904	100,000	2,000	1,448,926	Feather River
	3/3/1909		500	362,231	Feather River
			Total Face Value	1,811,157	(less redundant claims on Feather River)

Sutter Decree No. 2360, 12/15/1924	Miners' Inches	Cubic Feet Per Second	Acre-feet	Source
Sutter Butte Canal Company first right		1,200	869,355	Feather River
Great Western Power Company (later PG&E) second right		300	217,339	Feather River
Above 1500 cfs, SBCC's second right is 2/3 of flow between 1500 and 2700 cfs (1200 cfs difference)		800	579,570	Feather River
Above 1500 cfs, Great Western's second right is 1/3 of flow between 1500 and 2700 cfs		400	289,785	Feather River
Above 2700 cfs, Great Western and Western Canal Company receive the next 500 cfs		500	362,231	Feather River
Above 3200 cfs, SBCC has right to divert the next 500 cfs, including all accretions, whatever the source.		500	362,231	Feather River
		SBCC Total Face Value	1,811,157	
		Western Canal Company's total claims =	869,355	

Water Right Shares of Sutter Butte Canal Company's Decreed Water Rights allocated to Joint Water Districts		
Biggs-West Gridley Water District	29.0%	525,236
Butte Water District	24.0%	434,678
Richvale Irrigation District	27.0%	489,012
Sutter Extension Water District	20.0%	362,231

Sources: South Feather Water Power Agency;
Western Canal Water District;
Joint Water Districts.

Yuba River Pre-1914 Consumptive Water Rights

1) Browns Valley Irrigation District

Priority Date	Miners' Inches	Cubic Feet Per Second	Acre-feet	Source
3/21/1890	10,000	200	144,893	North Yuba River

2) Yuba County Water Agency

Priority Date	Miners' Inches	Cubic Feet Per Second	Acre-feet	Source
1890		50	36,223	Colgate Head Dam, year-round - North Yuba River and its tributaries
		200	144,893	Hydropower only - Colgate Head Dam on North Yuba River
		60	43,468	Hydropower only - Colgate Head Dam on North Yuba River
		Total Face Value, Consumptive Rights	36,223	

Sources: Browns Valley Irrigation District;
Yuba County Water Agency; C-WIN.

Sacramento River Pre-1914 Consumptive Water Rights

1) Right Bank of Sacramento River at Wheel Ditch in Redding:
Shasta County Water Rights Book 2, p. 391, notice dated 11/21/1914
Deeded by McCoy Fitzgerald to Anderson-Cottonwood Irrigation Disrict, 12/30/1914

Notice Date	Priority Date	Miners' Inches	Cubic Feet Per Second	Acre-feet	Source
11/21/1914	11/21/1914	20,000	400	289,785	Wheel Ditch - Sacramento River

2) Glenn-Colusa Irrigation District

Notice Date	Priority Date	Miners' Inches	Cubic Feet Per Second	Acre-feet	Source
4/16/1903	4/15/1903	500,000	10,000	7,244,628	Sacramento River
2/26/1903	2/25/1903	150,000	3,000	2,173,388	Sacramento River
2/26/1903	2/25/1903	150,000	3,000	2,173,388	Sacramento River
12/7/1901	11/30/1901		5,000	3,622,314	Sacramento River
12/7/1901	11/30/1901		5,000	3,622,314	Sacramento River
12/21/1883	12/18/1883		5,000	3,622,314	Sacramento River
11/19/1903	11/13/1903		5,000	3,622,314	Sacramento River
				26,080,661	Sacramento River Total
8/1/1907	8/1/1907		5,000	3,622,314	Stony Creek
			5,000	3,622,314	Stony Creek
5/4/1905	4/26/1905		5,000	3,622,314	Stony Creek
				10,866,942	Stony Creek Total
11/23/1904	11/21/1904		2,000	1,448,926	Willow Creek
				1,448,926	Willow Creek Total
				38,396,529	Grand Total

3) City of Sacramento
Source: State Water Board Notice of Petitions for Extensions of Time to Complete Construction Under Permits 11358, 11359, 11360, and 11361, November 3, 1988

Notice Date	Priority Date	Miners' Inches	Cubic Feet Per Second	Acre-feet	Source
	1854		75	54,335	Sacramento River

Sources: Anderson-Cottonwood Irrigation District;
Glenn-Colusa Irrigation District;
City of Sacramento;
State Water Resources Control Board.

Turlock and Modesto Irrigation Districts' Pre-1914 Consumptive Water Rights

Holder Name	Date	Point of Diversion	Facility Name	Comment	Diversion	Diversion Units	Storage	Storage Units	Irrigation Season Face Amount, AF (246 days)
Turlock and Modesto Irrigation Districts and La Grange	5/18/1871	La Grange Dam	La Grange Dam	Acquired from F. Green and A.D. Allen	66	cubic feet per second			66 cfs max
Modesto Irrigation District	2/27/1913	La Grange Dam	La Grange Dam	Acquired from J.M. Finley	13,000	miner's inches			Not to exceed 250 cfs, among these first three water rights claims for a total of: 121,983.47
Modesto Irrigation District	11/13/1913	La Grange Dam	La Grange Dam	Acquired from Waterford Irrigation District	16,000	miner's inches			
Turlock and Modesto Irrigation Districts	1/16/1855	La Grange Dam	La Grange Dam	Acquired from Franklin Water Company					The sum of these water rights may not exceed 4,500 cfs diversion; Franklin Water Co and Elam Dye have no diversion amounts; all rights associated with this limit are converted to acre-feet:
Turlock and Modesto Irrigation Districts	1/18/1862	La Grange Dam	La Grange Dam	Acquired from Elam Dye					
Turlock and Modesto Irrigation Districts	5/18/1872	La Grange Dam	La Grange Dam	Acquired from John Burcham, M.A. Wheaton, and Charles Elliott	500,000	miner's inches			
Turlock Irrigation District	1/5/1889	La Grange Dam	La Grange Dam	Posted by TID	225,000	miner's inches			
Modesto Irrigation District	6/21/1890	La Grange Dam	La Grange Dam	Posted by MID	250,000	miner's inches			
Modesto Irrigation District	10/1/1908	La Grange Dam, Modesto Reservoir	La Grange Dam, Modesto Reservoir	Posted by MID	50,000	miner's inches	40,000	acre-feet	
Turlock Irrigation District	8/31/1911	La Grange Dam, Turlock Lake	La Grange Dam, Turlock Lake	Posted by TID	200,000	miner's inches	100,000	acre-feet	3,260,082.64
				Estimated Total Face Amount =					3,382,066.12

Source: Letter from Kenneth Petruzzelli, O'Laughlin and Paris LLP, attorneys for the Modesto Irrigation District, "Public Records Act Request for Pre-1914 Water Rights," dated January 14, 2011; California Water Impact Network. There are 50 miner's inches to 1 cubic foot per second.

Pre-1914 Appropriative Water Rights Claims of the City and County of San Francisco

Appropriation ID	Date	Point of Diversion	Facility Name	Face Amt (cfs)	Source
151(6)	7/22/1902	Stanislaus National Forest, Cherry Valley Reservoir Site, NE 1/4 Section 5, T1N R19E MDB&M	Cherry Valley Reservoir Site	1,000.00	Cherry Creek
151(4)	7/20/1902	Junction Eleanor & Cherry Creek, Section 16, T1N R19E MDB&M	Cherry Valley Reservoir Site	240.00	Eleanor & Cherry Creek
158	2/27/1911	Stanislaus National Forest, just north of S 1/4 corner of Setion 32, T2N R19E	Cherry Valley Reservoir Site	500.00	Cherry Creek
153(1)	10/24/1909	Stanislaus National Forest, just west of E 1/4 corner of Section 8, T2N R19E MDB&M	Cherry Valley Reservoir Site	1,000.00	Cherry Creek
151(21)	10/11/1909	Junction Eleanor & Cherry Creek, Section 16, T1N R19E MDB&M	Cherry Valley Reservoir Site	240.00	Eleanor & Cherry Creek
			Cherry Valley Reservoir Site Total	2,980.00	
160	2/18/1911	Yosemite National Park, NW 1/4 of Section 16, T1N R20E MDB&M	Hetch Hetchy Reservoir Site	500.00	Tuolumne River
155(2)	10/4/1908	Stanislaus National Forest near mouth of Jawbone Creek	Hetch Hetchy Reservoir Site	200.00	Tuolumne River
156(3)	9/29/1908	Yosemite National Park, NE 1/4 Section 17, T1N R20E MDB&M	Hetch Hetchy Reservoir Site	200.00	Tuolumne River
			Hetch Hetchy Reservoir Site Total	700.00	
154(6)	7/29/1901	Yosemite National Park, Lake Eleanor Reservoir Site (1/4 mile beow Lake Eleanor) SE 1/4 Section 34, T2N R19E MDB&M NW 1/4 within SE 1/4.	Lake Eleanor Reservoir Site	1,000.00	Eleanor Creek
155(1)	7/29/1901	Yosemite National Park NW 1/4 Section 3, T1N R19E MDB&M	Lake Eleanor Reservoir Site	100.00	Eleanor Creek
159	2/27/1911	Yosemite National Park, NW 1/4 Section 3, T1N R19E MDB&M	Lake Eleanor Reservoir Site	All the waters of Eleanor Creek	Eleanor Creek
154(14)	11/17/1909	Stanislaus National Park, West Bank NE 1/4 of NE 1/4Section 9 T!N R19E, MDB&M	Lake Eleanor Reservoir Site	100.00	Eleanor Creek
156(1)	10/1/1908	Yosemite National Park, NW 1/4 Section 3, T1N R19E	Lake Eleanor Reservoir Site	100.00	Eleanor Creek
			Lake Eleanor Reservoir Site Total	1,100.00	
163	2/28/1911	Stanislaus National Forest near mouth of Jawbone Creek	Tuolumne River at and Near Early Intake	500.00	Tuolumne River
161	2/21/1911	Stanislaus National Forest 1 1/4 miles upstream from Range Line between R18E and R19E	Tuolumne River at and Near Early Intake	500.00	Tuolumne River
162	2/20/1911	Stanislaus Forest near west line of new park boundary	Tuolumne River at and Near Early Intake	500.00	Tuolumne River
153(5)	10/15/1909	Stanislaus National Forest 1 1/4 miles upstream from Range Line between R18E and R19E	Tuolumne River at and Near Early Intake	1,000.00	Tuolumne River
151(22)	10/12/1909	Stanislaus National Forest, above junction with Cherry River	Tuolumne River at and Near Early Intake	240.00	Tuolumne River
156(2)	10/4/1908	Near mouth of Jawbone Creek	Tuolumne River at and Near Early Intake	300.00	Jawbone Creek Tuolumne River
			Tuolumne River at and Near Early Intake Total	3,040.00	
			Grand Total	7,820.00	
			Tuolumne River at and Near Early Intake Total in Acre-feet originally claimed	2,202,366.94	

Source: R.B. Hansen, *San Francisco's Water Rights on the Tuolumne River Watershed*, prepared under the direction of A.O. Olson, Manager and Chief Engineer, Hetch Hetchy Water Supply, Power and Utilities Engineering Bureau, City and County of San Francisco Public Utilities Commission, July 1951. Available from the UC Riverside Water Resources Collections and Archives, Call No. G4794 H1.

Merced River Riparian Pre-1914 Consumptive Water Rights

Water Right Type	Status	Holder Name	Date	Point of Diversion	Comment	Face Amount, AF
Appropriative	Pre-1914	Farmer's Canal Company	1876	Originally that of the Robla Ditch	2500 cfs, with no apparent seasonal limitations.	1,811,157
Appropriative	Pre-1914	Crocker-Huffman Land & Water Company	1883	Crocker-Huffman Dam	2500 cfs; this right was originally filed by C.H. Huffman personally, acquired by Huffman and Crocker's Merced Canal & Irrigation Company, later taken over by Crocker Huffman Land & Water Company in late 1880s. This water right was acquired by Merced Irrigation District in 1919 after the District was formed.	1,811,157
Riparian		Upton et al	1895	Various - along Merced River below Crocker-Huffman Dam	Maximum diversion of 225 cfs pursuant to the Upton Decree of 1895	163,004
Riparian		Dale & Cook Ranch owners	1876	Various individuals associated with ownership of the Dale and Cook Ranch	24 cfs amount to a total diversion of 1,900 AF during diversion season	1,900
Riparian		J.J. Stevinson	1930	Merced ID's boundary intersecting with McCoy Spillway, Arena Spillway, or Bear Creek	Diversion season is from April 1 through September 30 with varying flow rates each month therein, according to the Stevinson Decree. Merced ID agreed with Stevinson to exchange delivery of water from Lake McClure up to 24,000 acre-feet annually, in exchange for an easement for the District to incorporate Stevinson's riparian water into District operations at Lake McClure."The rights hereby conveyed by the Company to the District shall be an easement in all the right title, interest, estate, and claims of the Company in and to the lands...in which it has an interest, and as against any right which the Company may now have in and to the waters of said Merced River."	24,000
Riparian		Parties to the Cowell Agreement	1926	Crocker-Huffman Dam	Merced Irrigation District is required to provide releases from New Exchequer Dam to meet riparian right holders requirements.	93,793
					Pre-1914 and Riparian Water Rights, Merced River	3,905,012

San Joaquin River Riparian and Pre-1914 Consumptive Water Rights Claims

San Joaquin River Irrigation Uses	Estimated Face Amount	Point of Diversion	Other Description
USBR Purchase Rights from Miller & Lux Inc.	624,200	Friant Dam, rediverted at Madera and Friant-Kern Canals	Subject of a water rights purchase contract with US Bureau of Reclamation, and appraised at this quantity of water (Etcheverry, 1936; California Water Project Authority, 1936).Originally grassland and "uncontrolled" riparian flood flows. Grassland flows were pre-1914 appropriative rights of the Miller & Lux canal company; "uncontrolled" flows were riparian rights associated with lands adjacent to the San Joaquin River owned by Miller & Lux cattle business for grazing.
San Joaquin River Exchange Contractors Rights - exchange/easement on cropland water rights	840,000	USBR diverts these flows from the San Joaquin River into Madera and Friant-Kern Canals	Subject of a water rights exchange contract with US Bureau of Reclamation (Engle, Part Two, 1957). Originally "cropland" rights owned by Miller & Lux Inc. on which permanent and other crops were cultivated with highly reliable senior appropriative and riparian water rights. The Exchange Contractors having provided USBR with an easement for these rights receives in their place flows from Shasta Reservoir via Delta Mendota Canal.
Chowchilla Farms/Water District	49,300	Chowchilla Canal diversion from San Joaquin River upstream of Mendota Pool, east side of the river.	Subject of a water rights purchase contract with US Bureau of Reclamation for appropriative rights via Chowchilla Canal and under appropriative and riparian rights through the Blythe Canal, acquisition of which would be used in storage at Friant Dam and diversion into Madera Canal (California Water Project Authority, No. 6, 1937). The lands from which these rights were purchased lie between Fresno and Chowchilla rivers along the east bank of the San Joaquin River.
Lands Between Chowchilla Farms and Stevinson Colony	40,281	Between Chowchilla River and Merced River along east side of San Joaquin River.	Subject to water rights purchase contracts with US Bureau of Reclamation (including lands of Bloss, Hatfield, Crane, Turner, Erreca and Hansen) (California Water Project Authority, No. 7, 1937). Includes lands formerly owned by Miller & Lux, Inc., conveyed with reservations of easements in and to use of water and upstream storage rights reserved to Miller & Lux. Estimate of water rights shown are for uncontrolled flood and riparian rights as described in 1936, subordinate only to prior appropriative, prescriptive and contractual rights held by Miller & Lux and associated companies.
Stevinson/East Side Canal	20,168	Pre-1914 appropriative and riparian diversions upstream on San Joaquin River from Merced River confluence.	Unclear whether US Bureau of Reclamation entered into a water rights purchase contract with Stevinson. Stevinson's diversion rights were considered subordinated to Edison Securities and Miller & Lux (California Water Project Authority, No. 8, 1939, 18), and Stevinson instead was able to arrange a supply of water for its lands via the Merced River from Merced Irrigation District under the Stevinson Contract. East Side Canal appropriation from the San Joaquin River was found to average 14,268 AF, while residual riparian rights to the San Joaquin averaged 5,900 AF.
Tranquillity & James Irrigation Districts - Fresno Slough	29,300	Riparian diversions along Fresno Slough upstream of Mendota Pool.	Diversions were subordinated to Miller & Lux rights and allowed only when San Joaquin River reached 1,360 cfs and then the districts could take just 12 percent up to a maximum of 140 cfs. Estimated face amount for these districts obtained from Table 5 of California Water Project Authority, 1936.
Edison Securities	33,127	Riparian diversions just upstream of Mendota Pool and Fresno Slough along left (south) bank of San Joaquin River	Subject of a water rights purchase contract with US Bureau of Reclamation for uncontrolled overflow riparian rights from the San Joaquin River and associated sloughs upstream of Mendota Pool, along south bank (California Water Project Authority, No. 8, 1938). Edison Securities purchased these riparian lands from the Herminghaus Estate in January 1928.
Friant to Gravelly Ford right holders	116,741	As many as 198 diversions and/or pumpers of water from lands adjacent to the San Joaquin River	Rights of most of these landowners were acquired by USBR, but some of those not immediately acquired by 1939 became plaintiffs in Rank v. Krug, a suit by water right holders and groundwater pumpers in this area against Friant Dam. Case decided by U.S. Supreme Court in 195?? The court determined that these water right holders collectively used about 200,000 acre-feet per year in this area of the San Joaquin River. This was the section of the river that received releases from Friant under D-990, and below Gravelly Ford, the river dried up through to the confluence with the Merced River. San Joaquin River Restoration Program Settlement Agreement states that riparian releases are now 117,000 to 126,000 acre-feet per year, consistent with "Steiner declaration."
Total Pre-1914 and Riparian Water Rights, Upper San Joaquin River	1,753,117		
Sources: State of California Water Project Authority, 1936-1939; *Rank v. Krug*; San Joaquin River Settlement Agreement, 2006.			

San Joaquin River Riparian and Pre-1914 Consumptive Water Rights Claims

Lands east of San Joaquin River, Between Chowchilla Farms and Stevinson Colony Assumed Riparian to that Stream or its Branch Channels	Area in Acres	Estimated Average Uncontrolled Diversions, based on 1.65 acre-feet per acre
A.J. Turner	158	261
George J. Hatfield	1,293	2,133
Charles S. Howard	5,514	9,098
Charles A. Crane	2,400	3,960
Ed P. Waltz	2,640	4,356
Fred A Solari and J.A. Turner	861	1,421
Dan L McNamara	1,236	2,039
Dan L McNamara	957	1,579
Martin Erreca	520	858
Nell E Hanson	527	870
Jessie S Potter(1)	2,270	3,746
Jessie S Potter(2)	6,037	9,961
Totals	24,413	40,281
Source: California Water Project Authority, 1937b, 1937c.		

Appendix D

Section D.6
Post-1914 Consumptive Water Rights Claims

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
A029129	20341		BLUE JAY WATER ASSOCIATION	10/19/1987	20.80	Trinity	TRINITY RIVER UNDERFLOW
			BLUE JAY WATER ASSOCIATION Total		20.80		
A027206	18568	12081	BRUCE G HANEY	2/5/1982	0.60	Trinity	TRINITY RIVER
			BRUCE G HANEY Total		0.60		
A021330	14347	10037	Chad Blevins	6/10/1963	5.20	Trinity	TRINITY RIVER
			Chad Blevins Total		5.20		
A017749	11255	6749	CHARLES HIGGS	7/31/1957	16.80	Trinity	TRINITY RIVER
			CHARLES HIGGS Total		16.80		
A027969	19275	12725	CHRISTOPHER T CROSS	2/3/1984	0.20	Trinity	TRINITY RIVER
			CHRISTOPHER T CROSS Total		0.20		
A010791	6398	4625	COVINGTON MUTUAL WATER COMPANY	3/24/1944	2,171.90	Trinity	EAST FORK STUART FORK TRINITY RIVER
			COVINGTON MUTUAL WATER COMPANY Total		2,171.90		
A017743	11178	6988	DAVID COVINGTON	1/28/1964	33.30	Trinity	TRINITY RIVER
			DAVID COVINGTON Total		33.30		
A026530	18389	12111	DAVID L SULLIVAN	9/24/1980	1.10	Trinity	TRINITY RIVER UNDERFLOW
			DAVID L SULLIVAN Total		1.10		
A026529A	18429	12935	GARTH R SUNDBERG	1/22/1982	0.50	Trinity	TRINITY RIVER UNDERFLOW
			GARTH R SUNDBERG Total		0.50		
A021142	14094	8656	GEORGE PAINTER	1/28/1963	0.30	Trinity	TRINITY RIVER
			GEORGE PAINTER Total		0.30		
A029111	20233	13386	GERARD A KAZ	9/16/1987	1.20	Trinity	TRINITY RIVER UNDERFLOW
			GERARD A KAZ Total		1.20		
A029183	20269	13322	HAZEL J SCHOTT	2/3/1988	2.30	Trinity	TRINITY RIVER
			HAZEL J SCHOTT Total		2.30		
A029336	20343	13616	James Lee and Billie Jo Bonk Revocable Trust	11/9/2005	0.30	Trinity	TRINITY RIVER
			James Lee and Billie Jo Bonk Revocable Trust Total		0.30		
A026660	18369	12082	JEFFREY J BUTLER	12/10/1980	0.60	Trinity	TRINITY RIVER
			JEFFREY J BUTLER Total		0.60		
A029302	20344	13485	KATHERINE L RIDENOUR	7/18/1988	1.80	Trinity	TRINITY RIVER UNDERFLOW
			KATHERINE L RIDENOUR Total		1.80		
A024059	16579	10904	KATHY WATSON	5/3/1972	1.40	Trinity	TRINITY RIVER UNDERFLOW
			KATHY WATSON Total		1.40		
A027867	19134	12721	Ken Tamplen	9/14/1983	1.10	Trinity	TRINITY RIVER UNDERFLOW
			Ken Tamplen Total		1.10		
A017669	11106	6566	Lewiston Community Service District	6/21/1957	543.00	Trinity	TRINITY RIVER
			Lewiston Community Service District Total		543.00		
A018177	11654	6612	LEWISTON PARK MUTUAL WATER COMPANY, INC	6/11/1958	311.30	Trinity	ALDER GULCH, TRINITY RIVER
			LEWISTON PARK MUTUAL WATER COMPANY, INC Total		311.30		
A027639	18898	12674	MADELINA CORONA	1/24/1983	0.30	Trinity	TRINITY RIVER
			MADELINA CORONA Total		0.30		

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
A020923	13998	8410	MARCIA OSA COATES	9/4/1962	0.30	Humboldt	TRINITY RIVER
			MARCIA OSA COATES Total		0.30		
A023097	15783	10384	MARK GIBERSON	7/25/1968	5.60	Trinity	TRINITY RIVER
			MARK GIBERSON Total		5.60		
A028907	20081	13096	NOELLE ROGET	9/25/1986	2.00	Trinity	TRINITY RIVER
			NOELLE ROGET Total		2.00		
A015365	9527	5059	NORMAN EVANS	6/3/1953	0.80	Trinity	TRINITY RIVER
A015366	9528	5060	NORMAN EVANS	6/3/1953	0.30	Trinity	TRINITY RIVER
			NORMAN EVANS Total		1.10		
A027855	19198	12716	RALPH M MCCOMB	8/31/1983	0.50	Trinity	TRINITY RIVER UNDERFLOW
			RALPH M MCCOMB Total		0.50		
A020084	13120	7920	ROGER F KENDELL	4/13/1961	2.20	Trinity	TRINITY RIVER
			ROGER F KENDELL Total		2.20		
A016087	10146	5302	RONALD JURIN	10/13/1954	1,642.50	Humboldt	TRINITY RIVER
			RONALD JURIN Total		1,642.50		
A015227	9531	5145	RUSSELL H HAGEN JR	3/9/1953	2.30	Humboldt	TRINITY RIVER
			RUSSELL H HAGEN JR Total		2.30		
A026531	18390	12060	STAN POFF	9/24/1980	0.40	Trinity	TRINITY RIVER UNDERFLOW
			STAN POFF Total		0.40		
A022840	15541	10386	STEPHEN DUTTON	6/30/1967	3.40	Trinity	TRINITY RIVER
			STEPHEN DUTTON Total		3.40		
A021166	14149	8631	STEVEN B PETERSON	2/18/1963	7.60	Trinity	TRINITY RIVER
			STEVEN B PETERSON Total		7.60		
A024462	17650		TRINITY VILLAGE WATER COMPANY	9/19/1973	360.00	Trinity	TRINITY RIVER
			TRINITY VILLAGE WATER COMPANY Total		360.00		
A011927	7140	3513	U S SHASTA-TRINITY NATL FOREST	6/9/1947	852.90	Trinity	EAST FORK STUART FORK TRINITY RIVER
			U S SHASTA-TRINITY NATL FOREST Total		852.90		
A021019	14077	8386	U S SIX RIVERS NATL FOREST	11/16/1962	29.00	Trinity	TRINITY RIVER
			U S SIX RIVERS NATL FOREST Total		29.00		
A005628	11967		U.S. BUREAU OF RECLAMATION	7/30/2027	3,349,943.80	Contra Costa, Trinity	OLD RIVER, TRINITY RIVER
A015374	11968		U.S. BUREAU OF RECLAMATION	7/29/2002	417,193.30	Contra Costa, Trinity	OLD RIVER, TRINITY RIVER
A015375	11969		U.S. BUREAU OF RECLAMATION	9/16/1959	3,030,761.80	Contra Costa, Trinity	Old River, TRINITY RIVER
A016767	11971		U.S. BUREAU OF RECLAMATION	7/29/2002	700,000.00	Contra Costa, Trinity	TRINITY RIVER
A017374	11973		U.S. BUREAU OF RECLAMATION	7/29/2002	1,085,966.30	Contra Costa, Trinity	TRINITY RIVER
			U.S. BUREAU OF RECLAMATION Total		8,583,865.20		
A023882	16413	10503	WADE AMMON SR	10/1/1971	4.00	Trinity	SOUTH FORK TRINITY RIVER
			WADE AMMON SR Total		4.00		

Trinity River Watershed - Post-1914 Appropriative Water Rights

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
A029410	20757		WEAVERVILLE COMMUNITY SERVICES DISTRICT	2/14/1989	870.00	Trinity	TRINITY RIVER
			WEAVERVILLE COMMUNITY SERVICES DISTRICT Total		870.00		
A028537	19864	12946	WILLIAM E HOYER	8/14/1985	0.10	Trinity	TRINITY RIVER UNDERFLOW
			WILLIAM E HOYER Total		0.10		
			Grand Total		8,590,763.10		

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
A001300	1360	2302	1994 ORAL BABCOCK LIVING TRUST	05/29/19	3,600.00	Lassen	EAST FORK JUNIPER CREEK
A001696	1361	2595	1994 ORAL BABCOCK LIVING TRUST	03/01/20	892.60	Lassen	DARK CANYON CREEK
			1994 ORAL BABCOCK LIVING TRUST Total		4,492.60		
A005549	2891	1366	AGENCY 5	06/28/27	282.40	Siskiyou	SOUTH FORK BEAR CREEK
			AGENCY 5 Total		282.40		
A004554	2316	1602	Alan K. Nelson	11/14/35	185.00	Modoc	DUTCH FLAT CREEK
			Alan K. Nelson Total		185.00		
A002383	1170	2169	ALTURAS RANCHES LLC	06/07/21	900.00	Modoc	JUNIPER GULCH
A010079	8453	4291	ALTURAS RANCHES LLC	12/05/40	745.00	Modoc	CROOKS CANYON
A013339	7970	6443	ALTURAS RANCHES LLC	09/07/49	470.00	Modoc	BIG JUNIPER CREEK
A013526	8456	4294	ALTURAS RANCHES LLC	12/29/49	113.80	Modoc	CROOKS CANYON
A014759	9219	6071	ALTURAS RANCHES LLC	04/17/52	93.50	Modoc	CROOKS CANYON
A016047	10304	6951	ALTURAS RANCHES LLC	09/15/54	204.00	Modoc	CROOKS CANYON
A016048	10305	6952	ALTURAS RANCHES LLC	09/15/54	204.00	Modoc	CROOKS CANYON
A021557	14924	9579	ALTURAS RANCHES LLC	11/27/63	1,370.00	Modoc	UNST, UNXX
			ALTURAS RANCHES LLC Total		4,100.30		
A020606	13624	8511	ANTHONY BOKARES	02/13/62	15.00	Lassen	UNST
A022408	15210	9918	ANTHONY BOKARES	02/28/66	14.00	Lassen	UNST, UNST (2)
			ANTHONY BOKARES Total		29.00		
A027640	18903	12948	AUGUSTINO DE MARIA	01/27/83	4.20	Modoc	UNST
			AUGUSTINO DE MARIA Total		4.20		
A021194	14258	9878	BECKETT TRUST	03/14/63	0.10	Siskiyou	LAVA CRACK SPRINGS
			BECKETT TRUST Total		0.10		
A011646	8075	4939	BETTY ANN CARROLL	12/04/46	750.00	Lassen	HOLBROOK CANYON STREAM
A015526	9636	4938	BETTY ANN CARROLL	09/03/53	215.00	Lassen	HOLBROOK CANYON STREAM
			BETTY ANN CARROLL Total		965.00		
A002093	872	4360	BIG VALLEY MUTUAL WATER COMPANY	11/22/20	2,635.00	Modoc	ANTELOPE FLAT DRAINAGE AREA
A010109	6084	4361	BIG VALLEY MUTUAL WATER COMPANY	02/05/41	100.00	Modoc	ANTELOPE FLAT DRAINAGE
A010407	6083	4362	BIG VALLEY MUTUAL WATER COMPANY	03/17/42	2,865.00	Modoc	LAST CHANCE CREEK, WHALEN CREEK
			BIG VALLEY MUTUAL WATER COMPANY Total		5,600.00		
A010866	6319	4442	Black Ranch, LLC	08/22/44	184.50	Shasta	BURNEY CREEK
			Black Ranch, LLC Total		184.50		
A014605	9028	4968	BO THORENFELT	12/18/51	200.00	Lassen	UNST
			BO THORENFELT Total		200.00		
A026030	17951	11911	BRIAN J VANVORIS	06/20/79	1.90	Shasta	UNST
			BRIAN J VANVORIS Total		1.90		
A014689	9035	5250	BRYON E GIBBONS	02/27/52	30.00	Modoc	NORTH FORK GLEASON CREEK
			BRYON E GIBBONS Total		30.00		
A012845	7485	4429	CALIF DEPT OF FORESTRY & FIRE PROTECTION	12/03/48	72.40	Shasta	HATCHET CREEK
			CALIF DEPT OF FORESTRY & FIRE PROTECTION Total		72.40		
A022921	15644	9980	CALIFORNIA PINES PROPERTY OWNERS' ASSOCIATION	10/09/67	16.00	Modoc	SOUTH FORK FITZHUGH CREEK
A022922	15645	9979	CALIFORNIA PINES PROPERTY OWNERS' ASSOCIATION	10/09/67	11.00	Modoc	MIDDLE FORK FITZHUGH CREEK
			CALIFORNIA PINES PROPERTY OWNERS' ASSOCIATION Total		27.00		
A015331	9762	7286	CHARLENE E STONE	05/04/53	353.50	Shasta	HALL CREEK

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
			CHARLENE E STONE Total		353.50		
A029440	20654		CHARLES A ORWICK	03/17/89	49.00	Lassen	UNST
			CHARLES A ORWICK Total		49.00		
A011102	6482	3952	CLARK FRONTIN	07/09/45	325.80	Shasta	LITTLE ROARING CREEK
			CLARK FRONTIN Total		325.80		
A026068	18571		CLEO V HUNT	08/21/79	49.00	Lassen	WILLOW CREEK
			CLEO V HUNT Total		49.00		
A025835	18599	12335	CLIFFORD DE WITT	09/27/78	38.00	Modoc	UNST
			CLIFFORD DE WITT Total		38.00		
A020320	13198	8334	CORY BOSCHEE	07/24/61	5.00	Lassen	UNST
A025713	17569	12905	CORY BOSCHEE	04/07/78	9.00	Lassen	UNST
			CORY BOSCHEE Total		14.00		
A029694	20696		CRAIG HERMSMEYER	06/03/02	27.00	Lassen	UNSP
			CRAIG HERMSMEYER Total		27.00		
A014927	9196	5036	DANIEL TANKERSLEY	07/28/52	190.00	Lassen	UNST
			DANIEL TANKERSLEY Total		190.00		
A021750	14649	9048	DANIEL K DAVIS	04/21/64	25.00	Shasta	UNST
			DANIEL K DAVIS Total		25.00		
A016506	10376	9234	DARAN V MYERS	08/08/55	279.00	Lassen	UNST, WILLOW CREEK
			DARAN V MYERS Total		279.00		
A020366	13402	9254	DAVID CRAWFORD	08/22/61	49.00	Lassen	UNST
			DAVID CRAWFORD Total		49.00		
A021064	14089	8630	David Hunt	12/06/62	24.00	Lassen	UNST
			David Hunt Total		24.00		
A022637	15852	10320	David King	11/14/66	10.00	Lassen	UNST
			David King Total		10.00		
A022762	15472	9137	DAVID E LLOYD	04/06/67	3.00	Modoc	UNST
			DAVID E LLOYD Total		3.00		
A022887	15562	10015	DELBERT GOULD	08/22/67	12.00	Modoc	UNST
			DELBERT GOULD Total		12.00		
A028571	20220		DENNIS DAUGHERTY	10/02/85	1,237.50	Lassen	CEDAR CREEK
			DENNIS DAUGHERTY Total		1,237.50		
A025231	18834	13011	DIXIE VALLEY RANCH	01/04/77	49.90	Lassen	RUSSELL DAIRY CREEK, UNST
			DIXIE VALLEY RANCH Total		49.90		
A025522	17921	11827	DON A GORDON	10/11/77	6.60	Shasta	UNST
A026108	17978	11826	DON A GORDON	10/09/79	8.00	Shasta	UNST
			DON A GORDON Total		14.60		
A021059	14056	8335	DONALD B MCKERN	12/03/62	49.00	Lassen	UNST
			DONALD B MCKERN Total		49.00		
A001503	660	531	DONALD J MARTIN	04/29/26	158.80	Shasta	FALL RIVER
			DONALD J MARTIN Total		158.80		
A013095	8315	4236	EDWARD MOHR	05/16/49	22.10	Modoc	PIT RIVER
			EDWARD MOHR Total		22.10		
A018923	12202	6637	EDWARD F BRUCE	08/19/59	4.00	Shasta	UNST
			EDWARD F BRUCE Total		4.00		

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
A022804	15612	9565	ELLEN E TAYLOR	06/06/67	228.00	Shasta	UNST
			ELLEN E TAYLOR Total		228.00		
A026243	18595	13611	ELWOOD FORD	09/13/05	3.80	Shasta	UNST
			ELWOOD FORD Total		3.80		
A017857	11414	6589	ERNEST W BRUCE	10/23/57	135.00	Shasta	PIT RIVER
			ERNEST W BRUCE Total		135.00		
A020025	13599	10798	EUGENE M BREZNOCK	03/09/61	198.00	Lassen	UNST
A020085	13600	8348	EUGENE M BREZNOCK	04/13/61	3.50	Lassen	UNST
			EUGENE M BREZNOCK Total		201.50		
A025806A	018103A	13107	FRED A COLLINS	07/29/91	3.80	Shasta	UNST
			FRED A COLLINS Total		3.80		
A013659	8943	6444	FREDRICK ANKLIN	03/29/50	840.00	Modoc	HILTON DAIRY CREEK
A014070	8975	9266	FREDRICK ANKLIN	11/22/50	22.50	Modoc	HILTON CREEK
			FREDRICK ANKLIN Total		862.50		
A011557	7210	6446	FROSTY ACRES INCORPORATED	09/18/46	200.00	Lassen	UNST
A011736	7052	4435	FROSTY ACRES INCORPORATED	02/18/47	40.00	Lassen	UNST, WILLOW CREEK
A011737	7053	4436	FROSTY ACRES INCORPORATED	02/18/47	3.00	Lassen	UNST
A019491	13360	8102	FROSTY ACRES INCORPORATED	06/16/60	50.00	Lassen	UNST
A021478	14999	10108	FROSTY ACRES INCORPORATED	09/26/63	230.00	Lassen	WILLOW CREEK
			FROSTY ACRES INCORPORATED Total		523.00		
A025856	20266		GENELLE VOORHEES	10/16/78	14.40	Shasta	UNST, WILLOW CREEK
			GENELLE VOORHEES Total		14.40		
A022399	15231	9037	GEORGE SHEPHERD	02/21/66	15.00	Modoc	UNST
			GEORGE SHEPHERD Total		15.00		
A023826	16662	10945	GEORGE R WRIGHT	07/27/71	17.00	Modoc	CROOKS CANYON, UNST
			GEORGE R WRIGHT Total		17.00		
A000930	428	330	GERALDINE SILVA	02/18/18	142.00	Modoc	UNST
			GERALDINE SILVA Total		142.00		
A025073	17557		GL JOHNS 2002 LIVING TRUST	05/24/76	49.00	Lassen	UNST
			GL JOHNS 2002 LIVING TRUST Total		49.00		
A019145	12799	8943	GOOSE VALLEY RANCH	04/04/07	4,000.00	Shasta	GOOSE CREEK
			GOOSE VALLEY RANCH Total		4,000.00		
A013524	8454	4292	GREEN VALLEY ENTERPRISES	12/29/49	227.50	Modoc	CROOKS CANYON
A014757	9217	4295	GREEN VALLEY ENTERPRISES	04/17/52	187.00	Modoc	CROOKS CANYON
A016046	10303	6950	GREEN VALLEY ENTERPRISES	07/18/63	408.00	Modoc	CROOKS CANYON
			GREEN VALLEY ENTERPRISES Total		822.50		
A026116	17974	13640	GREGORY R CALDWELL	04/11/06	20.00	Shasta	UNST
			GREGORY R CALDWELL Total		20.00		
A015339	9569	7237	HALCUMB CEMETERY DISTRICT	05/12/53	21.30	Shasta	MONTGOMERY CREEK
A021917	15596	10655	HALCUMB CEMETERY DISTRICT	09/25/64	22.00	Shasta	MONTGOMERY CREEK
			HALCUMB CEMETERY DISTRICT Total		43.30		
A019724	12980	9231	HAROLD W SIEMER	09/01/60	49.00	Lassen	UNCR
			HAROLD W SIEMER Total		49.00		
A029085	20238	13367	HARRY C BRAFF	08/10/87	1.10	Modoc	UNST

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
			HARRY C BRAFF Total		1.10		
A017256	10861	6858	HARRY J & MILI TURIELLO TRUST	08/27/56	13.50	Shasta	PEACOCK CREEK
A022452	15675	10435	HARRY J & MILI TURIELLO TRUST	04/25/66	36.00	Shasta	PEACOCK CREEK
			HARRY J & MILI TURIELLO TRUST Total		49.50		
A025783	17641	12731	Henrich 2002 Trust	07/13/78	14.90	Shasta	UNSP
A028219	19379	12733	Henrich 2002 Trust	08/15/84	3.60	Shasta	UNSP
A025784A	017642A	12732	Henrich 2002 Trust	09/16/86	5.00	Shasta	UNST
			Henrich 2002 Trust Total		23.50		
A018783	12140	8414	HOMER J ROBERTS	06/11/59	85.00	Modoc	UNST
A021280	14409	8415	HOMER J ROBERTS	05/13/63	85.00	Modoc	UNST
			HOMER J ROBERTS Total		170.00		
A003353	1768	9722	HOT SPRINGS VALLEY IRRIGATION DISTRICT	04/12/23	48,400.00	Modoc	RATTLESNAKE CREEK
A022427	15227	9723	HOT SPRINGS VALLEY IRRIGATION DISTRICT	03/17/66	20,000.00	Modoc	RATTLESNAKE CREEK
			HOT SPRINGS VALLEY IRRIGATION DISTRICT Total		68,400.00		
A021252	14278	8912	J A CONNER LIVING TRUST	04/23/63	49.00	Lassen	UNST
			J A CONNER LIVING TRUST Total		49.00		
A008627	4736	2378	J SCOTT & ELEANOR J VERMILYEA REVOCABLE TRUST 2000	04/03/36	457.00	Shasta	SHOTGUN CREEK
A021240	14262	9047	J SCOTT & ELEANOR J VERMILYEA REVOCABLE TRUST 2000	04/15/63	42.30	Shasta	UNSP, UNST
			J SCOTT & ELEANOR J VERMILYEA REVOCABLE TRUST 2000 Total		499.30		
A025000	17278	11664	JAMES H BICKFORD	02/23/76	200.00	Lassen	BEAVER CREEK, UNST
			JAMES H BICKFORD Total		200.00		
A002878	2026	1196	JANET PERRY	04/27/32	232.70	Shasta	HAT CREEK
			JANET PERRY Total		232.70		
A009609	5445	4437	JOE RUSS	06/06/39	100.00	Modoc	FRANKLIN CREEK
A009610	5446	4438	JOE RUSS	06/06/39	400.00	Siskiyou	FRANKLIN CREEK
A012005	7349	5491	JOE RUSS	07/24/47	120.00	Modoc	DRY CREEK
A020109	13413	8895	JOE RUSS	05/04/61	110.00	Modoc	UNST
A020936	14192	8896	JOE RUSS	09/11/62	20.00	Modoc	UNST
A021454	14575	8985	JOE RUSS	09/06/63	619.00	Modoc	LINNVILLE CREEK
A024016	16809	12904	JOE RUSS	04/03/72	568.00	Modoc	LINNVILLE CREEK
			JOE RUSS Total		1,937.00		
A022761	15471	9136	JOHN KAHL	04/06/67	2.00	Modoc	UNST
			JOHN KAHL Total		2.00		
A023950	16457	10697	JOHN A YOUNGER	12/16/71	680.00	Modoc	UNDR
			JOHN A YOUNGER Total		680.00		
A016857	10677	5720	JOHN ASKEW	01/27/56	2.00	Lassen	UNST
A026194	18410	13346	JOHN ASKEW	02/01/80	0.80	Lassen	UNST
			JOHN ASKEW Total		2.80		
A002227	1893	4940	JOHN B CROOK	02/23/21	5,250.00	Lassen	COYOTE FLAT DRAINAGE AREA
			JOHN B CROOK Total		5,250.00		
A004700	2608	2083	JOHN F PARRISH	09/04/40	381.80	Shasta	HAT CREEK
			JOHN F PARRISH Total		381.80		
A029321	20792		JOHN W CAPIK	08/19/88	45.00	Modoc	LINNVILLE CREEK, UNST

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			JOHN W CAPIK Total		45.00		
A030251	21250		JOHNSON CREEK DITCH USER'S ASSOCIATION	10/19/09	181.00	Shasta	UNST
			JOHNSON CREEK DITCH USER'S ASSOCIATION Total		181.00		
A025931	18350	13252	JOSEPH LOUIS OSA	02/28/79	27.00	Shasta	UNST
			JOSEPH LOUIS OSA Total		27.00		
A009761	5494	3318	JUANITA C GARDNER TRUST	11/04/39	492.50	Modoc	UNST
			JUANITA C GARDNER TRUST Total		492.50		
A021664	14735	10181	JUNIPER ACRES WATER ASSOCIATION	03/02/64	2.80	Modoc	UNSP
			JUNIPER ACRES WATER ASSOCIATION Total		2.80		
A026244	18418	12315	KEITH MACDONALD	03/03/80	1.10	Shasta	UNST
			KEITH MACDONALD Total		1.10		
A005812	3592	2179	KRAMER RANCH LLC	01/28/28	2,563.40	Lassen, Modoc	WIDOW VALLEY CREEK
A017267	10726	5192	KRAMER RANCH LLC	09/07/56	27.80	Modoc	WIDOW VALLEY CREEK
			KRAMER RANCH LLC Total		2,591.20		
A000245	190	250	LARRY R WILLMORE	02/03/16	181.00	Shasta	CLARK CREEK
			LARRY R WILLMORE Total		181.00		
A026038	18018	11918	LASSEN GOLD MINING INC	06/29/79	55.00	Lassen	UNST
A027034	18637	11923	LASSEN GOLD MINING INC	10/05/81	20.00	Lassen	UNST
			LASSEN GOLD MINING INC Total		75.00		
A024977	17063	11560	LEON URRUTIA	01/20/76	49.00	Modoc	UNST
			LEON URRUTIA Total		49.00		
A013207	8000	5072	LOOKOUT RANCH & LODGE LP	07/05/49	1,500.00	Modoc	TAYLOR CREEK
			LOOKOUT RANCH & LODGE LP Total		1,500.00		
A028610	20217		LOWELL L NOVY	10/31/85	2,790.00	Lassen	CEDAR CREEK
			LOWELL L NOVY Total		2,790.00		
A010820	6290	4188	M D & N L MYERS FAMILY 1986 REVOCABLE TR	05/18/44	90.00	Lassen	CHACE VALLEY CREEK
A013504	8430	6063	M D & N L MYERS FAMILY 1986 REVOCABLE TR	12/09/49	50.00	Lassen	UNST
			M D & N L MYERS FAMILY 1986 REVOCABLE TR Total		140.00		
A022750	15460	9138	MANUEL SOUZA	04/06/67	3.00	Modoc	UNST
A022751	15461	9169	MANUEL SOUZA	04/06/67	3.00	Modoc	UNST
A022752	15462	9172	MANUEL SOUZA	04/06/67	2.50	Modoc	UNST
A022753	15463	9212	MANUEL SOUZA	04/06/67	2.00	Modoc	UNST
A022754	15464	9131	MANUEL SOUZA	04/06/67	1.50	Modoc	UNST
A022755	15465	9139	MANUEL SOUZA	04/06/67	1.70	Modoc	UNST
A022756	15466	9128	MANUEL SOUZA	04/06/67	0.60	Modoc	UNST
A022757	15467	9168	MANUEL SOUZA	04/06/67	2.40	Modoc	UNST
A022758	15468	9175	MANUEL SOUZA	04/06/67	1.00	Modoc	UNST
A022759	15469	9135	MANUEL SOUZA	04/06/67	1.40	Modoc	UNST
A022760	15470	9134	MANUEL SOUZA	04/06/67	1.60	Modoc	UNST
			MANUEL SOUZA Total		20.70		
A020398	13622	9332	MANUEL A MORRIS	09/14/61	38.00	Modoc	KRESGE CANYON
			MANUEL A MORRIS Total		38.00		
A006398	3672	1554	MAPES RANCH, INC	08/07/29	4.30	Lassen	UNST
A019286	12548	7836	MAPES RANCH, INC	03/07/60	1.00	Lassen	UNST
			MAPES RANCH, INC Total		5.30		

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A013525	8455	4293	MCGARVA RANCH	12/29/49	113.80	Modoc	CROOKS CANYON
A014758	9218	6070	MCGARVA RANCH	04/17/52	93.50	Modoc	CROOKS CANYON
			MCGARVA RANCH Total		207.30		
A019743	13039	10035	MELVIN D MYERS	09/19/60	142.00	Lassen	BUTTE CREEK
			MELVIN D MYERS Total		142.00		
A028518	20218		MERRILL DAUGHERTY	04/14/88	315.00	Lassen	CEDAR CREEK
			MERRILL DAUGHERTY Total		315.00		
A000772	384	67	MICHAEL L SPAETH	10/09/19	22.30	Shasta	BY GONNY CREEK
			MICHAEL L SPAETH Total		22.30		
A026520	18999	13439	MILANO LAND AND CATTLE CO LLC	09/13/99	49.00	Modoc	BLACKS CANYON
A026521	19000	13440	MILANO LAND AND CATTLE CO LLC	09/13/99	142.00	Modoc	BLACKS CANYON
			MILANO LAND AND CATTLE CO LLC Total		191.00		
A021448	14429	10822	MONTGOMERY CREEK COMMUNITY CHURCH	09/03/63	0.20	Shasta	MONTGOMERY CREEK
			MONTGOMERY CREEK COMMUNITY CHURCH Total		0.20		
A016216	10191	5073	MORGAN RANCH COMPANY INC	01/24/55	200.00	Modoc	UNST
			MORGAN RANCH COMPANY INC Total		200.00		
A026197	18187	12069	NELLIE M DUNBAR	02/11/80	1.00	Shasta	UNST
			NELLIE M DUNBAR Total		1.00		
A015902	9988	5233	NELSON RANCHES	06/10/54	515.00	Modoc	JIM CREEK
A021318	14730	9346	NELSON RANCHES	05/31/63	215.00	Modoc	JIM CREEK
			NELSON RANCHES Total		730.00		
A016855	10715	5989	NOR CAL LAND & CATTLE CO	01/26/56	2.00	Lassen	UNST
			NOR CAL LAND & CATTLE CO Total		2.00		
A030720	20995		OAK RUN LUMBER CO LLC	06/23/98	3.00	Shasta	UNST
			OAK RUN LUMBER CO LLC Total		3.00		
A003566	1567	627	PARKS FAMILY 1995 REVOCABLE TRUST	08/04/23	3.00	Lassen	UNXX
			PARKS FAMILY 1995 REVOCABLE TRUST Total		3.00		
A008649	4793	2440	Patricia H Bushey	04/27/36	0.60	Modoc	UNSP
			Patricia H Bushey Total		0.60		
A027005	19072	12821	PAUL R JOLLY	09/15/81	3.90	Shasta	UNST
			PAUL R JOLLY Total		3.90		
A028892	20279		Peter D Stent	06/11/91	25.00	Shasta	BEAR CREEK
			Peter D Stent Total		25.00		
A026239	18761		PHILIP R GUNSAULS	02/28/80	35.00	Modoc	HALLS CANYON
			PHILIP R GUNSAULS Total		35.00		
A008194	4668	2076	PHYLLIS A HARRIS	12/22/34	200.00	Modoc	CLEAR LAKE
			PHYLLIS A HARRIS Total		200.00		
A001538	697	353	Pickering Family Trust	05/12/24	456.20	Shasta	FALL RIVER
			Pickering Family Trust Total		456.20		
A028570	20219		Pine Creek Cattle Company	10/02/85	157.50	Lassen	CEDAR CREEK
			Pine Creek Cattle Company Total		157.50		
A024696	18118	11874	R A STANFORD	10/17/74	23.00	Modoc	THOMAS & BAYNES DITCH, UNST
			R A STANFORD Total		23.00		
A014474	8866	6313	RAMIRO CHAVEZ	09/11/51	14.00	Lassen, Modoc	KELLY DRAW, UNKNOWN
			RAMIRO CHAVEZ Total		14.00		

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A000992	2307	1711	RAY BREINER	05/29/18	837.00	Modoc	FITZHUGH CREEK
A000993	2308	1712	RAY BREINER	05/29/18	457.00	Modoc	FITZHUGH CREEK
A000994	2309	1713	RAY BREINER	05/29/18	157.00	Modoc	FITZHUGH CREEK
A001252	2310	1714	RAY BREINER	04/21/19	400.00	Modoc	UNST
A007458	4506	4879	RAY BREINER	12/08/32	706.00	Modoc	FITZHUGH CREEK
			RAY BREINER Total		2,557.00		
A027787	19030	11857	REDWOOD ROD & GUN CLUB	06/30/83	3.30	Modoc	BOWMAN SPRINGS
			REDWOOD ROD & GUN CLUB Total		3.30		
A025806B	018103B	13132	RICHARD D WILLARD	08/11/78	2.50	Shasta	UNST
			RICHARD D WILLARD Total		2.50		
A019517	13969	9567	RICHARD E SHOEMAKER	07/06/60	44.00	Lassen	FRAZIER CREEK
			RICHARD E SHOEMAKER Total		44.00		
A000135	69	284	RICHARD L JENNINGS	09/16/15	1,428.00	Modoc	PORTUGE FLAT DRAINAGE
A000486	202	53	RICHARD L JENNINGS	09/27/16	146.00	Modoc	RALSTON CREEK
A010835	6340	3101	RICHARD L JENNINGS	07/07/44	149.00	Modoc	RALSTON GULCH
			RICHARD L JENNINGS Total		1,723.00		
A019209	13968	8686	RICHARD W CALLISON	02/02/60	126.30	Lassen	FRAZIER CREEK
			RICHARD W CALLISON Total		126.30		
A014321	8871	5241	ROBERT HEATON	07/01/58	47.10	Shasta	ROARING CREEK
			ROBERT HEATON Total		47.10		
A022203	15185	9750	ROBERT C MCDONALD	06/23/65	20.00	Lassen	UNST
			ROBERT C MCDONALD Total		20.00		
A013466	8323	6293	ROBERT C PEDOTTI	11/16/49	565.00	Modoc	RYE GRASS SWALE
A018851	12597	9869	ROBERT C PEDOTTI	07/10/59	669.00	Modoc	RYE GRASS SWALE
			ROBERT C PEDOTTI Total		1,234.00		
A002237	987	444	Robert C. Mann	01/11/26	153.30	Modoc	PIT RIVER
			Robert C. Mann Total		153.30		
A021090	14039	8599	ROBERT H MACKEY & SONS INC	12/21/62	3.50	Modoc	UNST
A021091	14040	8600	ROBERT H MACKEY & SONS INC	12/21/62	11.00	Modoc	UNST
			ROBERT H MACKEY & SONS INC Total		14.50		
A026159	18367	12239	ROGER ERICKSON	12/28/79	0.50	Modoc	CANTRELL CREEK
			ROGER ERICKSON Total		0.50		
A001164	573	318	ROLLIE L GILLIAM	02/03/19	400.00	Modoc	RYE GRASS SWALE
A003398	1769	1813	ROLLIE L GILLIAM	05/04/23	130.00	Modoc	RYE GRASS SWALE
			ROLLIE L GILLIAM Total		530.00		
A021444	14410	10692	Ronald M LaGrande	08/27/63	93.00	Modoc	COOLEY GULCH
			Ronald M LaGrande Total		93.00		
A025784B	017642B	12412	RONALD STICE	09/16/86	3.40	Shasta	UNST
			RONALD STICE Total		3.40		
A022562	15288	9753	RONALD VIERRA	08/29/66	24.00	Lassen	UNST
			RONALD VIERRA Total		24.00		
A000596	346	252	RONALD L SCHLUTER	02/24/17	563.00	Modoc	EMIGRANT CREEK
A003050	1396	1039	RONALD L SCHLUTER	09/22/22	295.00	Modoc	UNST

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			RONALD L SCHLUTER Total		858.00		
A020754	14061	9326	RONALD WESLEY KETLER	04/24/62	180.60	Modoc	UNST
A021405	14789	9325	RONALD WESLEY KETLER	07/23/63	55.00	Modoc	UNST, UNXX
A021908	15045	9336	RONALD WESLEY KETLER	09/17/64	45.00	Modoc	UNST
			RONALD WESLEY KETLER Total		280.60		
A000065	630	1146	SARAH WADE	03/15/32	30.70	Lassen	WILLOW CREEK
			SARAH WADE Total		30.70		
A021346	14382	8764	SHIRLEY A HUGHES TRUSTOR	06/18/63	18.00	Modoc	UNST
			SHIRLEY A HUGHES TRUSTOR Total		18.00		
A003220	1453	411	SIERRA PACIFIC INDUSTRIES	01/12/23	135.80	Shasta	NELSON CREEK
			SIERRA PACIFIC INDUSTRIES Total		135.80		
A014477	9129	4385	SL RANCH	05/21/56	200.00	Modoc	CROOKS CANYON
			SL RANCH Total		200.00		
A007860	4477	2474	SOUTH FORK IRRIGATION DISTRICT	03/05/34	17,000.00	Modoc	SOUTH FORK PIT RIVER, WEST VALLEY CREEK
A019309	12963	10603	SOUTH FORK IRRIGATION DISTRICT	03/14/60	2,240.00	Modoc	SOUTH FORK PIT RIVER, WEST VALLEY CREEK
			SOUTH FORK IRRIGATION DISTRICT Total		19,240.00		
A026955	18635	13409	Stephen Lyon	08/11/81	0.40	Shasta	UNSP
			Stephen Lyon Total		0.40		
A026795	18852	12922	STEPHEN C NELSON	04/20/81	49.00	Modoc	UNST
			STEPHEN C NELSON Total		49.00		
A016526	10828	8665	Steven Barber	08/15/55	5.40	Modoc	UNSP
A021923	14862	9173	Steven Barber	10/06/64	20.00	Modoc	UNSP
			Steven Barber Total		25.40		
A000338	137	54	SX Lowry Ranch	05/15/16	550.00	Modoc	GOVERNMENT CORRALS FLAT
A000421	885	1401	SX Lowry Ranch	08/03/16	1,550.00	Modoc	ANTELOPE PLAINS
A001108	568	4410	SX Lowry Ranch	10/05/18	380.00	Modoc	UNST
A023280	16046	10913	SX Lowry Ranch	05/15/79	2,000.00	Modoc	DOBE SWALE
A020904	14743	12437	SX Lowry Ranch	04/24/89	970.00	Modoc	UNST
			SX Lowry Ranch Total		5,450.00		
A006291	3873		TERRAL C YORK	05/17/29	500.00	Modoc	PARKER CREEK
			TERRAL C YORK Total		500.00		
A006290	3872		TERRY YORK	05/17/29	180.00	Modoc	PARKER CREEK
			TERRY YORK Total		180.00		
A021455	14781	11127	THE DENIS M ROUSE 1993 TRUST	09/10/63	34.00	Lassen	UNST (AKA HOMER JACK DITCH)
			THE DENIS M ROUSE 1993 TRUST Total		34.00		
A030197	20842	13614	THE HUNT FAMILY TRUST	11/08/05	4.50	Modoc	UNST
			THE HUNT FAMILY TRUST Total		4.50		
A020916	14574	10783	THE MCARTHUR 1989 TRUST	08/29/62	1,800.00	Lassen	EAST FORK JUNIPER CREEK, UNST
			THE MCARTHUR 1989 TRUST Total		1,800.00		
A025081	16924	11432	THOMAS M ORIGER	06/08/76	0.90	Modoc	UNST
			THOMAS M ORIGER Total		0.90		
A022935	15594	9632	TIM D BABCOCK	10/23/67	10.50	Lassen	UNST
			TIM D BABCOCK Total		10.50		
A028656	20237	13590	TIMOTHY W SKALLAND	03/19/04	6.00	Shasta	UNST (AKA INDIAN CREEK)
			TIMOTHY W SKALLAND Total		6.00		

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A020062	13147	8361	TOM GIFFORD	03/31/61	30.00	Modoc	UNST
A020063	13148	9260	TOM GIFFORD	03/31/61	42.00	Modoc	TURNER CREEK
			TOM GIFFORD Total		72.00		
A019862	13061	9279	TOMMY B. ESPERANCE	04/09/70	30.00	Lassen	UNST
			TOMMY B. ESPERANCE Total		30.00		
A000420	188	298	TRINITY MEADOWS LP	11/13/23	553.40	Shasta	HATCHET CREEK
			TRINITY MEADOWS LP Total		553.40		
A000760	852	465	U S FISH & WILDLIFE SERVICE	12/29/03	2,709.00	Modoc	PINE CREEK
A001042	853	466	U S FISH & WILDLIFE SERVICE	12/29/03	1,191.00	Modoc	PINE CREEK, STOCKDILL SLOUGH
A001321	854	13528	U S FISH & WILDLIFE SERVICE	12/29/03	6,100.00	Modoc	PARKER CREEK, STOCKDILL SLOUGH
A012263	7291	4822	U S FISH & WILDLIFE SERVICE	12/29/03	1,100.00	Modoc	PINE CREEK
			U S FISH & WILDLIFE SERVICE Total		11,100.00		
A012068	7103	3978	U S LASSEN NATL FOREST	09/04/47	1.10	Lassen	BOARD CABIN SPRING
A012069	7104	4001	U S LASSEN NATL FOREST	09/04/47	0.50	Lassen	FIVE TROUGHS SPRING
A014978	9234	4535	U S LASSEN NATL FOREST	08/19/52	0.80	Lassen	PAT MORRIS SPRING
A018840	12883	9191	U S LASSEN NATL FOREST	07/01/59	650.00	Lassen	LITTLE DAVIS CREEK, UNST
A019698	12777	7758	U S LASSEN NATL FOREST	08/22/60	0.40	Shasta	COBBLE SPRING
A019699	12778	7759	U S LASSEN NATL FOREST	08/22/60	0.40	Lassen	CONE CACHE SPRING
A019700	12779	7760	U S LASSEN NATL FOREST	08/22/60	1.10	Shasta	COYOTE SPRING
A021662	14493	8914	U S LASSEN NATL FOREST	03/02/64	1.90	Lassen	WILLOW SPRING
A021663	14494	8915	U S LASSEN NATL FOREST	03/02/64	1.30	Siskiyou	WILEY RANCH SPRINGS
A025248	17964	12076	U S LASSEN NATL FOREST	01/19/77	650.00	Lassen	BIG JACK LAKE
A025660	17965	12077	U S LASSEN NATL FOREST	01/27/78	50.00	Lassen	BIG JACK LAKE
A018105A01	14822	11220	U S LASSEN NATL FOREST	04/30/82	190.00	Shasta	PROCTOR CREEK, UNST
A018105A02	14822	11220	U S LASSEN NATL FOREST	04/30/82	40.00	Shasta	PROCTOR CREEK, UNST
A027411	20039	12932	U S LASSEN NATL FOREST	07/13/82	0.10	Shasta	SOLDIER CREEK
A027412	20040	12933	U S LASSEN NATL FOREST	07/13/82	0.20	Shasta	SOLDIER CREEK
A029987	20731		U S LASSEN NATL FOREST	08/09/91	2.80	Siskiyou	MAYFIELD SPRING
A030254	20752		U S LASSEN NATL FOREST	05/07/93	73.50	Shasta	UNST
			U S LASSEN NATL FOREST Total		1,664.10		
A009132	5320	3945	U S MODOC NATL FOREST	09/29/37	0.70	Siskiyou	HEMLOCK SPRING
A009202	5239	4577	U S MODOC NATL FOREST	12/10/37	0.70	Siskiyou	SCHONCHIN SPRING
A010841	6296	5038	U S MODOC NATL FOREST	07/18/44	0.80	Modoc	HARRIS SPRING
A012708	7536	3580	U S MODOC NATL FOREST	09/23/48	0.30	Modoc	BOTTLE CREEK, BOTTLE SPRING
A013190	7748	3581	U S MODOC NATL FOREST	06/30/49	0.40	Modoc	LAYTON SPRING
A013194	7751	4023	U S MODOC NATL FOREST	06/30/49	0.40	Modoc	COTTONWOOD FLAT SPRING
A013213	7752	4401	U S MODOC NATL FOREST	07/08/49	0.20	Lassen	UNSP
A013214	7753	4402	U S MODOC NATL FOREST	07/08/49	0.20	Modoc	UNSP
A013215	7754	4396	U S MODOC NATL FOREST	07/08/49	0.70	Lassen	UNSP
A013821	8359	3894	U S MODOC NATL FOREST	06/28/50	0.20	Modoc	HOWARDS GULCH CAMPGROUND SPRING
A014088	8664	4277	U S MODOC NATL FOREST	12/04/50	0.10	Modoc	WEST VALLEY SPRING
A014089	8665	4986	U S MODOC NATL FOREST	12/04/50	0.10	Modoc	FITZHUGH SPRING
A014090	8666	4484	U S MODOC NATL FOREST	12/04/50	0.30	Modoc	GROUSE SPRING
A014091	8742	4281	U S MODOC NATL FOREST	12/04/50	0.20	Modoc	COWHEAD SPRING
A018091	11574	6605	U S MODOC NATL FOREST	04/09/58	8.50	Modoc	UNST

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
A018203	11655	6376	U S MODOC NATL FOREST	06/30/58	0.10	Modoc	UNSP
A018204	11656	6377	U S MODOC NATL FOREST	06/30/58	0.10	Modoc	UNSP
A018636	12026	6619	U S MODOC NATL FOREST	04/10/59	0.30	Lassen	RICHMAN SPRING
A019163	12503	7311	U S MODOC NATL FOREST	01/04/60	0.50	Lassen	SUMMIT SPRING
A019164	12504	6712	U S MODOC NATL FOREST	01/04/60	0.10	Modoc	HUNTER SPRING
A019165	12467	7467	U S MODOC NATL FOREST	01/04/60	0.10	Modoc	HIDDEN SPRING
A019166	12468	6713	U S MODOC NATL FOREST	01/04/60	0.20	Modoc	QUAIL SPRING
A019189	12469	7312	U S MODOC NATL FOREST	01/25/60	0.20	Lassen	CHICKEN SPRING
A019283	12505	7532	U S MODOC NATL FOREST	03/07/60	0.40	Modoc	RONEY SPRING
A019284	12506	6714	U S MODOC NATL FOREST	03/07/60	0.40	Modoc	STUDLEY SPRING
A019285	12507	7533	U S MODOC NATL FOREST	03/07/60	0.20	Modoc	HORSEHEAD SPRING
A019340	12470	6715	U S MODOC NATL FOREST	04/04/60	0.30	Modoc	HARPER SPRING
A019365	12508	7534	U S MODOC NATL FOREST	04/20/60	0.20	Modoc	FERN SPRING
A019367	12510	7314	U S MODOC NATL FOREST	04/20/60	0.20	Lassen	MUD SPRING
A019368	12511	6716	U S MODOC NATL FOREST	04/20/60	0.20	Lassen	WATER CANYON SPRING
A019369	12512	7535	U S MODOC NATL FOREST	04/20/60	0.20	Modoc	HOG GULCH SPRING
A019370	12557	6717	U S MODOC NATL FOREST	04/20/60	0.20	Lassen	DAGO SPRINGS
A019970	13069	8052	U S MODOC NATL FOREST	02/07/61	0.30	Modoc	FOX MOUNTAIN SPRING
A019971	13070	8053	U S MODOC NATL FOREST	02/07/61	0.40	Modoc	PLUM SPRING
A019972	13071	8333	U S MODOC NATL FOREST	02/07/61	7.50	Lassen	UNSP
A019973	13072	8054	U S MODOC NATL FOREST	02/07/61	0.20	Lassen	SCHOTT SPRING
A020112	13484	8055	U S MODOC NATL FOREST	05/08/61	0.10	Lassen	DEER SPRING
A020113	13485	8056	U S MODOC NATL FOREST	05/08/61	0.10	Lassen	STUMP SPRING
A020716	13706	8558	U S MODOC NATL FOREST	04/10/62	0.20	Lassen	WALKER FLAT DRAW SPRING
A020717	13707	8559	U S MODOC NATL FOREST	04/10/62	0.30	Lassen	INDIAN SPRING
A021095	14181	8841	U S MODOC NATL FOREST	01/02/63	0.20	Lassen	UNSP
A021097	14183	8842	U S MODOC NATL FOREST	01/02/63	0.20	Modoc	UNSP
A021099	14185	8843	U S MODOC NATL FOREST	01/02/63	0.20	Lassen	UNSP
A021100	14095	8653	U S MODOC NATL FOREST	01/02/63	0.20	Modoc	UNSP
A021101	14096	8592	U S MODOC NATL FOREST	01/02/63	0.30	Modoc	MUD SPRING
A021102	14097	8643	U S MODOC NATL FOREST	01/02/63	0.30	Modoc	PINE SPRING
A021103	14098	8622	U S MODOC NATL FOREST	01/02/63	0.60	Modoc	HOSKINS SPRING
A021104	14099	8623	U S MODOC NATL FOREST	01/02/63	0.80	Modoc	HEAD OF RUSH CREEK SPRING
A021105	14100	8654	U S MODOC NATL FOREST	01/02/63	0.50	Modoc	CHALK SPRING
A021165	14101	8659	U S MODOC NATL FOREST	02/18/63	0.70	Modoc	RONEY FLAT SPRING
A021491	14341	8773	U S MODOC NATL FOREST	10/07/63	0.50	Lassen	DEER SPRING
A021492	14342	8838	U S MODOC NATL FOREST	10/07/63	0.50	Lassen	BUNSELMEIER SPRING
A021501	14422	8840	U S MODOC NATL FOREST	10/15/63	0.50	Lassen	JIMMY PACKWOOD SPRING
A021502	14489	8906	U S MODOC NATL FOREST	10/15/63	0.50	Lassen	GERIG SPRING
A021503	14536	8907	U S MODOC NATL FOREST	10/15/63	0.40	Modoc	DEEP CUT SPRING
A026211	17982	12567	U S MODOC NATL FOREST	02/20/80	0.20	Lassen	UNST
A026216	17985	12091	U S MODOC NATL FOREST	02/20/80	0.20	Lassen	UNST
A026217	17986	12092	U S MODOC NATL FOREST	02/20/80	0.20	Lassen	UNST
A026218	17987	12093	U S MODOC NATL FOREST	02/20/80	0.20	Lassen	UNST
A026220	17989	12094	U S MODOC NATL FOREST	02/20/80	0.20	Lassen	UNST

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A026221	17990	12095	U S MODOC NATL FOREST	02/20/80	0.20	Lassen	WINDMILL FLAT
A026222	17991	12096	U S MODOC NATL FOREST	02/20/80	0.10	Lassen	UNSP
A026288	18180	12097	U S MODOC NATL FOREST	04/10/80	0.20	Lassen	UNST
A026290	18182	12098	U S MODOC NATL FOREST	04/10/80	0.20	Lassen	UNST
A026348	18251	12090	U S MODOC NATL FOREST	05/14/80	0.20	Modoc	UNST
A026405	18265	12099	U S MODOC NATL FOREST	06/06/80	0.10	Modoc	SHAKE CANYON
A026477	18381	12100	U S MODOC NATL FOREST	07/29/80	0.20	Lassen	UNST
A026897	19797	13446	U S MODOC NATL FOREST	06/30/81	0.10	Modoc	UNST
A026893	19794		U S MODOC NATL FOREST	06/30/81	0.20	Modoc	UNST
A026894	19795		U S MODOC NATL FOREST	06/30/81	0.20	Modoc	UNST
A026898	19798		U S MODOC NATL FOREST	06/30/81	0.20	Lassen	UNST
A027231	18659	12568	U S MODOC NATL FOREST	03/09/82	0.20	Lassen	UNST
A027233	18661	12568	U S MODOC NATL FOREST	03/09/82	0.20	Lassen	UNST
A027234	18662	12570	U S MODOC NATL FOREST	03/09/82	0.20	Lassen	UNST
A027235	18663	12571	U S MODOC NATL FOREST	03/09/82	0.20	Lassen	COYOTE FLAT DRAW
A027236	18664	12572	U S MODOC NATL FOREST	03/09/82	0.20	Lassen	UNST
A027237	18665	12573	U S MODOC NATL FOREST	03/09/82	0.20	Lassen	UNST
A027238	18666	12574	U S MODOC NATL FOREST	03/09/82	0.20	Lassen	UNST
A027431	18853	13495	U S MODOC NATL FOREST	07/15/82	0.10	Modoc	UNST
A027647	19599		U S MODOC NATL FOREST	02/01/83	102.00	Lassen	UNST
A027648	19600		U S MODOC NATL FOREST	02/01/83	96.50	Lassen	UNST
A027732	19288	12746	U S MODOC NATL FOREST	04/27/83	0.20	Lassen	UNST
A027733	19289	12747	U S MODOC NATL FOREST	04/27/83	0.20	Lassen	UNST
A027734	19290	12748	U S MODOC NATL FOREST	04/27/83	0.20	Lassen	UNST
A027735	19291	12749	U S MODOC NATL FOREST	04/27/83	0.20	Lassen	UNST
A027737	19293	12750	U S MODOC NATL FOREST	04/27/83	0.20	Lassen	UNST
A027738	19294	12738	U S MODOC NATL FOREST	04/27/83	0.20	Lassen	UNST
A027739	19295	12752	U S MODOC NATL FOREST	04/27/83	0.20	Lassen	UNST
A027740	19296	12753	U S MODOC NATL FOREST	04/27/83	0.20	Lassen	UNST
A027741	19297	12754	U S MODOC NATL FOREST	04/27/83	0.20	Lassen	UNST
A027742	19298	12755	U S MODOC NATL FOREST	04/27/83	0.20	Lassen	UNST
A027999	19750	13062	U S MODOC NATL FOREST	03/15/84	0.10	Modoc	UNST
A028001	19752	13359	U S MODOC NATL FOREST	03/15/84	0.20	Modoc	UNST
A028002	19753	13360	U S MODOC NATL FOREST	03/15/84	0.20	Modoc	UNST
A028004	19755	13015	U S MODOC NATL FOREST	03/15/84	0.20	Modoc	UNST
A028006	19757	13016	U S MODOC NATL FOREST	03/15/84	0.20	Modoc	UNST
A028007	19758	13017	U S MODOC NATL FOREST	03/15/84	0.20	Modoc	UNST
A028008	19759	13018	U S MODOC NATL FOREST	03/15/84	0.20	Modoc	UNST
A028009	19760	13019	U S MODOC NATL FOREST	03/15/84	0.20	Modoc	UNST
A028011	19762	13361	U S MODOC NATL FOREST	03/15/84	0.20	Modoc	UNST
A028012	19763	13362	U S MODOC NATL FOREST	03/15/84	0.20	Modoc	UNST
A028014	19765	13020	U S MODOC NATL FOREST	03/15/84	0.20	Modoc	UNST
A028019	19770	13021	U S MODOC NATL FOREST	03/15/84	0.20	Modoc	UNST
A028021	19772	13493	U S MODOC NATL FOREST	03/15/84	0.20	Lassen	UNST
A028022	19773	13022	U S MODOC NATL FOREST	03/15/84	0.20	Lassen	COYOTE FLAT DRAW

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A028024	19775	13023	U S MODOC NATL FOREST	03/15/84	0.20	Modoc	STONE COAL CREEK
A028027	19778	13466	U S MODOC NATL FOREST	03/15/84	0.20	Modoc	STONE COAL CREEK
A028028	19779	13024	U S MODOC NATL FOREST	03/15/84	0.20	Modoc	UNST
A028030	19781	13025	U S MODOC NATL FOREST	03/15/84	0.20	Lassen	WALKER DRAW
A028031	19782	13397	U S MODOC NATL FOREST	03/15/84	0.20	Lassen	UNST
A028000	19751		U S MODOC NATL FOREST	03/15/84	0.20	Modoc	UNST
A028005	19756		U S MODOC NATL FOREST	03/15/84	0.20	Modoc	UNST
A028015	19766		U S MODOC NATL FOREST	03/15/84	0.20	Lassen	UNST
A028016	19767		U S MODOC NATL FOREST	03/15/84	0.20	Lassen	UNST
A028017	19768		U S MODOC NATL FOREST	03/15/84	0.20	Lassen	CARY SPRING
A028018	19769		U S MODOC NATL FOREST	03/15/84	0.20	Modoc	UNST
A028026	19777		U S MODOC NATL FOREST	03/15/84	0.20	Modoc	MUD SPRING
A028029	19780		U S MODOC NATL FOREST	03/15/84	0.20	Modoc	UNST
A028032	19783		U S MODOC NATL FOREST	03/15/84	0.20	Modoc	UNST
A028033	19784		U S MODOC NATL FOREST	03/15/84	0.20	Modoc	DEEP CUT SPRINGS
A028398	19671	13366	U S MODOC NATL FOREST	02/26/85	0.10	Lassen	UNST
A028400	19673	13374	U S MODOC NATL FOREST	02/26/85	0.10	Modoc	UNST
A028838	20023	13496	U S MODOC NATL FOREST	05/20/86	0.20	Lassen	UNST
A028841	20026	13453	U S MODOC NATL FOREST	05/20/86	0.20	Lassen	AMBROSE CANYON
A028845	20030	13365	U S MODOC NATL FOREST	05/20/86	0.20	Lassen	UNST
A028846	20031	13392	U S MODOC NATL FOREST	05/20/86	0.20	Lassen	UNST
A028837	20022		U S MODOC NATL FOREST	05/20/86	0.20	Modoc	UNST
A028839	20024		U S MODOC NATL FOREST	05/20/86	0.20	Modoc	UNST
A028840	20025		U S MODOC NATL FOREST	05/20/86	0.20	Modoc	UNST
A028842	20027		U S MODOC NATL FOREST	05/20/86	0.20	Lassen	UNST
A028843	20028		U S MODOC NATL FOREST	05/20/86	0.20	Lassen	SOUTH FORK JUNIPER CREEK
A028844	20029		U S MODOC NATL FOREST	05/20/86	0.20	Lassen	UNST
A028847	20032	13545	U S MODOC NATL FOREST	07/11/03	0.20	Lassen	UNST
A026899	19799	13550	U S MODOC NATL FOREST	07/22/03	0.20	Lassen	UNST
A026895	19796	13556	U S MODOC NATL FOREST	09/10/03	0.20	Modoc	ROCK SPRINGS
A028399	19672	13567	U S MODOC NATL FOREST	09/24/03	0.10	Lassen	UNST
A027432	18854	13574	U S MODOC NATL FOREST	11/24/03	0.10	Modoc	YELLOWJACKET SPRING
A028836	20021	13573	U S MODOC NATL FOREST	11/24/03	0.20	Lassen	UNST
			U S MODOC NATL FOREST Total		247.00		
A013019	7741	3782	U S SHASTA-TRINITY NATL FOREST	04/05/49	0.20	Shasta	DEEP CREEK
A013186	8047	3783	U S SHASTA-TRINITY NATL FOREST	06/30/49	1.60	Siskiyou	SLAGGER CAMP SPRING
A013187	8048	3784	U S SHASTA-TRINITY NATL FOREST	06/30/49	1.60	Siskiyou	LOST SPRINGS
A013189	8050	3786	U S SHASTA-TRINITY NATL FOREST	06/30/49	1.40	Siskiyou	BEAR SPRINGS
A020670	13640	8641	U S SHASTA-TRINITY NATL FOREST	03/21/62	1.00	Siskiyou	BELNAP SPRING
A020671	13641	8674	U S SHASTA-TRINITY NATL FOREST	03/21/62	0.90	Siskiyou	HARRIS SPRING
			U S SHASTA-TRINITY NATL FOREST Total		6.70		
A016866	10676	6381	US BUREAU OF LAND MANAGEMENT	01/31/56	1.50	Lassen	UNST
A016868	10689	6382	US BUREAU OF LAND MANAGEMENT	01/31/56	10.80	Lassen	UNST
A016869	10639	6078	US BUREAU OF LAND MANAGEMENT	01/31/56	2.90	Lassen	BALD MOUNTAIN LAKE, UNST
A016870	10640	6079	US BUREAU OF LAND MANAGEMENT	01/31/56	0.20	Lassen	UNDR

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A016871	10641	6080	US BUREAU OF LAND MANAGEMENT	01/31/56	4.00	Lassen	UNST
A016873	10643	6081	US BUREAU OF LAND MANAGEMENT	01/31/56	4.40	Lassen	NORTH GULCH, SPRING GULCH, UNST
A016899	10719	6540	US BUREAU OF LAND MANAGEMENT	02/20/56	10.00	Shasta	UNST
A018105B	14823	11219	US BUREAU OF LAND MANAGEMENT	04/24/58	180.00	Shasta	PROCTER CREEK, UNST
A020527	13928	8530	US BUREAU OF LAND MANAGEMENT	12/15/61	54.70	Shasta	UNST
A020528	13601	8140	US BUREAU OF LAND MANAGEMENT	12/15/61	6.00	Shasta	UNST
A020933	13992	8568	US BUREAU OF LAND MANAGEMENT	09/06/62	6.70	Shasta	UNST
A020998	14034	8590	US BUREAU OF LAND MANAGEMENT	10/29/62	4.70	Shasta	UNST
A021060	14078	8581	US BUREAU OF LAND MANAGEMENT	12/03/62	0.10	Shasta	UNST
A021774	14725	9233	US BUREAU OF LAND MANAGEMENT	05/18/64	6.40	Shasta	UNST
A027616	19354	12775	US BUREAU OF LAND MANAGEMENT	12/23/82	1,533.00	Lassen	DRY CREEK
A028088	19503	13261	US BUREAU OF LAND MANAGEMENT	03/29/84	0.80	Modoc	UNST
A028091	19506	13085	US BUREAU OF LAND MANAGEMENT	03/29/84	0.60	Modoc	UNST
A028093	19508	13371	US BUREAU OF LAND MANAGEMENT	03/29/84	0.90	Lassen	UNST
A028095	19510	13086	US BUREAU OF LAND MANAGEMENT	03/29/84	1.00	Modoc	UNST
A028096	19511	13087	US BUREAU OF LAND MANAGEMENT	03/29/84	0.40	Modoc	UNST
A028098	19512	13303	US BUREAU OF LAND MANAGEMENT	03/29/84	0.80	Lassen	UNST
A028099	19513	13262	US BUREAU OF LAND MANAGEMENT	03/29/84	1.20	Lassen	UNST
A028089	19504		US BUREAU OF LAND MANAGEMENT	03/29/84	3.00	Modoc	UNST
A028090	19505		US BUREAU OF LAND MANAGEMENT	03/29/84	1.00	Modoc	UNST
A028094	19509		US BUREAU OF LAND MANAGEMENT	03/29/84	1.10	Lassen	UNST
A028261	19536	13349	US BUREAU OF LAND MANAGEMENT	10/01/84	1.20	Modoc	UNST
A028264	19539	13370	US BUREAU OF LAND MANAGEMENT	10/01/84	0.90	Lassen	UNST
A028265	19540	13373	US BUREAU OF LAND MANAGEMENT	10/01/84	0.30	Lassen	UNST
A028270	19545	13364	US BUREAU OF LAND MANAGEMENT	10/01/84	0.50	Modoc	UNST
A028271	19546	13391	US BUREAU OF LAND MANAGEMENT	10/01/84	1.20	Modoc	UNST
A028272	19547	13358	US BUREAU OF LAND MANAGEMENT	10/01/84	0.20	Modoc	UNST
A028273	19548	13338	US BUREAU OF LAND MANAGEMENT	10/01/84	0.50	Lassen	UNST
A028274	19549	13335	US BUREAU OF LAND MANAGEMENT	10/01/84	0.40	Lassen	UNST
A028275	19550	13376	US BUREAU OF LAND MANAGEMENT	10/01/84	0.80	Lassen	UNST
A028276	19551	13334	US BUREAU OF LAND MANAGEMENT	10/01/84	0.40	Lassen	UNST
A028262	19537		US BUREAU OF LAND MANAGEMENT	10/01/84	1.10	Lassen	UNST
A028701	19953	13464	US BUREAU OF LAND MANAGEMENT	01/03/86	1.00	Modoc	UNST
A028702	19954	13327	US BUREAU OF LAND MANAGEMENT	01/03/86	1.20	Lassen	UNST
A028703	19955	13330	US BUREAU OF LAND MANAGEMENT	01/03/86	0.70	Lassen	UNST
A028704	19956	13336	US BUREAU OF LAND MANAGEMENT	01/03/86	0.40	Modoc	UNST
A028709	19961	13319	US BUREAU OF LAND MANAGEMENT	01/03/86	0.60	Lassen	UNST
A028706	19958		US BUREAU OF LAND MANAGEMENT	01/03/86	5.20	Lassen	UNST
A028717	19946	13341	US BUREAU OF LAND MANAGEMENT	01/14/86	0.50	Lassen	UNST
A028718	19947	13084	US BUREAU OF LAND MANAGEMENT	01/14/86	0.80	Lassen	UNST
A028721	19950	13343	US BUREAU OF LAND MANAGEMENT	01/14/86	1.10	Modoc	UNST
A028893	20111	13372	US BUREAU OF LAND MANAGEMENT	09/08/86	0.40	Modoc	UNST
A028894	20112	13297	US BUREAU OF LAND MANAGEMENT	09/08/86	1.10	Modoc	UNST
A029230	20724		US BUREAU OF LAND MANAGEMENT	04/19/88	1.30	Lassen	UNST
A029232	20725		US BUREAU OF LAND MANAGEMENT	04/19/88	1.30	Lassen	UNST

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A029589	20649	13333	US BUREAU OF LAND MANAGEMENT	10/16/89	0.40	Lassen	UNST
A031051	21129		US BUREAU OF LAND MANAGEMENT	05/12/00	6.00	Modoc	UNST
A031052	21130		US BUREAU OF LAND MANAGEMENT	05/12/00	9.00	Modoc	UNST
A031053	21131		US BUREAU OF LAND MANAGEMENT	05/12/00	15.00	Modoc	UNST
A028258	19533	13555	US BUREAU OF LAND MANAGEMENT	09/10/03	0.40	Lassen	UNST
A028257	19532	13572	US BUREAU OF LAND MANAGEMENT	11/24/03	0.60	Lassen	UNST
A028259	19534	13652	US BUREAU OF LAND MANAGEMENT	06/30/06	0.80	Lassen	UNST
A028256	19531	13673	US BUREAU OF LAND MANAGEMENT	10/23/06	0.60	Lassen	UNST
			US BUREAU OF LAND MANAGEMENT Total		1,892.10		
A005804	3240	1087	WARREN L WEBER	01/13/28	136.20	Modoc	DRY CREEK
			WARREN L WEBER Total		136.20		
A025140	17110	11557	WILLIAM PAPEZ	09/01/76	8.50	Modoc	UNST
A027961	19258	12760	WILLIAM PAPEZ	01/26/84	3.50	Modoc	UNST
			WILLIAM PAPEZ Total		12.00		
A027438	19320		WILLIAM C PROCK	07/16/82	229.00	Modoc	UNST
			WILLIAM C PROCK Total		229.00		
			Grand Total		166,380.90		

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A013398	8208	5317	AMY POWELL-REILLY	10/13/49	0.30	Plumas	UNSP
			AMY POWELL-REILLY Total		0.30		
A028202	19382	12743	APRIL L KEENAN	08/01/84	0.30	Plumas	UNST
			APRIL L KEENAN Total		0.30		
A010025	5864	4105	ASSOCIATION OF THOMPSON LAKE	10/02/40	5.10	Plumas	THOMPSON LAKE
A029432	20487		ASSOCIATION OF THOMPSON LAKE	03/08/89	20.00	Plumas	THOMPSON LAKE
			ASSOCIATION OF THOMPSON LAKE Total		25.10		
A009275	5190	2732	BERNICE C TERRY	04/15/38	4.50	Plumas	CROMBERG SPRING
			BERNICE C TERRY Total		4.50		
A012394	7599	3752	BIG MEADOWS INC	03/09/48	41.30	Plumas	UNSP
			BIG MEADOWS INC Total		41.30		
A015111	9442	6153	BOB CARTER	12/10/52	1.70	Plumas	UNSP
			BOB CARTER Total		1.70		
A010349	5964	2936	BRYAN P PITCAVAGE	12/31/41	21.30	Plumas	CLEAR CREEK
			BRYAN P PITCAVAGE Total		21.30		
A020786	14328	8802	BUCKS LAKE LODGE	05/22/62	0.10	Plumas	UNSP, UNST
			BUCKS LAKE LODGE Total		0.10		
A014583	9845	8347	BUCKS LAKE LODGES INCORPORATED	11/20/51	4.20	Plumas	UNST
			BUCKS LAKE LODGES INCORPORATED Total		4.20		
A011477	6689	3505	BUCKS LAKE SUMMER WATER ASSOCIATION	07/22/46	0.60	Plumas	UNST
A021842	14893	9171	BUCKS LAKE SUMMER WATER ASSOCIATION	07/09/64	0.40	Plumas	UNST
			BUCKS LAKE SUMMER WATER ASSOCIATION Total		1.00		
A007370	4083	2235	CALIF DEPT OF TRANSPORTATION	09/08/32	2.20	Plumas	UNSP
A016380	10367	5872	CALIF DEPT OF TRANSPORTATION	05/17/55	3.40	Sierra	UNSP
			CALIF DEPT OF TRANSPORTATION Total		5.60		
A005630	16478		CALIF DEPT OF WATER RESOURCES	07/30/27	1,393,568.50	Butte, Contra Costa, Sacramento	FEATHER RIVER, ITALIAN SLOUGH, SACRAMENTO RIVER DELTA CHANNELS
A014443	16479		CALIF DEPT OF WATER RESOURCES	08/24/51	9,004,510.20	Butte, Contra Costa	FEATHER RIVER, SACRAMENTO SAN JOAQUIN DELTA CHANNELS

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A016951	14587	9389	CALIF DEPT OF WATER RESOURCES	03/20/56	18,200.00	Plumas	INDIAN CREEK
A016952	12945	9182	CALIF DEPT OF WATER RESOURCES	03/20/56	30,000.00	Plumas	LITTLE LAST CHANCE CREEK
A018844	12946	9928	CALIF DEPT OF WATER RESOURCES	07/06/59	4,962.00	Plumas	LITTLE LAST CHANCE CREEK
A020117	14588	10975	CALIF DEPT OF WATER RESOURCES	05/09/61	3,400.00	Plumas	INDIAN CREEK
A016950	15254		CALIF DEPT OF WATER RESOURCES	01/05/67	49,000.00	Plumas	BIG GRIZZLY CREEK
A021443	15255		CALIF DEPT OF WATER RESOURCES	01/05/67	34,000.00	Plumas	BIG GRIZZLY CREEK
			CALIF DEPT OF WATER RESOURCES Total		10,537,640.70		
A012548	7491	3530	CAMP TIMBERWOLF IMPROVEMENT COMMITTEE	06/16/48	0.40	Plumas	UNSP
			CAMP TIMBERWOLF IMPROVEMENT COMMITTEE Total		0.40		
A007003	3866	1575	CAROL A RHODEHOUSE	07/10/31	3,330.30	Plumas	BLACKHAWK CREEK
			CAROL A RHODEHOUSE Total		3,330.30		
A019730	12871	10458	CASIMIR JATCZAK	09/07/60	0.20	Plumas	UNST
			CASIMIR JATCZAK Total		0.20		
A010011	5685	2581	CITY OF PORTOLA	04/08/43	875.90	Plumas	WILLOW CREEK
A017069	12282	10013	CITY OF PORTOLA	05/03/56	600.00	Plumas	UNSP (5), UNSP (7)
			CITY OF PORTOLA Total		1,475.90		
A012900	7594	4841	Collin Harris	01/17/49	126.00	Sierra	ANTELOPE CREEK
			Collin Harris Total		126.00		
A029127	20591		COZETTE E GRAHAM	10/19/87	18.70	Plumas	TWELVE MILE RAVINE, UNST
			COZETTE E GRAHAM Total		18.70		
A007978	4430	2682	DANIEL WILSON	06/15/34	2.20	Plumas	INDIAN CREEK
			DANIEL WILSON Total		2.20		
A019121	13930	8392	DANIEL H CLIFTON	12/04/59	0.40	Sierra	TREASURE SPRING, TREASURE SPRING CREEK
			DANIEL H CLIFTON Total		0.40		
A015567	10328	7268	DANNY WILSON	10/05/53	0.20	Butte	BALSAM CREEK
			DANNY WILSON Total		0.20		
A017314	11155	8371	DARLA J WOJCIK FAMILY TRUST	10/08/56	1.90	Butte	OREGON GULCH

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			DARLA J WOJCIK FAMILY TRUST Total		1.90		
A009972	5640	3476	DAVID C NORTON	08/09/40	16.20	Plumas	UNSP
A014016	8784	9609	DAVID C NORTON	10/25/50	3.50	Plumas	UNSP
			DAVID C NORTON Total		19.70		
A004122	2107	2023	DAVID K LEE	05/15/40	135.80	Plumas	COLD SPRING, KINGS CREEK
A005171	2866	2024	DAVID K LEE	05/15/40	91.70	Plumas	SUNFLOWER FLAT CREEK
			DAVID K LEE Total		227.50		
A017739	11215	6958	DAVID ROBERT OSTLER	07/24/57	1.10	Sierra	UNSP
			DAVID ROBERT OSTLER Total		1.10		
A006728	3882	2143	DAWN INSTITUTE OF SCIENCE & ART	07/11/30	8.40	Plumas	UNSP
A009968	5684		DAWN INSTITUTE OF SCIENCE & ART	07/22/93	1.30	Plumas	UNSP
			DAWN INSTITUTE OF SCIENCE & ART Total		9.70		
A017195	11014	5884	DAWN M JONES	07/20/56	0.20	Plumas	UNST
			DAWN M JONES Total		0.20		
A016436	10623	6036	DEAN PANFILI	06/23/55	630.80	Plumas	LONG VALLEY CREEK
			DEAN PANFILI Total		630.80		
A001024	497	217	DELBERT H LEHR	07/17/18	108.60	Plumas	UNXX
A011786	6906	3421	DELBERT H LEHR	03/19/47	312.00	Plumas	EAST BRANCH OF NORTH FORK FEATHER RIVER
			DELBERT H LEHR Total		420.60		
A016583	10536	7291	Derek C Anderson	06/07/65	3.50	Plumas	UNST
			Derek C Anderson Total		3.50		
A021361	14791	9026	DEWEY S RAVENSCROFT	06/25/63	5.00	Plumas	FERN CANYON
			DEWEY S RAVENSCROFT Total		5.00		
A029537	20577	13827	DIANE MONTGOMERY	01/10/11	35.00	Sierra	UNST
			DIANE MONTGOMERY Total		35.00		
A026571	18470	13246	Donald A Wallace	10/07/80	89.00	Sierra	SIERRA VALLEY CHANNELS
			Donald A Wallace Total		89.00		
A017963	11625	6601	DUSTIN F DOYLE	01/28/58	0.10	Plumas	UNST
			DUSTIN F DOYLE Total		0.10		
A011271	6536	3737	ELLIOT P SMART	01/31/46	1.60	Plumas	WATERING TROUGH SPRING
			ELLIOT P SMART Total		1.60		
A008964	4958	2564	EST OF WILLIAM JAMES DAWSON JR	05/06/37	5.60	Plumas	UNST
			EST OF WILLIAM JAMES DAWSON JR Total		5.60		
A017132	10832	5918	Est. of Martin A. Poss	06/14/56	0.20	Plumas	UNST
			Est. of Martin A. Poss Total		0.20		
A008460	4682	2223	Feather River Land Trust, a Cal Nonprofit	10/03/35	200.00	Plumas	TAYLOR LAKE
A012844	7617	9165	Feather River Land Trust, a Cal Nonprofit	12/03/48	100.00	Plumas	TAYLOR LAKE
			Feather River Land Trust, a Cal Nonprofit Total		300.00		

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A026942	20121		FIVE BEARS HYDRO, INC	08/06/81	1,448.00	Plumas	SOUTH BRANCH WARD CREEK
A027349	20122		FIVE BEARS HYDRO, INC	06/03/82	5,791.80	Plumas	SOUTH BRANCH WARD CREEK
			FIVE BEARS HYDRO, INC Total		7,239.80		
A009616	5470	2570	FRAZIER CREEK WATER ASSOCIATION	06/14/39	112.20	Butte	EAST BRANCH FRAZIER CREEK, WEST BRANCH FRAZIER CREEK
			FRAZIER CREEK WATER ASSOCIATION Total		112.20		
A008996	5022	4494	FREELANDER TRUST	06/14/37	412.70	Plumas	CLEAR CREEK, OWL CREEK
A017303	12796	7821	FREELANDER TRUST	08/03/66	467.50	Plumas	CLEAR CREEK, OWL CREEK
			FREELANDER TRUST Total		880.20		
A015571	10136	7056	GARY L BROWN	10/07/53	607.00	Plumas	INDIAN CREEK
			GARY L BROWN Total		607.00		
A018968	13221	7798	GENE ALEXANDER	09/04/59	0.10	Plumas	UNST
			GENE ALEXANDER Total		0.10		
A010963	6386	3323	GENE H FISHER	01/26/45	27.40	Butte	ROMA CREEK
			GENE H FISHER Total		27.40		
A008495	4785	2340	GRAEAGLE LAND & WATER COMPANY	11/14/35	11,454.70	Plumas	GRAY EAGLE CREEK, LONG LAKE
A008496	4786	2341	GRAEAGLE LAND & WATER COMPANY	11/14/35	2,895.50	Plumas	GRAY EAGLE CREEK
A025030	17676	12546	GRAEAGLE LAND & WATER COMPANY	03/26/76	196.00	Plumas	FRAZIER CREEK
			GRAEAGLE LAND & WATER COMPANY Total		14,546.20		
A004022	1978	2010	GRAY EAGLE LODGE	06/11/24	5.40	Plumas	UNSP
A004023	1979	1042	GRAY EAGLE LODGE	05/14/31	610.90	Plumas	GRAY EAGLE CREEK
			GRAY EAGLE LODGE Total		616.30		
A021216	14766	9215	GRIZZLY LAKE RESORT IMPROVEMENT DISTRICT	04/01/63	42.00	Plumas	HUMBUG CREEK
			GRIZZLY LAKE RESORT IMPROVEMENT DISTRICT Total		42.00		
A017171	11030	6181	HAROLD D FRANCIS	07/11/56	0.20	Plumas	UNST
			HAROLD D FRANCIS Total		0.20		
A017471	11399	7881	HYDE FAMILY 1990 TRUST	02/20/57	5.40	Plumas	UNST
			HYDE FAMILY 1990 TRUST Total		5.40		
A023364	16585		JAMES D BAKER	10/07/69	0.40	Sierra	TREASURE SPRING, TREASURE SPRING CREEK
			JAMES D BAKER Total		0.40		
A017160	10997	5889	JAMES F RUTHERFORD	12/02/04	0.20	Plumas	UNST
			JAMES F RUTHERFORD Total		0.20		
A027754	19252	12757	JAMES P ROBBINS	05/12/83	3.40	Plumas	UNSP
			JAMES P ROBBINS Total		3.40		

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A012122	7659	3486	JEANNETTE S SASSER	10/08/47	0.50	Plumas	CROMBERG SPRING
			JEANNETTE S SASSER Total		0.50		
A017231	10894	6053	JEFFERY L WILSON	08/10/56	22.40	Plumas	JACKASS CREEK
			JEFFERY L WILSON Total		22.40		
A001712	730	1128	JOAN ESCALANTE	03/06/20	1.10	Butte	UNST
			JOAN ESCALANTE Total		1.10		
A015071	9532	5288	JOHN J GILLAM	11/03/52	144.80	Plumas	HARVEY RAVINE
			JOHN J GILLAM Total		144.80		
A020468	13751	8748	JOHN P SCHMIDT	11/06/61	0.20	Plumas	UNST
			JOHN P SCHMIDT Total		0.20		
A024048	16589	11004	Kathy L. McDonell	05/05/80	0.30	Plumas	CROMBERG SPRING
A025089	17679	11695	Kathy L. McDonell	02/26/85	1.00	Plumas	CROMBERG SPRING
			Kathy L. McDonell Total		1.30		
A006723	3634	2560	Kovach Trust	07/08/30	1,809.00	Butte	EMPIRE CREEK
			Kovach Trust Total		1,809.00		
A011753	7180	5086	LAKE MADRONE WATER DISTRICT	03/04/47	1.70	Butte	FERN DELL CREEK
A030657	21027		LAKE MADRONE WATER DISTRICT	10/07/97	200.00	Butte	BERRY CREEK
			LAKE MADRONE WATER DISTRICT Total		201.70		
A023580	16107	10828	LAKE OROVILLE INVESTMENT GROUP LLC	08/14/70	9.50	Butte	UNST
			LAKE OROVILLE INVESTMENT GROUP LLC Total		9.50		
A018149	11610	7646	LARRY MCMULLAN	05/22/58	0.20	Plumas	UNSP
			LARRY MCMULLAN Total		0.20		
A012117	7658	3484	Laura Rowan Peake	10/02/47	0.30	Plumas	CROMBERG SPRING
			Laura Rowan Peake Total		0.30		
A023924	16402	10760	LDS Recreation Properties LLC	11/18/71	57.70	Sierra	BONTA CREEK, UNST
			LDS Recreation Properties LLC Total		57.70		
A029501	20707		Lewis Van Vleck	06/12/89	44.50	Sierra	SIERRA VALLEY CHANNELS
			Lewis Van Vleck Total		44.50		
A005996	3203	1067	LOREN PERKINS	07/27/28	217.20	Plumas	UNCR
A009886	5589	2625	LOREN PERKINS	04/29/40	202.70	Plumas	UNCR
			LOREN PERKINS Total		419.90		
A016529A	10428	007026A	LOREN V PERKINS LIVING TRUST	08/17/55	5.10	Butte	CARTER RAVINE
A016530	10429	7027	LOREN V PERKINS LIVING TRUST	08/17/55	0.70	Butte	CARTER RAVINE
			LOREN V PERKINS LIVING TRUST Total		5.80		
A005015	2623	2118	LOTTS LAKE ASSOCIATION	05/13/26	0.20	Plumas	UNSP
			LOTTS LAKE ASSOCIATION Total		0.20		
A023564	16180	10365	LOUIS A PAYEN	07/22/70	403.00	Sierra	BIG SPRING, SMALL SPRING

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			LOUIS A PAYEN Total		403.00		
A011713	6995	3586	MARGUERITE A MOHIUDDIN	02/03/47	7.70	Plumas	UNSP
			MARGUERITE A MOHIUDDIN Total		7.70		
A016529B	10428	007026B	MARK PHILLIPS	08/17/55	6.50	Butte	UNSP
			MARK PHILLIPS Total		6.50		
A022485	15693	10425	MARK A GLOISTEIN	06/06/66	20.00	Sierra	UNST
			MARK A GLOISTEIN Total		20.00		
A014807	9846	4942	MARK D EVANS	05/15/52	0.20	Plumas	UNST
			MARK D EVANS Total		0.20		
A023260A	15932	11069	MARK L SCOTT	11/26/80	17.00	Butte	UNST
			MARK L SCOTT Total		17.00		
A008422	4644	2423	Mary Ann Nash	08/21/35	9.00	Butte	OGDEN CREEK
			Mary Ann Nash Total		9.00		
A000685	312	166	MASSACK WATER USERS ASSOCIATION	05/18/17	5.60	Plumas	UNSP
A029544	20513		MASSACK WATER USERS ASSOCIATION	08/18/89	1.70	Plumas	UNSP
			MASSACK WATER USERS ASSOCIATION Total		7.30		
A015570	10135	7055	MC INTYRE RANCHING INC	10/07/53	758.70	Plumas	INDIAN CREEK
			MC INTYRE RANCHING INC Total		758.70		
A019090	13222	7708	MICHAEL MONAHAN	11/20/59	0.20	Plumas	UNST
			MICHAEL MONAHAN Total		0.20		
A011243	6594	4540	MICHAEL NEWSOM	12/26/45	0.10	Plumas	UNSP
			MICHAEL NEWSOM Total		0.10		
A006469	3446	1600	MICHAEL D GRANT	10/28/29	0.70	Plumas	UNSP
A011201	6472	3482	MICHAEL D GRANT	11/01/45	17.90	Plumas	UNSP
			MICHAEL D GRANT Total		18.60		
A024815	18294	12167	MIGUEL AUBAN	12/01/08	1.40	Plumas	UNSP
			MIGUEL AUBAN Total		1.40		
A024421	17166	11470	MIGUEL AUBEN	07/26/73	2.00	Plumas	UNST
			MIGUEL AUBEN Total		2.00		
A031433	21285		MINERAL RESOURCES LLC	06/06/11	46.00	Butte	UNST
			MINERAL RESOURCES LLC Total		46.00		
A004281	2443	1232	MIRIAM C BARKER	10/28/24	5.10	Plumas	LITTLE GRAY EAGLE CREEK
			MIRIAM C BARKER Total		5.10		
A030596	20954	13840	NADINE M BASS	11/08/11	19.00	Sierra	UNST
			NADINE M BASS Total		19.00		
A010917	6403	3113	NORMAN F ROBERTS	11/21/44	1.10	Plumas	UNSP
			NORMAN F ROBERTS Total		1.10		
A020303	13390	8417	NORMAN R COTE	07/14/61	0.40	Plumas	UNST
			NORMAN R COTE Total		0.40		

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A014113	11518		North Yuba Water District	08/18/58	624,084.30	Butte, Plumas	LOST CREEK, SOUTH FORK FEATHER RIVER
			North Yuba Water District Total		624,084.30		
A026904	18878		OKIZU FOUNDATION	07/03/81	49.00	Butte	BERRY CREEK, UNST
A031379			OKIZU FOUNDATION	12/17/02	40.00	Butte	BERRY CREEK, UNST
			OKIZU FOUNDATION Total		89.00		
A019233	13931	8393	PAUL CUETO	02/15/60	0.40	Sierra	TREASURE SPRING, TREASURE SPRING CREEK
			PAUL CUETO Total		0.40		
A011397	6637	3381	PERRY GREENE	05/14/46	2.40	Plumas	UNSP
			PERRY GREENE Total		2.40		
A012279	7286	3603	PETER SENTER	01/30/48	0.10	Plumas	UNSP
			PETER SENTER Total		0.10		
A014653	9216	4183	PG&E	01/22/52	0.60	Plumas	UNST
			PG&E Total		0.60		
A011585	6666	3638	R C K RANCH LLC	10/09/46	464.10	Plumas	MORRIS SLOUGH
			R C K RANCH LLC Total		464.10		
A017776	11243	6014	RALPH F BECKER	08/16/57	2.20	Plumas	UNSP
			RALPH F BECKER Total		2.20		
A019265	13932	8394	RANDY JENSEN	02/28/60	0.40	Sierra	TREASURE SPRING, TREASURE SPRING CREEK
			RANDY JENSEN Total		0.40		
A007526	4213	2065	REGENTS OF THE UNIVERSITY OF CALIFORNIA	03/29/33	1.50	Plumas	SCHNEIDER CREEK
			REGENTS OF THE UNIVERSITY OF CALIFORNIA Total		1.50		
A019750	13241	8020	RICHARD GREIN	09/23/60	0.10	Plumas	UNSP
			RICHARD GREIN Total		0.10		
A004234	2125	631	RICHARD L SCHIWENDINGER	09/24/24	1.70	Plumas	RUSSEL SPRING, UNSP (3)
			RICHARD L SCHIWENDINGER Total		1.70		
A009207	5218	2284	ROBERT RITTER	12/22/37	0.30	Plumas	CROMBERG SPRING
			ROBERT RITTER Total		0.30		
A023260C	15932	11071	ROBERT TEICHMAN	11/26/80	0.20	Butte	UNST
			ROBERT TEICHMAN Total		0.20		
A011976	7075	6880	ROBERT A JONES	06/10/63	18.80	Plumas	UNSP
			ROBERT A JONES Total		18.80		
A004261	2148	732	ROBERT B BECKWITH	10/16/24	0.70	Plumas	UNSP
A020432	13824	9217	ROBERT B BECKWITH	01/18/91	0.50	Plumas	UNSP

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			ROBERT B BECKWITH Total		1.20		
A027688	19665	13174	ROBERT J PALOWODA	03/11/83	0.10	Plumas	UNST
			ROBERT J PALOWODA Total		0.10		
A025500	17476	11505	ROBERT S CONOVER	09/02/77	0.50	Plumas	UNST
			ROBERT S CONOVER Total		0.50		
A009274	5189	2193	ROBERT W ELFEN	04/15/38	0.60	Plumas	CROMBERG SPRING
A009392	5316	2572	ROBERT W ELFEN	08/18/38	0.60	Plumas	CROMBERG SPRING
			ROBERT W ELFEN Total		1.20		
A016910	10730	5905	ROBERT W STEIN	02/28/56	140.00	Plumas	BIG GRIZZLY CREEK
			ROBERT W STEIN Total		140.00		
A019653	12990	9223	RON CARPENTER	08/09/60	166.50	Plumas	HAUNS CREEK
			RON CARPENTER Total		166.50		
A020911	14297	8961	RONALD DREISBACH	08/27/62	76.00	Butte	GRIZZLY CREEK
			RONALD DREISBACH Total		76.00		
A014760	9210	5515	RUSSELL C WESTOVER JR	04/17/52	0.60	Plumas	UNSP
			RUSSELL C WESTOVER JR Total		0.60		
A022855	15751	10561	SEAN CUNNINGHAM	12/31/75	452.40	Plumas	MILL CREEK
			SEAN CUNNINGHAM Total		452.40		
A017870	11564	9566	SHIRLEY ISHAM	11/01/57	33.00	Plumas	MOSQUITO SPRINGS
			SHIRLEY ISHAM Total		33.00		
A016520	10670	9872	SIERRA BIBLE CAMP INC	08/12/55	19.20	Plumas	UNSP
			SIERRA BIBLE CAMP INC Total		19.20		
A009690	5443	3114	SIERRA PACIFIC HOLDING COMPAMY	08/08/39	150.00	Butte	GRUBBS CREEK, LITTLE FREY CREEK
			SIERRA PACIFIC HOLDING COMPAMY Total		150.00		
A006412	3643	1485	SOPER COMPANY	08/17/29	17.00	Yuba	STICKNER SPRING
A014218	8611	4300	SOPER COMPANY	03/29/51	3.40	Plumas	UNSP
A014219	8612	4301	SOPER COMPANY	03/29/51	48.00	Plumas	MOSES CREEK
			SOPER COMPANY Total		68.40		
A021440	14485	10038	SOPER COMPANY, A DELAWARE CORPORATION	08/22/63	2.20	Plumas	UNSP
			SOPER COMPANY, A DELAWARE CORPORATION Total		2.20		
A002142	1268		SOUTH FEATHER WATER & POWER AGENCY	12/17/20	5,000.00	Butte	LOST CREEK
A002778	2492		SOUTH FEATHER WATER & POWER AGENCY	03/06/22	31,148.90	Butte	LOST CREEK
A002979	1271		SOUTH FEATHER WATER & POWER AGENCY	08/12/22	133,935.80	Butte	LOST CREEK
A001651	1267		SOUTH FEATHER WATER & POWER AGENCY	01/05/23	145,508.40	Plumas	SOUTH FORK FEATHER RIVER
			SOUTH FEATHER WATER & POWER AGENCY Total		315,593.10		
A029060	20656		Squirrel Creek, LLC	07/07/87	9.00	Plumas	BEAR CREEK
			Squirrel Creek, LLC Total		9.00		

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A014864	9192	6512	THE CAMP TIMBERWOLF IMPROVMENT COMM, INC	06/18/52	1.50	Plumas	UNSP
			THE CAMP TIMBERWOLF IMPROVMENT COMM, INC Total		1.50		
A001739	1911	845	THERMALITO WATER AND SEWER DISTRICT	03/25/20	8,200.00	Butte	CONCOW CREEK
A003040	1912	737	THERMALITO WATER AND SEWER DISTRICT	09/16/22	8,200.00	Butte	CONCOW CREEK
			THERMALITO WATER AND SEWER DISTRICT Total		16,400.00		
A011205	6989	3483	THOMAS E NOLTE	11/07/45	1.10	Plumas	CROMBERG SPRING
			THOMAS E NOLTE Total		1.10		
A014810	9849	5616	TIME EADE	05/15/52	0.10	Plumas	UNST
			TIME EADE Total		0.10		
A016582	10535	6631	TOMMIE D MASSSENGILL	09/06/55	2.30	Plumas	UNST
			TOMMIE D MASSSENGILL Total		2.30		
A006171	3243	1089	TRAVIS O MCWILLIAMS	01/28/29	36.70	Butte	BRANCH OF BUSHMAN CREEK
			TRAVIS O MCWILLIAMS Total		36.70		
A009293	5181	2548	U S FOREST SERVICE	05/16/38	17.90	Sierra	UNSP
A014228	8709	3968	U S FOREST SERVICE	04/04/51	0.30	Sierra	UNSP
A014281	8800	4915	U S FOREST SERVICE	05/02/51	0.30	Sierra	UNSP
A014282	8801	4947	U S FOREST SERVICE	05/02/51	1.50	Sierra	LEWIS MILL GUARD STATION SPRING
A014283	8802	5334	U S FOREST SERVICE	05/02/51	0.50	Sierra	SARDINE LOOKOUT SPRING
A014284	8803	4701	U S FOREST SERVICE	05/02/51	0.30	Sierra	UNSP
A014285	8804	4186	U S FOREST SERVICE	05/02/51	0.70	Plumas	UNSP
A014286	8805	5013	U S FOREST SERVICE	05/02/51	1.30	Sierra	UNSP
A014287	8806	4922	U S FOREST SERVICE	05/02/51	0.60	Sierra	UNSP
A023225	16015	10230	U S FOREST SERVICE	01/30/69	0.60	Plumas	HORSETROUGH SPRING
A023226	16014	10274	U S FOREST SERVICE	01/30/69	0.80	Plumas	BECKWOURTH SPRING
A027284	18875		U S FOREST SERVICE	04/07/82	32.00	Sierra	CARMAN CREEK, UNST
			U S FOREST SERVICE Total		56.80		

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
A019416	12655	8021	U S LASSEN NATL FOREST	05/05/60	120.00	Plumas	MORRIS LAKE
A019417	12656	8022	U S LASSEN NATL FOREST	05/05/60	27.00	Plumas	GRASSY LAKE
A019418	12657	8023	U S LASSEN NATL FOREST	05/05/60	27.00	Plumas	SADDLE LAKE
A019419	12658	8024	U S LASSEN NATL FOREST	05/05/60	8.00	Plumas	LONG LAKE
A020429	13430	8025	U S LASSEN NATL FOREST	10/06/61	3.40	Butte	UNSP
A021083	14154	8026	U S LASSEN NATL FOREST	12/14/62	34.00	Plumas	SPRING VALLEY LAKE
			U S LASSEN NATL FOREST Total		219.40		
A008990	5028	2332	U S PLUMAS NATL FOREST	06/05/37	3.10	Plumas	UNCR
A008991	5029	2930	U S PLUMAS NATL FOREST	06/05/37	0.70	Plumas	UNSP
A009514	5369	3736	U S PLUMAS NATL FOREST	03/01/39	33.60	Butte	FOLEY GULCH, MOUNTAIN HOUSE CREEK
A003918	2625	861	U S PLUMAS NATL FOREST	05/24/39	23.40	Plumas	TOLLGATE CREEK
A009734	5826	3747	U S PLUMAS NATL FOREST	09/22/39	4.50	Plumas	UNST
A009770	5559	4894	U S PLUMAS NATL FOREST	11/21/39	4.70	Plumas	UNSP
A010726	6216	2968	U S PLUMAS NATL FOREST	11/05/43	0.90	Plumas	UNSP
A011146	6509	3339	U S PLUMAS NATL FOREST	09/06/45	3.00	Plumas	UNSP
A011907	7171	6503	U S PLUMAS NATL FOREST	05/27/47	1.70	Plumas	UNST
A012038	7092	5500	U S PLUMAS NATL FOREST	08/13/47	2.80	Plumas	KLING RAVINE
A012535	7401	3605	U S PLUMAS NATL FOREST	06/04/48	6.10	Plumas	UNSP
A013625	8291	5325	U S PLUMAS NATL FOREST	03/10/50	4.70	Plumas	COLD SPRINGS
A014761	9211	5070	U S PLUMAS NATL FOREST	04/17/52	0.30	Plumas	UNST
A014815	10916	6076	U S PLUMAS NATL FOREST	05/20/52	540.00	Plumas	SNAKE LAKE
A015676	9796	5371	U S PLUMAS NATL FOREST	01/08/54	0.30	Plumas	FANT SPRING
A016200	10940	8222	U S PLUMAS NATL FOREST	01/12/55	12.30	Plumas	CUB CREEK

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
A017074	10784	6101	U S PLUMAS NATL FOREST	05/04/56	0.70	Plumas	UNSP
A017832	11562	6924	U S PLUMAS NATL FOREST	09/23/57	0.20	Plumas	UNSP
A018185	11617	6281	U S PLUMAS NATL FOREST	07/17/58	0.20	Plumas	UNST
A018413	11822	6885	U S PLUMAS NATL FOREST	11/14/58	0.70	Butte	UNSP
A019239	12414	10956	U S PLUMAS NATL FOREST	02/16/60	0.90	Plumas	WEST BRANCH WHITEHORSE CREEK
A019586	12604	7673	U S PLUMAS NATL FOREST	07/28/60	0.70	Butte	BEAR RANCH L O SPRING
A019587	12605	7674	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	RIDGE SPRING
A019588	12606	7675	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	STONY CREEK SPRING
A019589	12607	7676	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	CHIPMUNK SPRING
A019590	12608	7677	U S PLUMAS NATL FOREST	07/28/60	0.20	Plumas	POISON CREEK SPRING
A019591	12609	8061	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	BEAR SPRING
A019592	12610	7678	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	CROCKER CUT-OFF SPRING
A019593	12611	7679	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	LITTLE DIXIE SPRING
A019594	12612	7680	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	DOYLE SPRING
A019596	12614	7682	U S PLUMAS NATL FOREST	07/28/60	0.20	Plumas	JENKINS #3 SPRING
A019597	12615	7683	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	GRANITE SPRING
A019598	12616	7684	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	PLINCO SPRING
A019599	12617	7685	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	CHASE SPRING
A019600	12618	8062	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	COYOTE SPRING
A019601	12619	7686	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	SQUAW CAMP SPRING
A019602	12620	7687	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	HORSE SHOE SPRING
A019603	12621	7688	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	HORTON CANYON SPRING
A019604	12622	8063	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	JUNIPER SPRING

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
A019605	12623	7689	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	FITCH CANYON SPRING
A019606	12624	7690	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	MAHOGANY SPRING
A019607	12625	7691	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	JENKINS #2 SPRING
A019608	12626	8064	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	MIDWAY HOUSE SPRING
A019609	12627	7692	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	DOWNING CABIN SPRING
A019610	12628	7693	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	JUNIPER SPRING
A019611	12629	8065	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	HOG SPRING
A019612	12630	7694	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	JOHNSON MILL SPRING
A019613	12631	7695	U S PLUMAS NATL FOREST	07/28/60	0.70	Butte	SPOON RAVINE SPRING
A019614	12632	7696	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	LONE SPRING
A019615	12633	7697	U S PLUMAS NATL FOREST	07/28/60	0.40	Plumas	SECTION 15 SPRING
A019617	12635	7699	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	SQUAW SUPPRESSION CAMP SPRING
A019619	12637	8066	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	RATTLESNAKE SPRING
A019620	12638	8067	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	CEDAR SPRING
A019621	12639	8068	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	PINE TREE SPRING
A019622	12640	7700	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	GALEPPI SPRING
A019623	12641	7701	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	MURDOCK CROSSING SPRING
A019624	12642	7702	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	SQUAW VALLEY SPRING
A019625	12643	7703	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	BASS #1 SPRING
A019626	12644	7704	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	SOUTH TROUGH SPRING
A019627	12645	7710	U S PLUMAS NATL FOREST	07/28/60	0.70	Plumas	DAVIDSON MINE SPRING
A019628	12646	8305	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	SQUAW CANYON SPRING
A020852	13951	8617	U S PLUMAS NATL FOREST	07/12/62	1.60	Plumas	UNSP

Feather River - Post-1914 Appropriative Water Rights

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
A021295	14364	8995	U S PLUMAS NATL FOREST	05/29/63	0.20	Plumas	BLAKELESS SPRING #2
A021296	14365	8982	U S PLUMAS NATL FOREST	05/29/63	0.80	Plumas	CHASE ENCLOSURE SPRING #2
A021297	14366	8996	U S PLUMAS NATL FOREST	05/29/63	0.80	Plumas	CHASE ENCLOSURE SPRING #1
A021304	14367	8968	U S PLUMAS NATL FOREST	05/29/63	0.80	Plumas	BULSON SPRING NO 3
A021305	14368	8969	U S PLUMAS NATL FOREST	05/29/63	0.80	Plumas	BULSON SPRING NO 2
A021306	14369	8970	U S PLUMAS NATL FOREST	05/29/63	0.80	Plumas	BULSON SPRING NO 1
A021307	14370	8971	U S PLUMAS NATL FOREST	05/29/63	0.60	Plumas	BLAKELESS SPRING NO 4
A021308	14371	8972	U S PLUMAS NATL FOREST	05/29/63	0.30	Plumas	BLAKELESS SPRING NO 1
A021312	14372	8984	U S PLUMAS NATL FOREST	05/29/63	0.50	Plumas	BIG BUCK SPRING
A021313	14373	9004	U S PLUMAS NATL FOREST	05/29/63	1.70	Plumas	HEADQUARTERS SPRING #1, HEADQUARTERS SPRINGS #2&3
A021314	14244	8997	U S PLUMAS NATL FOREST	05/29/63	0.80	Plumas	TROSI CANYON SPRING
A021316	14374	8998	U S PLUMAS NATL FOREST	05/29/63	1.50	Plumas	BIG PINE SPRING
A021317	14375	8999	U S PLUMAS NATL FOREST	05/29/63	0.40	Plumas	CEDAR CANYON SPRING
A022187	15225	8986	U S PLUMAS NATL FOREST	06/10/65	0.10	Plumas	UNST
A024263	16728	10955	U S PLUMAS NATL FOREST	12/19/72	9.00	Plumas	UNSP
A026877	18796		U S PLUMAS NATL FOREST	06/17/81	42.00	Plumas	DOTTA CANYON
			U S PLUMAS NATL FOREST Total		720.60		
A019565	12818	9877	USA-USDA FOREST SERVICE	01/02/09	0.80	Plumas	UNNAMED SPRING
			USA-USDA FOREST SERVICE Total		0.80		
A020529	13891	9187	VERDA F LEE FAMILY DATED 4/11/2001	12/18/61	54.00	Plumas	UNSP
			VERDA F LEE FAMILY DATED 4/11/2001 Total		54.00		
A028992	20339		WALLACE FAMILY TRUST	03/20/87	184.00	Sierra	SIERRA VALLEY CHANNELS
			WALLACE FAMILY TRUST Total		184.00		
A011316	7110	3738	WAYNE RANKIN	05/20/53	108.60	Plumas	BERRY CREEK
			WAYNE RANKIN Total		108.60		
A014113	11518		Yuba County Water District	12/28/50	330,861.98	Butte, Sutter, Plumas	SOUTH FORK FEATHER RIVER, LOST CREEK, FEATHER RIVER

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
			Yuba County Water District Total		330,861.98		
			Grand Total		11,862,602.48		

Yuba River - Post-1914 Appropriative Water Rights

Application ID	Permit ID	License ID	Water Right Type	Status	Holder Name	Date	Face Amt	County	Source
A003126	1371	1140	Appropriative	Licensed	ALBERT P STIEFEL	11/08/22	87.10	Butte	UNST, WYMAN RAVINE
					ALBERT P STIEFEL Total		87.10		
A016725	10685	6660	Appropriative	Licensed	ALLEGHANY COUNTY WATER DISTRICT	04/18/02	12.00	Sierra	UNSP
					ALLEGHANY COUNTY WATER DISTRICT Total		12.00		
A016724	10441	7079	Appropriative	Licensed	ALLEN C UPTON	11/08/55	1.00	Butte	WYANDOTTE CREEK
					ALLEN C UPTON Total		1.00		
A028395	20887		Appropriative	Permitted	ALLEN F MOORE	02/22/85	3.00	Yuba	DRY CREEK, UNSP
					ALLEN F MOORE Total		3.00		
A025086	17517	11958	Appropriative	Licensed	ANANDA CHURCH OF SELF REALIZATION	06/16/76	43.20	Nevada	UNST
A028680	20373		Appropriative	Permitted	ANANDA CHURCH OF SELF REALIZATION	12/24/85	29.30	Nevada	UNST
					ANANDA CHURCH OF SELF REALIZATION Total		72.50		
A024824	17031	13124	Appropriative	Licensed	ANDERSON AND ANDERSON INC	06/25/75	25.00	Nevada	UNST
A027748	19166	13125	Appropriative	Licensed	ANDERSON AND ANDERSON INC	05/05/83	1.00	Nevada	UNST
					ANDERSON AND ANDERSON INC Total		26.00		
A028403	20927		Appropriative	Permitted	ANNA MAY ROSE	03/07/85	2.00	Yuba	DRY CREEK, UNST
					ANNA MAY ROSE Total		2.00		
A030234	21008		Appropriative	Permitted	AUBURN SKI CLUB INC	03/15/93	122.00	Nevada	UPPER CASTLE CREEK
					AUBURN SKI CLUB INC Total		122.00		
A025584	17400	11440	Appropriative	Licensed	Bank of America	11/29/77	9.60	Yuba	UNST
					Bank of America Total		9.60		
A006099	3220	1080	Appropriative	Licensed	BENJAMIN N BORSOFF	10/19/28	17.90	Yuba	EAST BRANCH RICH GULCH
					BENJAMIN N BORSOFF Total		17.90		
A018175	11802	6611	Appropriative	Licensed	BERNICE ROSENLOF	06/10/58	12.50	Nevada	UNST
					BERNICE ROSENLOF Total		12.50		
A019562	12917	7493	Appropriative	Licensed	BILL AABERG	07/20/60	0.30	Sierra	UNST
					BILL AABERG Total		0.30		
A024530	17274	11238	Appropriative	Licensed	BILLY G CAROTHERS	01/21/74	10.00	Nevada	SWEETLAND CREEK
					BILLY G CAROTHERS Total		10.00		
A020521	13657	8703	Appropriative	Licensed	BITNEY SPRINGS LLC	12/11/61	14.00	Nevada	UNST
					BITNEY SPRINGS LLC Total		14.00		
A026408	18310	12153	Appropriative	Licensed	BOB LATTA	06/06/80	0.80	Sierra	HOWARD CREEK, NORTH YUBA RIVER
					BOB LATTA Total		0.80		

Application ID	Permit ID	License ID	Water Right Type	Status	Holder Name	Date	Face Amt	County	Source
A005590	2913	814	Appropriative	Licensed	BRADLEY T SHARPE	07/01/27	2.20	Yuba	WEST BRANCH RICH GULCH
A005677	2914	815	Appropriative	Licensed	BRADLEY T SHARPE	09/07/27	18.10	Yuba	WEST BRANCH RICH GULCH
A006096	3218	1084	Appropriative	Licensed	BRADLEY T SHARPE	10/19/28	1.00	Yuba	WEST BRANCH RICH GULCH
A006097	3219	1085	Appropriative	Licensed	BRADLEY T SHARPE	10/19/28	17.90	Yuba	WEST BRANCH RICH GULCH
					BRADLEY T SHARPE Total		39.20		
A020485	13927	8368	Appropriative	Licensed	Brian Brackbill	11/08/61	0.60	Sierra	Unnamed Stream
					Brian Brackbill Total		0.60		
A019560	12915	7492	Appropriative	Licensed	BRIAN G JACOBS	07/20/60	0.20	Sierra	UNST
					BRIAN G JACOBS Total		0.20		
A008986	5083	2182	Appropriative	Licensed	BROWNS VALLEY IRRIGATION DISTRICT	03/01/41	2,171.90	Yuba	TENNESSEE CREEK
A013130	8649	13608	Appropriative	Licensed	BROWNS VALLEY IRRIGATION DISTRICT	08/31/05	20,000.00	Yuba	DRY CREEK
A013873	9703	13609	Appropriative	Licensed	BROWNS VALLEY IRRIGATION DISTRICT	08/31/05	31,900.00	Yuba	DRY CREEK
A023757	16792	13610	Appropriative	Licensed	BROWNS VALLEY IRRIGATION DISTRICT	08/31/05	11,000.00	Yuba	DRY CREEK
					BROWNS VALLEY IRRIGATION DISTRICT Total		65,071.90		
A023135	15964	10995	Appropriative	Licensed	BRUCE K JORDAN	09/18/68	0.90	Nevada	UNSP
					BRUCE K JORDAN Total		0.90		
A024293	16636	10700	Appropriative	Licensed	BRUCE L RAYNER	01/30/73	1.80	Nevada	MOSQUITO CREEK
					BRUCE L RAYNER Total		1.80		
A029103	20530	13712	Appropriative	Licensed	CAL-WESTERN RECONVEYANCE CORPORATION	05/09/07	6.70	Butte	ROBINSON RAVINE
					CAL-WESTERN RECONVEYANCE CORPORATION Total		6.70		
A013870	8369	4804	Appropriative	Licensed	CALIF DEPT OF FORESTRY AND FIRE PROTECTION	07/27/50	2.40	Nevada	UNSP
					CALIF DEPT OF FORESTRY AND FIRE PROTECTION Total		2.40		
A020427	13564	7019	Appropriative	Licensed	CAROL BROOKS	10/05/61	0.60	Sierra	UNSP
					CAROL BROOKS Total		0.60		
A016874	10804	9323	Appropriative	Licensed	CAROL B DARDICK	01/31/56	21.40	Nevada	UNST
					CAROL B DARDICK Total		21.40		
A019282	12436	7169	Appropriative	Licensed	CATHOLIC YOUTH ORGANIZATION	03/04/60	3.40	Yuba	UNSP
					CATHOLIC YOUTH ORGANIZATION Total		3.40		
A024183	16604	10883	Appropriative	Licensed	CHARLES FOWLER	09/15/72	0.10	Nevada	LEFT OVER SPRING
					CHARLES FOWLER Total		0.10		
A024559	16997	13267	Appropriative	Licensed	CHARLES A JOHNSON	02/21/74	2.20	Nevada	UNSP

Application ID	Permit ID	License ID	Water Right Type	Status	Holder Name	Date	Face Amt	County	Source
					CHARLES A JOHNSON Total		2.20		
A028191	20013		Appropriative	Permitted	CHEROKEE NEVADA CORPORATION	11/21/94	1,445.00	Sierra	UNST
					CHEROKEE NEVADA CORPORATION Total		1,445.00		
A019561	12916	7540	Appropriative	Licensed	CHRISTIAN HUNTINGTON	07/20/60	0.20	Sierra	UNST
					CHRISTIAN HUNTINGTON Total		0.20		
A014960	9302	7082	Appropriative	Licensed	Christopher W Miller	08/12/52	0.40	Placer	UNSP
					Christopher W Miller Total		0.40		
A026117	18434	12293	Appropriative	Licensed	CITY OF NEVADA CITY	10/17/79	53.70	Nevada	LITTLE DEER CREEK, UNST
					CITY OF NEVADA CITY Total		53.70		
A021158	14239	9010	Appropriative	Licensed	CONSTANCE C CLOVER	02/13/63	1.00	Sierra	UNSP
					CONSTANCE C CLOVER Total		1.00		
A005880	3102	2172	Appropriative	Licensed	COUGHLAN FAMILY RANCH	04/16/28	1,013.60	Nevada	BONNIE RAVINE, GLENNON RAVINE, ROBERTS CREEK
					COUGHLAN FAMILY RANCH Total		1,013.60		
A023111	15803	10206	Appropriative	Licensed	CRAIG LABADIE	08/13/68	0.80	Sierra	UNST
					CRAIG LABADIE Total		0.80		
A004731	2393	735	Appropriative	Licensed	CYRUS M ROLLINS	08/12/25	2.40	Sierra	UNSP
A006120	3232	1309	Appropriative	Licensed	CYRUS M ROLLINS	11/13/28	1.70	Sierra	UNST
					CYRUS M ROLLINS Total		4.10		
A023082	15977	10901	Appropriative	Licensed	DAN T THOMPSON	07/10/68	10.20	Nevada	KENTUCKY RAVINE
					DAN T THOMPSON Total		10.20		
A021554	14793	9832	Appropriative	Licensed	DANIEL MASON	11/27/63	18.00	Nevada	FRENCH CORRAL CREEK
					DANIEL MASON Total		18.00		
A021672	14830	9700	Appropriative	Licensed	DANIEL J GUYER	03/05/64	140.00	Sierra	UNST
					DANIEL J GUYER Total		140.00		
A017285	11045	7214	Appropriative	Licensed	DAVE KING	09/20/56	37.00	Nevada	KENTUCKY RAVINE
					DAVE KING Total		37.00		
A019710	12873	10129	Appropriative	Licensed	David Grenell	08/24/60	1.10	Sierra	THOMAS ELLIS SPRING #3, THOMAS ELLIS SPRING #4
					David Grenell Total		1.10		
A023514	16108	10245	Appropriative	Licensed	DAVID HERSHBERGER	05/20/70	0.30	Nevada	UNSP
A026065	17908	12157	Appropriative	Licensed	DAVID HERSHBERGER	08/14/79	0.60	Nevada	UNSP
					DAVID HERSHBERGER Total		0.90		
A019025	12515	7832	Appropriative	Licensed	DAVID RUMSEY	10/09/59	0.20	Sierra	UNSP
					DAVID RUMSEY Total		0.20		
A020313	13946	8660	Appropriative	Licensed	DAVID WALSH	07/21/61	0.20	Sierra	UNST
					DAVID WALSH Total		0.20		
A022928	15954	10996	Appropriative	Licensed	DAVID B JORDON	10/13/67	0.90	Nevada	UNSP
					DAVID B JORDON Total		0.90		
A027876	19125	12696	Appropriative	Licensed	DAVID B PEDERSON	09/15/83	1.40	Yuba	UNST
					DAVID B PEDERSON Total		1.40		
A016558	11367	8127	Appropriative	Licensed	DAVID C BREWER	08/29/55	4.20	Nevada	LITTLE ROCK CREEK
					DAVID C BREWER Total		4.20		

Application ID	Permit ID	License ID	Water Right Type	Status	Holder Name	Date	Face Amt	County	Source
A022898	15669	11110	Appropriative	Licensed	DAVID K DAVISON	08/28/67	4.70	Sierra	HUNGRY MOUTH CANYON
					DAVID K DAVISON Total		4.70		
A025105	17076	11251	Appropriative	Licensed	DAVID W MARKS	07/19/76	11.00	Nevada	KENTUCKY RAVINE
					DAVID W MARKS Total		11.00		
A021598	14416	8825	Appropriative	Licensed	DAWN B VINJE	01/15/64	18.00	Yuba	UNST
					DAWN B VINJE Total		18.00		
A019390	12911	8810	Appropriative	Licensed	DENISE STEBLER	04/26/60	1.60	Sierra	ROCK CREEK
					DENISE STEBLER Total		1.60		
A022566	15575	9896	Appropriative	Licensed	DIANE W ROLLINS	04/14/72	20.00	Sierra	DRURY RAVINE
					DIANE W ROLLINS Total		20.00		
A010009	5687	4866	Appropriative	Licensed	DICKEY EXPLORATION COMPANY	09/23/40	97.00	Sierra	WET RAVINE
					DICKEY EXPLORATION COMPANY Total		97.00		
A023535	16409	11027	Appropriative	Licensed	DIRK C REED	06/24/70	15.70	Nevada	UNST, WILLOW VALLEY CREEK
					DIRK C REED Total		15.70		
A030332	21118		Appropriative	Permitted	DONNER SUMMIT PUBLIC UTILITY DISTRICT	02/08/94	664.00	Nevada	LAKE ANGELA
					DONNER SUMMIT PUBLIC UTILITY DISTRICT Total		664.00		
A025719	17610	12075	Appropriative	Licensed	DOROTHEA SELBY	04/17/78	13.50	Yuba	UNST
					DOROTHEA SELBY Total		13.50		
A028988	20947		Appropriative	Permitted	Dorothy Pencik	03/16/87	24.00	Sierra	OAK VALLEY CREEK
					Dorothy Pencik Total		24.00		
A020808	13929	8700	Appropriative	Licensed	DOROTHY L VENDLEY	07/19/68	9.20	Nevada	SPRING CREEK
					DOROTHY L VENDLEY Total		9.20		
A009827	5663	2650	Appropriative	Licensed	DOWNIEVILLE PUBLIC UTILITY DISTRICT	05/15/01	114.00	Sierra	PAULEY CREEK
					DOWNIEVILLE PUBLIC UTILITY DISTRICT Total		114.00		
A026227	17973	11822	Appropriative	Licensed	DUANE FRED LEE	02/21/80	2.60	Nevada	UNST
					DUANE FRED LEE Total		2.60		
A022735	15630	10005	Appropriative	Licensed	DUANE T NICHOLSON	03/05/73	4.50	Yuba	UNST
					DUANE T NICHOLSON Total		4.50		
A020146	13371	8148	Appropriative	Licensed	DWAYNE M DOBBINS	05/24/61	0.20	Nevada	UNSP
					DWAYNE M DOBBINS Total		0.20		
A024876	17136	11423	Appropriative	Licensed	EDWARD CARTER	09/10/75	2.20	Yuba	UNST
					EDWARD CARTER Total		2.20		
A020291	13386	9922	Appropriative	Licensed	ELLEN DAVIS	05/12/72	102.00	Yuba	LITTLE DRY CREEK
					ELLEN DAVIS Total		102.00		
A015415	9591	5978	Appropriative	Licensed	Eric Christopher Dunisch	07/16/53	0.40	Placer	UNSP
					Eric Christopher Dunisch Total		0.40		
A013594	7966	4185	Appropriative	Licensed	ERMA B BELLETT	02/20/50	61.00	Nevada	UNST

Application ID	Permit ID	License ID	Water Right Type	Status	Holder Name	Date	Face Amt	County	Source
A013772	8313	4184	Appropriative	Licensed	ERMA B BELLETT	06/05/50	19.00	Nevada	UNST
					ERMA B BELLETT Total		80.00		
A019723	13031	9257	Appropriative	Licensed	ERNEST LOCATELLI	08/31/60	6.50	Sierra	MINE TUNNEL
					ERNEST LOCATELLI Total		6.50		
A020340	13854	8677	Appropriative	Licensed	Estate of Luella Debruin	08/02/61	4.90	Nevada	FRENCH CORRAL CREEK, UNST
A022900	15557	10027	Appropriative	Licensed	Estate of Luella Debruin	09/01/67	5.30	Nevada	UNST
					Estate of Luella Debruin Total		10.20		
A003332	1725	3267	Appropriative	Licensed	FAR VIEW ENTERPRISES INC	03/27/23	191.90	Butte	KINGS CREEK, LINCOLN HOUSE RAVINE
A016151	10611	7713	Appropriative	Licensed	FAR VIEW ENTERPRISES INC	11/23/54	50.00	Butte	LINCOLN HOUSE RAVINE
					FAR VIEW ENTERPRISES INC Total		241.90		
A017887	11400	6918	Appropriative	Licensed	FELLOWSHIP OF FRIENDS, INC	11/20/57	2.40	Yuba	UNST
A022518	15590	9584	Appropriative	Licensed	FELLOWSHIP OF FRIENDS, INC	07/06/66	3.20	Yuba	UNST
A025865	17749	13546	Appropriative	Licensed	FELLOWSHIP OF FRIENDS, INC	07/17/03	40.00	Yuba	WOODS CREEK
A027042	19277	13547	Appropriative	Licensed	FELLOWSHIP OF FRIENDS, INC	07/17/03	16.00	Yuba	UNST
A027043	19278	13548	Appropriative	Licensed	FELLOWSHIP OF FRIENDS, INC	07/17/03	42.00	Yuba	WOODS CREEK
					FELLOWSHIP OF FRIENDS, INC Total		103.60		
A007217	4420	2197	Appropriative	Licensed	FLORENCE B VON PLATEN	03/28/32	9.50	Nevada	UNXX
					FLORENCE B VON PLATEN Total		9.50		
A020310	13945	8349	Appropriative	Licensed	FORREST THOMAS	07/19/61	0.60	Sierra	UNSP
					FORREST THOMAS Total		0.60		
A010186	5823	2957	Appropriative	Licensed	FORSYTHE FAMILY TRUST	04/18/41	3.40	Sierra	UNSP
					FORSYTHE FAMILY TRUST Total		3.40		
A019007	12872	10128	Appropriative	Licensed	FRANCIS B PLANT	09/29/59	1.80	Sierra	SPRING #3, THOMAS ELLIS SPRING #1, THOMAS ELLIS SPRING #2, UNSP
					FRANCIS B PLANT Total		1.80		
A028922	20946		Appropriative	Permitted	Frank Pencik	10/20/86	6.00	Sierra	OAK VALLEY CREEK
					Frank Pencik Total		6.00		
A016792B	10815	008072B	Appropriative	Licensed	FRANK A MACHI	12/06/85	4.70	Nevada	UNST
					FRANK A MACHI Total		4.70		
A023956	16404	12058	Appropriative	Licensed	FRANKLIN JONES	12/30/71	0.60	Nevada	UNST

Application ID	Permit ID	License ID	Water Right Type	Status	Holder Name	Date	Face Amt	County	Source
					FRANKLIN JONES Total		0.60		
A012154	7067	7040	Appropriative	Licensed	Gary J. Howsley	11/14/47	120.10	Yuba	LITTLE DRY CREEK
					Gary J. Howsley Total		120.10		
A019827	14390	9729	Appropriative	Licensed	GARY POOR	04/08/71	5.30	Sierra	UNST
					GARY POOR Total		5.30		
A009765	5532	4921	Appropriative	Licensed	GARY ZOLLDAN	11/09/39	1.50	Sierra	HARDY SPRING
					GARY ZOLLDAN Total		1.50		
A014371	9978	5645	Appropriative	Licensed	GARY D SMITH	06/27/51	2,903.80	Yuba	FRENCH DRY CREEK
					GARY D SMITH Total		2,903.80		
A017407	11040	6917	Appropriative	Licensed	GARY W DE MAR	12/26/56	72.50	Sierra	ARIZONA TUNNEL SPRING
					GARY W DE MAR Total		72.50		
A022567	15585	9649	Appropriative	Licensed	GEORGE KOOLERY	09/02/66	1.90	Sierra	UNSP
					GEORGE KOOLERY Total		1.90		
A022341	15153	9652	Appropriative	Licensed	GEORGINE TOMASI	11/23/65	0.80	Nevada	UNST
					GEORGINE TOMASI Total		0.80		
A023893	16447	10718	Appropriative	Licensed	GERALD BROOKS	10/07/71	16.00	Nevada	OWL CREEK
					GERALD BROOKS Total		16.00		
A002696	1200	511	Appropriative	Licensed	GOLD LAKE HOLDINGS LLC	12/21/21	3.00	Sierra	UNCR
					GOLD LAKE HOLDINGS LLC Total		3.00		
A028147	19447		Appropriative	Permitted	GREENE ACRES PROPERTY OWNERS ASSOCIATION	06/04/84	14.00	Sierra	UNSP
					GREENE ACRES PROPERTY OWNERS ASSOCIATION Total		14.00		
A026763	18953	12672	Appropriative	Licensed	GREGORY G KSANDER	03/25/81	0.20	Sierra	UNSP
					GREGORY G KSANDER Total		0.20		
A023470	16259	10568	Appropriative	Licensed	GREGORY L COMBS	03/19/70	5.40	Nevada	UNST
					GREGORY L COMBS Total		5.40		
A015100	9828	5683	Appropriative	Licensed	GUS NORTON	12/01/52	0.80	Sierra	UNST
					GUS NORTON Total		0.80		
A026703	18532	12361	Appropriative	Licensed	Heidi Biber	02/03/81	1.20	Nevada	UNST
					Heidi Biber Total		1.20		
A014962	9304	5295	Appropriative	Licensed	HELENE M WULBERN REVOCABLE TRUST 11/21/02	08/12/52	0.20	Placer	UNSP
					HELENE M WULBERN REVOCABLE TRUST 11/21/02 Total		0.20		
A014390A	008798A	007078A	Appropriative	Licensed	HENRY C LITTLE	07/31/92	20.00	Butte	WYANDOTTE CREEK
					HENRY C LITTLE Total		20.00		
A020243	13943	8370	Appropriative	Licensed	Hilary Winslow	06/01/61	0.60	Sierra	UNSP
					Hilary Winslow Total		0.60		
A030265	20863		Appropriative	Permitted	HOLT FAMILY TRUST	07/07/93	7.00	Sierra	UNST
					HOLT FAMILY TRUST Total		7.00		
A026949	18911	12397	Appropriative	Licensed	HUEY JOHNSON	08/10/81	0.20	Nevada	UNST
					HUEY JOHNSON Total		0.20		

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A028682	20102		Appropriative	Permitted	HUTCH H HUTCHISON	12/26/85	0.50	Nevada	UNSP
					HUTCH H HUTCHISON Total		0.50		
A010716	6336	3002	Appropriative	Licensed	IRVING N CHRISTENSEN	10/05/43	7.80	Sierra	UNSP
A019279	12546	7168	Appropriative	Licensed	IRVING N CHRISTENSEN	03/04/60	4.50	Sierra	UNSP
					IRVING N CHRISTENSEN Total		12.30		
A011257	6539	3342	Appropriative	Licensed	JACK E BERNDT	01/10/46	4.30	Sierra	UNSP, UNST
					JACK E BERNDT Total		4.30		
A014991	9201	5305	Appropriative	Licensed	JAMES NEWMAN	08/22/52	2.20	Nevada	UNST
					JAMES NEWMAN Total		2.20		
A012118	7160	3884	Appropriative	Licensed	James & Aileen Stevens Revocable Trust	10/03/47	15.00	Yuba	LITTLE DRY CREEK
A014946	9652	5084	Appropriative	Licensed	James & Aileen Stevens Revocable Trust	07/31/52	11.00	Yuba	LITTLE DRY CREEK
					James & Aileen Stevens Revocable Trust Total		26.00		
A019647	12870	8606	Appropriative	Licensed	JAMES K CHRISTENSEN	08/04/60	27.80	Sierra	EMPIRE SPRING
					JAMES K CHRISTENSEN Total		27.80		
A018804	12160	8625	Appropriative	Licensed	JAMES L MOHAN	06/17/59	1.00	Yuba	MOONSHINE CREEK
					JAMES L MOHAN Total		1.00		
A010181	6026	2944	Appropriative	Licensed	James M & Aileen Stevens Rev Tr	04/09/41	98.70	Yuba	LITTLE DRY CREEK
					James M & Aileen Stevens Rev Tr Total		98.70		
A026522	18513	12362	Appropriative	Licensed	JAMES NELSON DEGLANDON	09/11/80	24.00	Nevada	UNST
					JAMES NELSON DEGLANDON Total		24.00		
A026282	18202	12016	Appropriative	Licensed	JAMES R CUMMINS	04/09/80	6.10	Yuba	UNST
					JAMES R CUMMINS Total		6.10		
A021865	14988	8879	Appropriative	Licensed	JAMES S AVILLA	08/05/64	0.30	Placer	UNSP
					JAMES S AVILLA Total		0.30		
A010839	6383	3431	Appropriative	Licensed	Jana Burgess-Henry	07/15/44	29.00	Yuba	WAGNER CREEK
					Jana Burgess-Henry Total		29.00		
A013342	8218	4055	Appropriative	Licensed	Janie Kouch	09/08/49	1.20	Yuba	SOUTH HONCUT CREEK
					Janie Kouch Total		1.20		
A024799	17750	12294	Appropriative	Licensed	JAY CORY	04/14/75	0.20	Sierra	UNSP
					JAY CORY Total		0.20		
A021644	14628	9333	Appropriative	Licensed	JENISE J WARDEN	02/13/64	0.40	Nevada	UNSP
					JENISE J WARDEN Total		0.40		
A010856	6542	3299	Appropriative	Licensed	JERRY DON ELLSWORTH	03/14/01	57.00	Sierra	FIDDLE CREEK
					JERRY DON ELLSWORTH Total		57.00		
A025403	17354	11466	Appropriative	Licensed	JESSIE C TROST	06/23/77	0.10	Yuba	UNST
					JESSIE C TROST Total		0.10		
A020770	14744	9239	Appropriative	Licensed	JO HAMILTON	05/10/62	2.00	Nevada	UNSP (2)
					JO HAMILTON Total		2.00		
A021970	14989	8881	Appropriative	Licensed	JOAN M HANSON	11/23/64	1.00	Placer	UNSP
					JOAN M HANSON Total		1.00		
A025503	18013	13383	Appropriative	Licensed	JOE W ALEXANDER	09/12/77	49.90	Yuba	UNST
A026515A	018442A	13384	Appropriative	Licensed	JOE W ALEXANDER	02/05/92	5.20	Yuba	UNST

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A026515B	018422B	13385	Appropriative	Licensed	JOE W ALEXANDER	02/05/92	6.00	Yuba	UNST
					JOE W ALEXANDER Total		61.10		
A006057	3283	2041	Appropriative	Licensed	JOHN BARKER	09/17/28	5.10	Sierra	UNSP
					JOHN BARKER Total		5.10		
A025542	17408	11250	Appropriative	Licensed	JOHN FARACE	10/27/77	1.80	Yuba	KEYSTONE CREEK
					JOHN FARACE Total		1.80		
A018696	12090	7389	Appropriative	Licensed	JOHN A PARKER	05/07/59	0.20	Sierra	UNST
					JOHN A PARKER Total		0.20		
A013656	8167	5234	Appropriative	Licensed	JOHN H LUNDIN	03/28/50	1.60	Yuba	UNST
					JOHN H LUNDIN Total		1.60		
A026073	18076	12085	Appropriative	Licensed	JOHN R POWERS III & JANEY H POWERS REVOC TRUST DATED 9/6/00	08/24/79	4.20	Nevada	UNST
					JOHN R POWERS III & JANEY H POWERS REVOC TRUST DATED 9/6/00 Total		4.20		
A017288	10935	6019	Appropriative	Licensed	JOHN T SMEE	09/21/56	0.10	Sierra	UNST
					JOHN T SMEE Total		0.10		
A010173	5777	4026	Appropriative	Licensed	JOSEPH E MARCANTONIO	03/29/41	36.50	Sierra	SLATE CASTLE RAVINE
A018484	11894	6979	Appropriative	Licensed	JOSEPH E MARCANTONIO	01/21/59	0.50	Sierra	SLATE CASTLE CREEK
					JOSEPH E MARCANTONIO Total		37.00		
A012700	7530	3719	Appropriative	Licensed	JULI SHAPIRO-ABDEEN	09/15/48	25.00	Nevada	UNST
					JULI SHAPIRO-ABDEEN Total		25.00		
A016732	11900	6537	Appropriative	Licensed	JUNE BURCHAM WILHELM	11/10/55	0.50	Nevada	UNXX
					JUNE BURCHAM WILHELM Total		0.50		
A019448	13768	8041	Appropriative	Licensed	KATHARINE SPIERS	05/24/60	42.00	Yuba	UNST
					KATHARINE SPIERS Total		42.00		
A018914	12417	7415	Appropriative	Licensed	Katherine Greene	08/14/59	17.00	Yuba	GARDEN RAVINE
					Katherine Greene Total		17.00		
A020792	14164	8897	Appropriative	Licensed	KATHLEEN H GOLDEN	05/25/62	0.20	Sierra	UNSP
					KATHLEEN H GOLDEN Total		0.20		
A014740	9017	5273	Appropriative	Licensed	KEITH L DOLAR	04/04/52	85.30	Butte	UNST
					KEITH L DOLAR Total		85.30		
A026245	18702	12528	Appropriative	Licensed	KEN BURKINDINE	03/04/80	0.40	Sierra	UNST
					KEN BURKINDINE Total		0.40		
A027819	19238	12680	Appropriative	Licensed	KEVIN HOMAN	08/04/83	2.00	Nevada	UNST
					KEVIN HOMAN Total		2.00		
A008330	4661	1928	Appropriative	Licensed	KIM HEMSTALK	05/04/35	5.00	Sierra	COYOTE RAVINE
					KIM HEMSTALK Total		5.00		
A023315	16073		Appropriative	Permitted	KINGVALE PROPERTY OWNERS & WATER USERS INC	07/18/69	20.00	Nevada	FOCHETTI SPRING, LOLA MONTEZ SPRING, S P SPRING
					KINGVALE PROPERTY OWNERS & WATER USERS INC Total		20.00		
A026074	18088		Appropriative	Permitted	LA PORTE PINES COUNTRY CLUB	08/24/79	55.00	Plumas	UNSP, UNSP(2), UNST

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A027273	18597		Appropriative	Permitted	LA PORTE PINES COUNTRY CLUB	09/17/02	54.80	Plumas	UNSP
					LA PORTE PINES COUNTRY CLUB Total		109.80		
A004494	2081	781	Appropriative	Licensed	LAKE VERA MUTUAL WATER COMPANY	03/06/25	70.00	Nevada	ROCK CREEK
A005719	2979	782	Appropriative	Licensed	LAKE VERA MUTUAL WATER COMPANY	10/13/27	729.90	Nevada	ROCK CREEK
					LAKE VERA MUTUAL WATER COMPANY Total		799.90		
A023047	15779	10779	Appropriative	Licensed	LAKE WILDWOOD ASSOCIATION	05/17/68	3,840.00	Nevada	DEER CREEK
					LAKE WILDWOOD ASSOCIATION Total		3,840.00		
A007657	4239	6379	Appropriative	Licensed	LANCE BARLEAN	08/28/33	3.40	Yuba	UNSP
					LANCE BARLEAN Total		3.40		
A028134	20886	13842	Appropriative	Licensed	LEAH M STOCKER	11/08/11	5.00	Yuba	UNST
					LEAH M STOCKER Total		5.00		
A018396	11929	7012	Appropriative	Licensed	LEONARD C FUQUA	11/05/58	0.20	Sierra	COLD SPRING
					LEONARD C FUQUA Total		0.20		
A029180	20522		Appropriative	Permitted	LINDA BATES	03/19/02	5.00	Sierra	GRIZZLY GULCH
					LINDA BATES Total		5.00		
A026605	18765	13817	Appropriative	Licensed	LINDA BIRGE	01/05/11	45.00	Nevada	UNST
					LINDA BIRGE Total		45.00		
A024857	17681	12173	Appropriative	Licensed	LOUIS CLIFFORD LESTER SR	08/14/75	14.50	Nevada	UNST
					LOUIS CLIFFORD LESTER SR Total		14.50		
A012025	7313	6960	Appropriative	Licensed	LOWELL G ROBINSON	08/05/47	0.30	Sierra	UNSP
					LOWELL G ROBINSON Total		0.30		
A022801	15654	10430	Appropriative	Licensed	MAPLE GROVE MUTUAL WATER COMPANY	06/05/67	1.10	Sierra	CEDAR SPRING
A023795	16373		Appropriative	Permitted	MAPLE GROVE MUTUAL WATER COMPANY	06/02/71	10.00	Sierra	UNSP, WIXON SPRING
					MAPLE GROVE MUTUAL WATER COMPANY Total		11.10		
A006834	3665	1878	Appropriative	Licensed	MARIE BERTILLION COLLINS	11/19/30	0.70	Sierra	UNSP
A024808	16940	11499	Appropriative	Licensed	MARIE BERTILLION COLLINS	05/07/75	0.70	Sierra	UNSP
A026189	18266		Appropriative	Permitted	MARIE BERTILLION COLLINS	01/08/99	2.00	Sierra	UNSP
					MARIE BERTILLION COLLINS Total		3.40		
A018779	12139	8117	Appropriative	Licensed	MARIE M LANDERS	06/09/59	0.30	Sierra	UNSP
					MARIE M LANDERS Total		0.30		
A013399	8022	3796	Appropriative	Licensed	MARIN COUNCIL BOY SCOUT TRUST FUND #2	10/13/49	42.50	Nevada	CHUBB LAKE
					MARIN COUNCIL BOY SCOUT TRUST FUND #2 Total		42.50		
A014959	9301	5983	Appropriative	Licensed	MARK MOORE	08/12/52	0.40	Placer	UNSP
					MARK MOORE Total		0.40		
A015345	9575	5185	Appropriative	Licensed	MARK ROTH	06/09/58	0.10	Placer	UNSP

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					MARK ROTH Total		0.10		
A018079	11547	6800	Appropriative	Licensed	MARTIN FAMILY TRUST	04/02/58	3.70	Nevada	UNST
					MARTIN FAMILY TRUST Total		3.70		
A027000	18773	13792	Appropriative	Licensed	MAURICE ALTSHULER	05/28/09	20.00	Nevada	UNST
A030728	21195	13793	Appropriative	Licensed	MAURICE ALTSHULER	05/28/09	6.00	Nevada	UNST
					MAURICE ALTSHULER Total		26.00		
A021251	14195	9944	Appropriative	Licensed	MICHAEL CIAFARDONI	04/22/63	17.00	Nevada	UNST
					MICHAEL CIAFARDONI Total		17.00		
A025891	17758	11770	Appropriative	Licensed	MICHAEL K SCHARF	12/26/78	1.70	Nevada	UNST
					MICHAEL K SCHARF Total		1.70		
A009750	5462	3069	Appropriative	Licensed	MILTON R HOLSTROM	10/13/39	726.00	Sierra	EMPIRE CREEK, UNSP
					MILTON R HOLSTROM Total		726.00		
A024730	17134	11755	Appropriative	Licensed	Modern Building Inc.	12/20/74	25.00	Butte	UNST
					Modern Building Inc. Total		25.00		
A001270	2082	12795	Appropriative	Licensed	NEVADA IRRIGATION DISTRICT	07/10/91	130,701.50	Nevada	CANYON CREEK, FALL CREEK, JACKSON CREEK, TEXAS CREEK, TRAP CREEK
A001614	1481		Appropriative	Permitted	NEVADA IRRIGATION DISTRICT	01/08/20	60,000.00	Nevada	DEER CREEK
A001615	5801	8808	Appropriative	Licensed	NEVADA IRRIGATION DISTRICT	01/08/20	36,496.40	Nevada	DEER CREEK, SOUTH FORK DEER CREEK
A002276	2085	12797	Appropriative	Licensed	NEVADA IRRIGATION DISTRICT	03/25/21	60,000.00	Nevada, Sierra	MIDDLE YUBA RIVER
A005193	13770		Appropriative	Permitted	NEVADA IRRIGATION DISTRICT	09/08/26	50,000.00	Nevada, Sierra	MIDDLE YUBA RIVER (@ MILTON DAM), MIDDLE YUBA RIVER (@JACKSON MEADOWS DAM)
A006702	5807	12800	Appropriative	Licensed	NEVADA IRRIGATION DISTRICT	06/16/30	4,889.30	Nevada	CLEAR CREEK, FALL CREEK, TRAP CREEK
A008180	5815		Appropriative	Permitted	NEVADA IRRIGATION DISTRICT	11/27/34	207,894.90	Nevada	CLEAR CREEK, FALL CREEK, RUCKER CREEK, TEXAS CREEK, TRAP CREEK
A020017	13772		Appropriative	Permitted	NEVADA IRRIGATION DISTRICT	03/06/61	101,160.00	Nevada	SOUTH YUBA RIVER
					NEVADA IRRIGATION DISTRICT Total		651,142.10		
A014961	9303	6158	Appropriative	Licensed	NORMAN R PICKLES	08/12/52	0.40	Placer	UNSP
					NORMAN R PICKLES Total		0.40		
A013957	11516		Appropriative	Permitted	North Yuba Water District	08/18/58	145,084.30	Plumas, Yuba	SLATE CREEK
					North Yuba Water District Total		145,084.30		

Application ID	Permit ID	License ID	Water Right Type	Status	Holder Name	Date	Face Amt	County	Source
A013959	8944	4700	Appropriative	Licensed	O'Brien Ranch LLC	09/21/50	983.80	Butte, Yuba	SOUTH HONCUT CREEK
					O'Brien Ranch LLC Total		983.80		
A018565	12005	6754	Appropriative	Licensed	OLIVER G MILHOUS	03/03/59	20.00	Nevada	UNST
					OLIVER G MILHOUS Total		20.00		
A000481	203	368	Appropriative	Licensed	ORIGINAL SIXTEEN TO ONE MINE, INC	07/31/24	724.00	Sierra	BUCKEYE RAVINE
A001193	562	121	Appropriative	Licensed	ORIGINAL SIXTEEN TO ONE MINE, INC	02/25/19	362.00	Sierra	UNSP
					ORIGINAL SIXTEEN TO ONE MINE, INC Total		1,086.00		
A013689	8312	3836	Appropriative	Licensed	OSHA B READER	04/14/50	49.60	Sierra	UNST
A018928	12203	6983	Appropriative	Licensed	OSHA B READER	08/20/59	1.70	Sierra	UNSP
					OSHA B READER Total		51.30		
A011120	6599	3392	Appropriative	Licensed	OSTROM FAMILY TRUST	07/27/45	12.00	Sierra	UNSP
A011501	6713	3393	Appropriative	Licensed	OSTROM FAMILY TRUST	08/07/46	38.20	Sierra	UNSP
A017135	10850	6922	Appropriative	Licensed	OSTROM FAMILY TRUST	06/14/56	0.20	Sierra	UNSP
A017137	10852	5981	Appropriative	Licensed	OSTROM FAMILY TRUST	06/14/56	0.10	Sierra	UNSP
A018782	12221		Appropriative	Permitted	OSTROM FAMILY TRUST	10/02/01	40.10	Sierra	ANDERSON SPRING
A023778	16372		Appropriative	Permitted	OSTROM FAMILY TRUST	05/04/71	24.10	Sierra	UNSP, WIXON SPRING
					OSTROM FAMILY TRUST Total		114.70		
A024165	16758	11081	Appropriative	Licensed	PACIFIC EDGE INC	08/30/72	9.00	Yuba	UNST
					PACIFIC EDGE INC Total		9.00		
A015542	9622	5189	Appropriative	Licensed	PAUL F BUKENHOFER	09/17/53	72.50	Yuba	UNST
					PAUL F BUKENHOFER Total		72.50		
A020823	13820	8729	Appropriative	Licensed	PAULA M SCHROEDER	06/20/62	0.60	Sierra	UNSP
					PAULA M SCHROEDER Total		0.60		
A018176	11803	8201	Appropriative	Licensed	PHILIP PERSONENI	06/10/58	91.70	Nevada	SHADY CREEK
					PHILIP PERSONENI Total		91.70		
A024842	17048	11439	Appropriative	Licensed	PHILIP J SIMMONS	07/22/75	1.00	Sierra	UNST
					PHILIP J SIMMONS Total		1.00		
A009617	5497	2705	Appropriative	Licensed	PONTA, MELVIN J & MARCELLA M 1984 REVOCABLE TRUST	09/26/44	39.80	Sierra	WOODRUFF CREEK
A011994	7054	3526	Appropriative	Licensed	PONTA, MELVIN J & MARCELLA M 1984 REVOCABLE TRUST	07/16/47	1.60	Sierra	UNSP
					PONTA, MELVIN J & MARCELLA M 1984 REVOCABLE TRUST Total		41.40		
A027638	18933	12446	Appropriative	Licensed	R MARILYN WILSON	01/24/83	2.00	Nevada	KENTUCKY RAVINE
					R MARILYN WILSON Total		2.00		
A018368	11988	8848	Appropriative	Licensed	RAENNE A KALFSBEEK	10/10/58	3.70	Yuba	GOLDEN GATE RAVINE
					RAENNE A KALFSBEEK Total		3.70		
A008343	4680	1903	Appropriative	Licensed	RAINBOW HOLDING COMPANY, LTD	05/25/35	112.90	Placer	UNSP
					RAINBOW HOLDING COMPANY, LTD Total		112.90		
A025997	18129	12158	Appropriative	Licensed	RAMON HERNANDEZ	05/16/79	15.00	Yuba	UNST
					RAMON HERNANDEZ Total		15.00		
A017934	11550	6977	Appropriative	Licensed	RAY COLAIZZI	01/06/58	0.80	Sierra	INDEPENDENCE CREEK

Application ID	Permit ID	License ID	Water Right Type	Status	Holder Name	Date	Face Amt	County	Source
					RAY COLAIZZI Total		0.80		
A022395	15508	10302	Appropriative	Licensed	REGULAR BAPTIST CAMP INCORPORATED	02/18/66	87.00	Sierra	PILOT LAKE (AKA DELAHUNTY LAKE)
A022396	15220	11011	Appropriative	Licensed	REGULAR BAPTIST CAMP INCORPORATED	09/19/02	3.20	Sierra	UNSP (3)
					REGULAR BAPTIST CAMP INCORPORATED Total		90.20		
A018212	11725	9140	Appropriative	Licensed	RENTIER INCORPORATED	07/09/58	0.70	Sierra	UNST
					RENTIER INCORPORATED Total		0.70		
A018279	11926	7127	Appropriative	Licensed	RICHARD L MILLER	08/21/58	0.20	Sierra	UNSP
					RICHARD L MILLER Total		0.20		
A017797	11267	7196	Appropriative	Licensed	RICHARD W WALKER	08/22/57	1.70	Placer	UNST
					RICHARD W WALKER Total		1.70		
A027542	18885	12513	Appropriative	Licensed	RICHARDS LAND & CATTLE CO	09/30/82	12.00	Yuba	WOODS CREEK
A027603	18884	13380	Appropriative	Licensed	RICHARDS LAND & CATTLE CO	12/03/82	49.00	Yuba	WOODS CREEK
					RICHARDS LAND & CATTLE CO Total		61.00		
A019559	12914	7539	Appropriative	Licensed	ROBERT CARLSTROEM	07/20/60	0.20	Sierra	UNST
					ROBERT CARLSTROEM Total		0.20		
A021496	14525	9634	Appropriative	Licensed	ROBERT A HELLER	10/09/63	1.10	Sierra	UNXX
					ROBERT A HELLER Total		1.10		
A026640	18874		Appropriative	Permitted	ROBERT A ROWE	12/02/80	3.20	Nevada	KENTUCKY RAVINE
					ROBERT A ROWE Total		3.20		
A016792A	10815	008072A	Appropriative	Licensed	ROBERT L RYAN	12/06/85	9.40	Nevada	UNST
					ROBERT L RYAN Total		9.40		
A014951	10084	5848	Appropriative	Licensed	ROBERTA D'ARCY	08/06/52	113.10	Yuba	DRY CREEK
					ROBERTA D'ARCY Total		113.10		
A018674	12824	8179	Appropriative	Licensed	ROCHELLE A FLEMING	04/28/59	0.30	Sierra	UNST
					ROCHELLE A FLEMING Total		0.30		
A021562	14484	8801	Appropriative	Licensed	ROGER P VAN CRAEYNEST	12/04/63	2.70	Sierra	UNSP
					ROGER P VAN CRAEYNEST Total		2.70		
A026809	18475	12287	Appropriative	Licensed	RONALD GUILD	04/29/81	4.00	Yuba	PRAIRIE CREEK
					RONALD GUILD Total		4.00		
A027976	19244	12656	Appropriative	Licensed	RONALD L GOODSPEED	02/08/84	0.30	Nevada	UNST
					RONALD L GOODSPEED Total		0.30		
A018286	11774	7006	Appropriative	Licensed	ROSS JACOBS	08/26/58	0.20	Sierra	UNST
					ROSS JACOBS Total		0.20		

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A026365	18355	12070	Appropriative	Licensed	ROY BRAATZ	05/19/80	3.30	Nevada	UNST
					ROY BRAATZ Total		3.30		
A020263	13977	10086	Appropriative	Licensed	ROY RAMEY	06/13/61	24.20	Nevada	WEST BRANCH GOLD RUN CREEK
					ROY RAMEY Total		24.20		
A008984	5142	2367	Appropriative	Licensed	RUBY DEVELOPMENT COMPANY	06/02/37	241.10	Sierra	ROCK CREEK
					RUBY DEVELOPMENT COMPANY Total		241.10		
A024904	17224	11479	Appropriative	Licensed	RUBY J RICKARD	10/17/75	2.00	Nevada	UNSP
					RUBY J RICKARD Total		2.00		
A018252	11757	7003	Appropriative	Licensed	SEGHEZZI INC	03/20/64	51.70	Nevada	UNST
					SEGHEZZI INC Total		51.70		
A020309	13944	8350	Appropriative	Licensed	SHAWN BEACHAMP	07/19/61	0.60	Sierra	UNSP
					SHAWN BEACHAMP Total		0.60		
A021727	14700	9328	Appropriative	Licensed	SHERMAN D WINSHIP	04/07/64	15.00	Nevada	UNST
					SHERMAN D WINSHIP Total		15.00		
A021417	14529	9226	Appropriative	Licensed	SIBLEY HANSEN	08/02/63	0.10	Sierra	SMALL SPRING
					SIBLEY HANSEN Total		0.10		
A006286	3316	2427	Appropriative	Licensed	SIERRA CLUB	05/13/29	2.80	Nevada	ZERO SPRING
A008465	4945	2628	Appropriative	Licensed	SIERRA CLUB	10/05/35	5.60	Nevada	UNSP
					SIERRA CLUB Total		8.40		
A020890	14177	9068	Appropriative	Licensed	SIERRA PACIFIC INDUSTRIES	08/06/62	5.60	Sierra	UNSP, UNST
					SIERRA PACIFIC INDUSTRIES Total		5.60		
A026028	18161	12301	Appropriative	Licensed	SOPER COMPANY	06/18/79	2.50	Nevada	UNST
					SOPER COMPANY Total		2.50		
A026067	18454	11796	Appropriative	Licensed	STARDUSTER LAKE ASSOCIATION	08/17/79	27.00	Nevada	UNST
					STARDUSTER LAKE ASSOCIATION Total		27.00		
A023591	16215	10645	Appropriative	Licensed	STEPHEN MAKI	08/24/70	2.30	Nevada	UNST
					STEPHEN MAKI Total		2.30		
A028615	20873		Appropriative	Permitted	STEVE MEHALAKIS	11/08/85	20.00	Yuba	UNST
A028616	20874		Appropriative	Permitted	STEVE MEHALAKIS	11/08/85	656.00	Yuba	UNST
					STEVE MEHALAKIS Total		676.00		
A016659	10458	6570	Appropriative	Licensed	Steven A Beckwitt	10/10/55	7.00	Nevada	UNCR
					Steven A Beckwitt Total		7.00		
A028564	20071	13055	Appropriative	Licensed	STEVEN NIGHTINGALE	09/26/85	0.40	Sierra	UNST
					STEVEN NIGHTINGALE Total		0.40		
A030074	20797		Appropriative	Permitted	SUGAR BOWL CORPORATION	06/15/95	136.00	Placer	LAKE MARY

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A030359	20798		Appropriative	Permitted	SUGAR BOWL CORPORATION	06/15/95	136.00	Placer	LAKE MARY
					SUGAR BOWL CORPORATION Total		272.00		
A017808	11602	6617	Appropriative	Licensed	SUSAN TRIMBLE SILVEY	08/30/57	0.30	Nevada	UNSP, UNST
					SUSAN TRIMBLE SILVEY Total		0.30		
A022135	15294	9724	Appropriative	Licensed	SUSAN M FORD	04/30/65	6.00	Sierra	UNSP
					SUSAN M FORD Total		6.00		
A028187	20186		Appropriative	Permitted	SUSAN T TOWNSEND	07/10/84	35.00	Nevada	OWL CREEK
					SUSAN T TOWNSEND Total		35.00		
A017798	11268	6932	Appropriative	Licensed	SUSANNAH SCHROLL	08/22/57	0.90	Placer	UNST
					SUSANNAH SCHROLL Total		0.90		
A010980	6391	3171	Appropriative	Licensed	Terry Mitchell Riley	02/13/45	17.00	Yuba	MOONSHINE CREEK
					Terry Mitchell Riley Total		17.00		
A021079	14144	9865	Appropriative	Licensed	THE KRUMP LIMITED PARTNERSHIP	12/11/62	29.00	Nevada	NORTH CREEK
					THE KRUMP LIMITED PARTNERSHIP Total		29.00		
A011106	6583	4849	Appropriative	Licensed	THOMAS DE JONGHE	07/13/45	19.70	Sierra	UNSP, VAN JOAN CREEK
A018663	12077	6842	Appropriative	Licensed	THOMAS DE JONGHE	04/24/59	796.40	Sierra	SAN JUAN CANYON
					THOMAS DE JONGHE Total		816.10		
A009651	5425	2777	Appropriative	Licensed	THOMAS A JEKYLL	06/30/39	5.60	Yuba	MOONSHINE CREEK
					THOMAS A JEKYLL Total		5.60		
A028126	20885		Appropriative	Permitted	THOMAS R POPE	04/30/84	7.00	Yuba	UNST
					THOMAS R POPE Total		7.00		
A018395	11928	7011	Appropriative	Licensed	TIMOTHY WALKER	11/05/58	0.20	Sierra	COLD SPRING
					TIMOTHY WALKER Total		0.20		
A017142	10833	6907	Appropriative	Licensed	TREVOR D ROBBINS	06/20/56	2.60	Nevada	UNST
					TREVOR D ROBBINS Total		2.60		
A014930	9266	5083	Appropriative	Licensed	TRI-LODGE ASSOCIATION	07/28/52	16.80	Nevada	LYTTON CREEK
					TRI-LODGE ASSOCIATION Total		16.80		
A015246	9585	4864	Appropriative	Licensed	TROY L JONES	03/19/53	2.30	Nevada	UNSP
					TROY L JONES Total		2.30		
A022265	15651	13721	Appropriative	Licensed	TSCHOPP MUTUAL WATER COMPANY	05/30/07	8.40	Sierra	UNSP, WIXON SPRING
					TSCHOPP MUTUAL WATER COMPANY Total		8.40		
A018581	11987	7507	Appropriative	Licensed	TYE ROMMEL	03/10/59	0.10	Sierra	UNST
					TYE ROMMEL Total		0.10		
A006563	3462	4000	Appropriative	Licensed	U S FOREST SERVICE	02/13/30	0.40	Sierra	UNSP
A007608	4266	1863	Appropriative	Licensed	U S FOREST SERVICE	07/05/33	1.80	Sierra	UNSP

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A007691	4232	1864	Appropriative	Licensed	U S FOREST SERVICE	09/28/33	0.40	Sierra	GENTLE ANNIE SPRING
A007767	4269	1865	Appropriative	Licensed	U S FOREST SERVICE	11/27/33	0.30	Sierra	UNSP
A008493	4684	2139	Appropriative	Licensed	U S FOREST SERVICE	11/13/35	6.20	Sierra	JERRETT SPRING
A009561	5364	2480	Appropriative	Licensed	U S FOREST SERVICE	04/19/39	8.40	Sierra	BAKER SPRING
A010038	5700	4893	Appropriative	Licensed	U S FOREST SERVICE	10/17/40	5.60	Placer	SUMMIT SPRING NO 1
A010153	5788	2659	Appropriative	Licensed	U S FOREST SERVICE	03/22/41	1.10	Nevada	LOGAN SPRING
A010154	5789	2660	Appropriative	Licensed	U S FOREST SERVICE	03/22/41	1.40	Nevada	BIG LICK SPRINGS
A010155	5790	2661	Appropriative	Licensed	U S FOREST SERVICE	03/22/41	1.00	Nevada	DEMPSEY SPRINGS
A010156	5791	4888	Appropriative	Licensed	U S FOREST SERVICE	03/22/41	9.20	Nevada	WHITE CLOUD SPRINGS
A010158	5793	2662	Appropriative	Licensed	U S FOREST SERVICE	03/22/41	1.40	Nevada	COLEMAN SPRINGS
A010159	5794	4175	Appropriative	Licensed	U S FOREST SERVICE	03/22/41	0.60	Nevada	SKILLMAN FLAT SPRING
A010160	5795	2663	Appropriative	Licensed	U S FOREST SERVICE	03/22/41	0.60	Nevada	DEMORY SPRING
A010161	5796	2664	Appropriative	Licensed	U S FOREST SERVICE	03/22/41	1.40	Nevada	UPPER DERBEC SPRING
A010162	5797	2665	Appropriative	Licensed	U S FOREST SERVICE	03/22/41	9.80	Nevada	SNOWTENT SPRING
A010163	5798	2666	Appropriative	Licensed	U S FOREST SERVICE	03/22/41	2.90	Nevada	DERBEC SPRINGS
A010164	5799	2667	Appropriative	Licensed	U S FOREST SERVICE	03/22/41	4.40	Nevada	WILLOW SPRINGS
A010446	6018	2891	Appropriative	Licensed	U S FOREST SERVICE	05/06/42	3.10	Nevada	THIMBLEBERRY CREEK
A010447	6019	2892	Appropriative	Licensed	U S FOREST SERVICE	05/06/42	3.70	Nevada	JUNCTION HOUSE SPRING
A010448	6020	4895	Appropriative	Licensed	U S FOREST SERVICE	05/06/42	1.10	Nevada	GROUSE RIDGE SPRING NO 3
A010449	6021	3057	Appropriative	Licensed	U S FOREST SERVICE	05/06/42	0.20	Nevada	MOGONIGAL SPRING
A010451	6023	2894	Appropriative	Licensed	U S FOREST SERVICE	05/06/42	3.40	Nevada	BEAR TRAP CREEK
A010452	6024	3058	Appropriative	Licensed	U S FOREST SERVICE	05/06/42	0.20	Nevada	GROUSE RIDGE SPRING NO 1
A010453	6025	3921	Appropriative	Licensed	U S FOREST SERVICE	05/06/42	0.60	Nevada	GROUSE RIDGE SPRING NO 2

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A010496	6091	2895	Appropriative	Licensed	U S FOREST SERVICE	07/15/42	0.90	Nevada	MOBLEY HOMESTEAD SPRING NO 1
A010497	6092	2896	Appropriative	Licensed	U S FOREST SERVICE	07/15/42	4.70	Nevada	HOLDEN SPRING
A010500	6095	2898	Appropriative	Licensed	U S FOREST SERVICE	07/15/42	1.80	Nevada	UNSP
A010502	6099	2899	Appropriative	Licensed	U S FOREST SERVICE	07/15/42	3.20	Nevada	MOBLEY HOMESTEAD SPRING NO 2
A010503	6100	2900	Appropriative	Licensed	U S FOREST SERVICE	07/15/42	4.10	Nevada	INDIAN SPRING
A010506	6103	2902	Appropriative	Licensed	U S FOREST SERVICE	07/15/42	0.90	Nevada	UPPER WOOLSEY SPRING
A010634	6150	2903	Appropriative	Licensed	U S FOREST SERVICE	05/01/43	2.20	Sierra	HALLS RANCH SPRING
A010637	6153	2905	Appropriative	Licensed	U S FOREST SERVICE	05/01/43	2.20	Sierra	WILD PLUM SPRING
A010639	6155	2907	Appropriative	Licensed	U S FOREST SERVICE	05/01/43	1.60	Sierra	DEADWOOD SPRING
A010640	6156	2908	Appropriative	Licensed	U S FOREST SERVICE	05/01/43	2.20	Sierra	GOLD LAKE SPRING
A010642	6158	2910	Appropriative	Licensed	U S FOREST SERVICE	05/01/43	1.50	Sierra	SADDLEBACK SPRING
A011382	6627	7752	Appropriative	Licensed	U S FOREST SERVICE	04/23/46	0.60	Nevada	RED MOUNTAIN SPRING NO 1
A012054	7080	3979	Appropriative	Licensed	U S FOREST SERVICE	08/21/47	210.30	Sierra	BEAR CREEK
A012104	7107	5532	Appropriative	Licensed	U S FOREST SERVICE	09/24/47	5.00	Sierra	HASKELL CREEK
A012105	7197	4210	Appropriative	Licensed	U S FOREST SERVICE	09/24/47	0.10	Sierra	GLEASON SPRING
A012108	7198	8987	Appropriative	Licensed	U S FOREST SERVICE	09/24/47	6.10	Sierra	CARVIN CREEK, UNSP
A012734	7577	4944	Appropriative	Licensed	U S FOREST SERVICE	10/07/48	17.90	Placer	UNSP
A013626	8115	5514	Appropriative	Licensed	U S FOREST SERVICE	03/10/50	8.20	Sierra	GRASSY LAKE CREEK
A013627	8116	4873	Appropriative	Licensed	U S FOREST SERVICE	03/10/50	12.20	Sierra	ORGAN CREEK
A014368	9086	4981	Appropriative	Licensed	U S FOREST SERVICE	06/27/51	0.10	Sierra	INDEPENDENCE RAVINE
A014369	8833	5423	Appropriative	Licensed	U S FOREST SERVICE	06/27/51	1.60	Sierra	FIDDLE CREEK
A014399	8880	5114	Appropriative	Licensed	U S FOREST SERVICE	07/19/51	2.00	Nevada	RATTLESNAKE CREEK
A014400	8830	6972	Appropriative	Licensed	U S FOREST SERVICE	07/19/51	0.60	Nevada	JACKSON CREEK

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A016642	10775	6162	Appropriative	Licensed	U S FOREST SERVICE	09/30/55	0.90	Sierra	CARVIN CREEK
A017236	14333	9873	Appropriative	Licensed	U S FOREST SERVICE	08/13/56	4,320.00	Nevada	WEAVER LAKE
A017827	11555	6959	Appropriative	Licensed	U S FOREST SERVICE	09/19/57	0.90	Sierra	UNSP (2)
A017867	11386	8642	Appropriative	Licensed	U S FOREST SERVICE	10/31/57	4.00	Nevada	UNSP
A018294	11777	7651	Appropriative	Licensed	U S FOREST SERVICE	08/28/58	0.20	Nevada	MARSH TRACT SPRING
A018744	13212	8632	Appropriative	Licensed	U S FOREST SERVICE	05/28/59	130.00	Sierra	UNST
A018745	13213	8633	Appropriative	Licensed	U S FOREST SERVICE	05/28/59	90.00	Sierra	PACKER CREEK
A018746	13214	8634	Appropriative	Licensed	U S FOREST SERVICE	05/28/59	380.00	Sierra	SALMON CREEK
A018747	13215	8635	Appropriative	Licensed	U S FOREST SERVICE	05/28/59	282.20	Sierra	SARDINE CREEK
A018748	13216	8983	Appropriative	Licensed	U S FOREST SERVICE	05/28/59	350.00	Sierra	SAWMILL CREEK
A018749	13217	8636	Appropriative	Licensed	U S FOREST SERVICE	05/28/59	250.00	Sierra	SALMON CREEK
A021130	14147	8582	Appropriative	Licensed	U S FOREST SERVICE	01/22/63	2.20	Sierra	UNSP
A021420	14530	8940	Appropriative	Licensed	U S FOREST SERVICE	08/06/63	0.20	Sierra	UNSP
A023124	15805	9651	Appropriative	Licensed	U S FOREST SERVICE	09/05/68	0.30	Sierra	UNSP
A028413	19713	13031	Appropriative	Licensed	U S FOREST SERVICE	03/29/85	0.80	Sierra	UNSP
					U S FOREST SERVICE Total		6,170.90		
A024067	16490	11008	Appropriative	Licensed	WALTER BALDAIN	05/12/72	8.00	Yuba	UNST
					WALTER BALDAIN Total		8.00		
A022419	15278	9703	Appropriative	Licensed	WASHINGTON COUNTY WATER DISTRICT	03/11/66	48.00	Nevada	HENDERSON RAVINE
					WASHINGTON COUNTY WATER DISTRICT Total		48.00		
A016823	10823	7089	Appropriative	Licensed	WAYNE L HARSHBARGER	01/09/56	35.00	Nevada	UNST
					WAYNE L HARSHBARGER Total		35.00		
A018170	11648	7666	Appropriative	Licensed	WILLIAM C DOUB II	06/05/58	1.10	Yuba	LITTLE WILLOW CREEK
					WILLIAM C DOUB II Total		1.10		
A026642	18723		Appropriative	Permitted	WILLIAM H CLEMENS	12/03/80	3.00	Nevada	RAPP RAVINE
					WILLIAM H CLEMENS Total		3.00		
A011355	6661	3358	Appropriative	Licensed	WILLIAM R SMITH	03/28/46	0.60	Sierra	JIM CROW CANYON

Application ID	Permit ID	License ID	Water Right Type	Status	Holder Name	Date	Face Amt	County	Source
					WILLIAM R SMITH Total		0.60		
A002197	1154	435	Appropriative	Licensed	YUBA COUNTY WATER AGENCY	02/11/21	511,784.30	Yuba	NORTH YUBA RIVER
A003026	1354	436	Appropriative	Licensed	YUBA COUNTY WATER AGENCY	09/07/22	10,000.00	Yuba	NORTH YUBA RIVER
A005004	2604	777	Appropriative	Licensed	YUBA COUNTY WATER AGENCY	04/30/26	15,000.00	Yuba	NORTH YUBA RIVER
A005632	15026		Appropriative	Permitted	YUBA COUNTY WATER AGENCY	07/30/27	1,159,000.00	Yuba	NORTH YUBA RIVER, YUBA RIVER
A009516	6106	3050	Appropriative	Licensed	YUBA COUNTY WATER AGENCY	03/01/39	72,397.80	Yuba	NORTH YUBA RIVER
A010282	8330	5544	Appropriative	Licensed	YUBA COUNTY WATER AGENCY	09/12/41	5,335.00	Yuba	NORTH YUBA RIVER
A015204	15027		Appropriative	Permitted	YUBA COUNTY WATER AGENCY	03/28/66	246,000.00	Yuba	NORTH YUBA RIVER, YUBA RIVER
A015574	15030		Appropriative	Permitted	YUBA COUNTY WATER AGENCY	03/28/66	514,000.00	Nevada, Yuba	MIDDLE YUBA RIVER, NORTH YUBA RIVER, OREGON CREEK, YUBA RIVER
A029837	20595		Appropriative	Permitted	YUBA COUNTY WATER AGENCY	10/11/90	21,719.30	Yuba	DEADWOOD CREEK, OWL GULCH
					YUBA COUNTY WATER AGENCY Total		2,555,236.40		
A002978	1270	12984	Appropriative	Licensed	YUBA COUNTY WATER DISTRICT	08/12/22	6,060.00	Yuba	DRY CREEK
A013957	11516		Appropriative	Licensed	YUBA COUNTY WATER DISTRICT	09/20/50	145,082.64	Plumas, Yuba	NORTH YUBA RIVER, YUBA RIVER
					YUBA COUNTY WATER DISTRICT Total		151,142.64		
A011596	7086	4699	Appropriative	Licensed	YUBA INVESTMENT COMPANY	10/28/46	2,558.70	Yuba	DRY CREEK
					YUBA INVESTMENT COMPANY Total		2,558.70		
A026914	18489	12619	Appropriative	Licensed	YUBA RIVER RECREATION GROUP INC	07/13/81	2.60	Nevada	HUMBUG CREEK
					YUBA RIVER RECREATION GROUP INC Total		2.60		
					Grand Total		3,595,920.74		

Bear River - Post-1914 Appropriative Water Rights

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
A029052	20786	13687	ANNE K SOUSA	12/13/06	5.80	Nevada	UNST
			ANNE K SOUSA Total		5.80		
A029455	20562		ARTHUR W ARMSTRONG	3/28/89	7.00	Nevada	IRON CROSS CREEK, ROCK CREEK
			ARTHUR W ARMSTRONG Total		7.00		
A025897	18040	11864	BEN R RAWE	1/5/79	0.30	Nevada	WOLF CREEK
			BEN R RAWE Total		0.30		
A026042	17969	11895	Bethel Church Nevada County	7/5/79	1.50	Nevada	UNST
			Bethel Church Nevada County Total		1.50		
A019535	12763	7754	BETTY THOMAS	7/11/60	20.00	Nevada	UNST
			BETTY THOMAS Total		20.00		
A015964	10090	7264	BLEAU 1989 REVOCABLE TRUST DATED 12/22/89	5/5/65	14.80	Nevada	UNST
			BLEAU 1989 REVOCABLE TRUST DATED 12/22/89 Total		14.80		
A027768	19029	12402	BOB J BALDWIN	6/7/83	2.40	Nevada	UNST
			BOB J BALDWIN Total		2.40		
A000959	743	385	CAMP FAR WEST IRRIGATION DISTRICT	4/1/18	4,832.10	Yuba	BEAR RIVER
A002881	2089	2266	CAMP FAR WEST IRRIGATION DISTRICT	6/13/22	5,000.00	Yuba	BEAR RIVER
A003843	2090	2267	CAMP FAR WEST IRRIGATION DISTRICT	2/11/24	3,592.20	Yuba	BEAR RIVER
A010190	5852	2740	CAMP FAR WEST IRRIGATION DISTRICT	4/28/41	5,000.00	Yuba	BEAR RIVER
			CAMP FAR WEST IRRIGATION DISTRICT Total		18,424.30		
A021821	14841	9992	CITY OF GRASS VALLEY	6/18/64	4.00	Nevada	RHODE ISLAND RAVINE
A025601	17893		CITY OF GRASS VALLEY	12/16/77	2,200.00	Nevada	UNXX
			CITY OF GRASS VALLEY Total		2,204.00		
A029097	20492	13344	COX-HARTLEY FAMILY 1993 TRUST	8/17/87	17.00	Nevada	LONG RAVINE
			COX-HARTLEY FAMILY 1993 TRUST Total		17.00		
A026932	18555	12337	CRAIG FERRARI	7/27/81	1.30	Nevada	LONG RAVINE
A029177	20384	13514	CRAIG FERRARI	1/26/88	3.30	Nevada	LONG RAVINE
			CRAIG FERRARI Total		4.60		
A020794	14711	10153	DANIEL HALE	5/28/62	8.30	Nevada	UNSP, UNST
			DANIEL HALE Total		8.30		
A017495	11042	5812	DARKHORSE GOLF CLUB LLC	3/5/57	9.00	Nevada	UNST
A027767	19028	12401	DARKHORSE GOLF CLUB LLC	6/7/83	1.90	Nevada	UNST
			DARKHORSE GOLF CLUB LLC Total		10.90		
A026161	18143	12136	DAVID MCFARLANE	1/3/80	0.10	Nevada	UNSP
			DAVID MCFARLANE Total		0.10		
A015282	9761	4714	DAVID L FERGUSON	4/7/53	15.00	Nevada	INDIAN RAVINE
			DAVID L FERGUSON Total		15.00		
A025099	16957	11240	DENNIS ACMOODY	7/14/76	0.70	Placer	CAMPBELL CREEK
			DENNIS ACMOODY Total		0.70		
A023012	15728	10361	Dept of Fish and Game	3/27/68	44.00	Yuba	UNST
A023013	15729	10387	Dept of Fish and Game	3/27/68	9.60	Nevada	UNST
A023014	15730	10388	Dept of Fish and Game	3/27/68	21.00	Yuba	UNST

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
A024601	16798	11216	Dept of Fish and Game	5/2/74	3.00	Yuba	UNST
A024641	16797	11212	Dept of Fish and Game	4/22/82	5.10	Yuba	UNST
			Dept of Fish and Game Total		82.70		
A021495	14411	9027	DONALD L DAY	10/9/63	9.20	Nevada	UNST
			DONALD L DAY Total		9.20		
A027513	18935	12432	DORIS L MINARD	9/13/82	3.10	Nevada	UNST
			DORIS L MINARD Total		3.10		
A021843	14973	9263	ELIZABETH STREATER	7/10/64	0.10	Nevada	UNSP
			ELIZABETH STREATER Total		0.10		
A017858	11509	6590	GARY M LAUGHLIN	10/23/57	0.80	Nevada	UNSP (2)
			GARY M LAUGHLIN Total		0.80		
A027958	19299	12783	GLADYS MARTINES	1/25/84	3.00	Nevada	UNST
A029895	20705		GLADYS MARTINES	1/25/91	27.00	Nevada	UNST
			GLADYS MARTINES Total		30.00		
A023070	16276	11076	GREGORY W BOCK	6/18/68	52.30	Nevada	UNST
			GREGORY W BOCK Total		52.30		
A014179	8713	4076	HERRMANN GOTTFIELD	3/7/51	21.30	Nevada	UNST
			HERRMANN GOTTFIELD Total		21.30		
A017539	11052	6926	HIDDEN MEADOW RANCH	4/3/57	91.80	Nevada	UNCR
			HIDDEN MEADOW RANCH Total		91.80		
A015879	10532	5520	IKE GOMEZ	5/19/54	18.30	Nevada	LONG HOLLOW
			IKE GOMEZ Total		18.30		
A028605	20716		JACK F ANDERSEN	10/28/85	6.50	Nevada	SOUTH WOLF CREEK, UNST
			JACK F ANDERSEN Total		6.50		
A018371	11846	8036	JAMES C PAGE	10/14/58	90.80	Placer	UNST
A025408	18090	11807	JAMES C PAGE	6/28/77	29.00	Placer	UNST
			JAMES C PAGE Total		119.80		
A030915	21141		JAMES M SILLER	1/2/03	89.00	Yuba	VINEYARD CREEK
			JAMES M SILLER Total		89.00		
A025582	17443	11469	Jape Holley Taylor	11/29/77	15.00	Nevada	UNST
			Jape Holley Taylor Total		15.00		
A030508	20929		JAY BETZ	11/21/95	56.00	Nevada	ROCK CREEK, UNST
			JAY BETZ Total		56.00		
A025502	17606	12279	JAY VICE	9/7/77	9.40	Nevada	MEYER RAVINE
			JAY VICE Total		9.40		
A017437	11015	7742	JEFFREY L FINK	1/28/57	3.50	Nevada	UNST
			JEFFREY L FINK Total		3.50		
A029100	20553	13829	Jim A Nevins	1/11/11	8.40	Placer	UNST
			Jim A Nevins Total		8.40		
A024814	17265	11749	JOHN C HUSMANN	5/23/75	0.50	Nevada	UNST
			JOHN C HUSMANN Total		0.50		
A014896	9165	4969	JOSEPH D LITCHFIELD	7/8/52	10.00	Nevada	UNST
			JOSEPH D LITCHFIELD Total		10.00		
A025493	17730	12042	JOSHUA L WITTLER	8/29/77	21.00	Nevada	INDIAN SPRINGS CREEK, UNST

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
			JOSHUA L WITTLER Total		21.00		
A028102	19386	12709	Judy Bauer	4/4/84	4.00	Nevada	UNST
			Judy Bauer Total		4.00		
A017942B	11413	008536B	LADSON I GEDDINGS	10/14/81	9.80	Nevada	LONG HOLLOW RAVINE
			LADSON I GEDDINGS Total		9.80		
A019830	13852	8657	LAKE MANAGEMENT COMMITTEE	10/27/60	35.00	Nevada	BUTLER CREEK
			LAKE MANAGEMENT COMMITTEE Total		35.00		
A017258	11462	6296	LAKE OF THE PINES ASSN INC	8/27/56	17.00	Nevada	RAGSDALE CREEK
A022535	15355	9675	LAKE OF THE PINES ASSN INC	7/27/66	4,150.00	Nevada	MAGNOLIA CREEK
			LAKE OF THE PINES ASSN INC Total		4,167.00		
A018214	11635	6752	LCB PROPERTIES LLC	7/11/58	55.80	Nevada	LONG HOLLOW RAVINE
			LCB PROPERTIES LLC Total		55.80		
A022821A		009610A	Louis BARTOLUCCI	5/6/02	21.00	Nevada	UNST
A023549A		010658A	Louis BARTOLUCCI	12/14/98	14.00	Nevada	UNST
			Louis BARTOLUCCI Total		35.00		
A025375	17757	11924	LUELLA BURTON	6/1/77	23.00	Placer	UNST
A028660	19898	13032	LUELLA BURTON	12/13/85	10.00	Placer	UNST
			LUELLA BURTON Total		33.00		
A017863	11331	9020	MARTIN P & BARBARA C BRUMM JOINT LIVING TRUST	10/25/57	26.80	Nevada	UNST
			MARTIN P & BARBARA C BRUMM JOINT LIVING TRUST Total		26.80		
A017918	11685	10988	MELBA C SMITH	12/17/57	53.00	Nevada	WOLF CREEK
			MELBA C SMITH Total		53.00		
A027040	18782	12458	MICHAEL J BONELLI	10/13/81	14.50	Nevada	UNST
			MICHAEL J BONELLI Total		14.50		
A028348	19601	12817	MICHAEL K SCHARF	12/4/84	3.90	Placer	UNST
			MICHAEL K SCHARF Total		3.90		
A031298	21148		MICHAEL S DICKEY	5/15/03	49.00	Nevada	UNST
			MICHAEL S DICKEY Total		49.00		
A028630	20005	13060	MIKE BASICH	12/2/85	0.10	Placer	CAMPBELL CREEK
			MIKE BASICH Total		0.10		
A019749C		008012C	MOREHEAD LAND LLC	10/13/00	402.40	Nevada, Sutter	EAST BORROW PIT OF SUTTER BYPASS, POODLE CREEK, UNST
			MOREHEAD LAND LLC Total		402.40		
A002652A	5803	10350	NEVADA IRRIGATION DISTRICT	11/22/21	12,500.00	Nevada, Placer	BEAR RIVER
A006229	5804	8809	NEVADA IRRIGATION DISTRICT	3/26/29	50,936.30	Placer	BEAR RIVER
A002652B	11626		NEVADA IRRIGATION DISTRICT	11/22/21	65,000.00	Placer	BEAR RIVER
			NEVADA IRRIGATION DISTRICT Total		128,436.30		
A023107	16058	10594	PATRICK D BRYAN	8/7/68	9.20	Nevada	UNST
			PATRICK D BRYAN Total		9.20		
A028561	19808	12977	PAUL R SEIDER	9/20/85	1.50	Nevada	SOUTH WOLF CREEK
			PAUL R SEIDER Total		1.50		

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
A026684	18972	12398	PINE LAKE ASSOCIATION	1/13/81	45.00	Nevada	UNST
			PINE LAKE ASSOCIATION Total		45.00		
A025922A	17889	11925	PITTS FAMILY TRUST	3/11/86	18.00	Nevada	UNST
			PITTS FAMILY TRUST Total		18.00		
A017912	11641	7101	RICHARD L BARBER	12/11/57	5.60	Placer	UNSP (2)
A021867	15251	9546	RICHARD L BARBER	8/10/64	358.30	Placer	LITTLE BEAR CREEK, UNST
			RICHARD L BARBER Total		363.90		
A020105	13690	7762	RICHARD P O'NEIL	5/1/61	2.50	Nevada	WOLF CREEK
			RICHARD P O'NEIL Total		2.50		
A021473	14619	8876	ROBERT FORD	9/23/63	0.90	Nevada	UNST
			ROBERT FORD Total		0.90		
A025962	17954	12055	ROBERT C ERDMANN	4/3/79	5.00	Nevada	UNST
			ROBERT C ERDMANN Total		5.00		
A025922B	17889	11926	Robert M Rourke	3/11/86	5.30	Nevada	UNST
			Robert M Rourke Total		5.30		
A003995	1847	1612	ROBERT N CAIN	5/20/24	40.00	Nevada	MAGNOLIA CREEK
A015607	9697	5685	ROBERT N CAIN	11/10/53	91.10	Nevada	MAGNOLIA CREEK
			ROBERT N CAIN Total		131.10		
A017942A	11413	008536A	ROBERT P WADMAN	10/14/81	48.30	Nevada	LONG HOLLOW RAVINE
			ROBERT P WADMAN Total		48.30		
A024624	18166	12199	ROBIN BURKE	4/27/87	8.80	Placer	UNST
			ROBIN BURKE Total		8.80		
A023550	16229	12355	RODRIC ANDERSON	7/10/70	8.00	Nevada	UNST
			RODRIC ANDERSON Total		8.00		
A025226	17450	12339	ROGER C PATTERSON	1/3/77	92.00	Placer	UNST
			ROGER C PATTERSON Total		92.00		
A031859			RON BINGAMAN	10/20/10	2,172.00	Nevada	
A030973	21073		RON BINGAMAN	10/14/99	2,172.00	Nevada	UNST (AKA WOLF HANNAMAN RANDOM DITCH)
			RON BINGAMAN Total		4,344.00		
A026072	18034	11907	RONALD F BURKHARDT	8/24/79	18.00	Nevada	UNST
			RONALD F BURKHARDT Total		18.00		
A017767	11458	8624	Ryan R Say	8/12/57	4.80	Nevada	UNST
			Ryan R Say Total		4.80		
A025492	17729	11941	SARAH JOELSON	8/29/77	15.00	Nevada	INDIAN SPRINGS CREEK
			SARAH JOELSON Total		15.00		
A026100	18035	11880	SCOTT C JASPAR	9/28/79	2.40	Nevada	UNST
			SCOTT C JASPAR Total		2.40		
A019003	12858	7437	SETH NOTO	9/25/59	1.10	Nevada	UNST
			SETH NOTO Total		1.10		
A023549B		010658B	SHARON EARHART	12/14/98	8.00	Nevada	UNST
			SHARON EARHART Total		8.00		
A026876	19442	12618	SHEILA ST GERMAIN	6/17/81	5,166.00	Nevada	UNST
			SHEILA ST GERMAIN Total		5,166.00		

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
A024984	16847	11190	SMITH & SMITH RANCH, A PARTNERSHIP	1/29/76	3.00	Nevada	UNST
A027152	18851	12679	SMITH & SMITH RANCH, A PARTNERSHIP	12/17/81	2.40	Nevada	UNST
			SMITH & SMITH RANCH, A PARTNERSHIP Total		5.40		
A010221	14871	11120	SOUTH SUTTER WATER DISTRICT	5/15/81	130,745.10	Yuba	BEAR RIVER
A014804	11297	11118	SOUTH SUTTER WATER DISTRICT	5/12/52	139,534.80	Yuba	BEAR RIVER
			SOUTH SUTTER WATER DISTRICT Total		270,279.90		
A014773B	9106	006560B	SPRING VALLEY HOMEOWNERS ASSOCIATION	12/10/82	24.00	Placer	UNST
A020632	13760	8381	SPRING VALLEY HOMEOWNERS ASSOCIATION	3/1/62	52.00	Placer	UNST
A025139	17584	13120	SPRING VALLEY HOMEOWNERS ASSOCIATION	8/31/76	4.70	Placer	UNST
			SPRING VALLEY HOMEOWNERS ASSOCIATION Total		80.70		
A017430	11047	6954	STEVE KOTHE	1/23/57	84.90	Nevada	RAGSDALE CREEK
			STEVE KOTHE Total		84.90		
A022382	15366	10099	THE LAKEWOOD ASSOCIATION INC	2/4/66	486.00	Nevada	DRY CREEK
			THE LAKEWOOD ASSOCIATION INC Total		486.00		
A026160	18323	12118	THOMAS S VAN HORNE	12/31/79	3.10	Nevada	UNSP
A027695	19793	12934	THOMAS S VAN HORNE	3/23/83	11.90	Nevada	UNST
			THOMAS S VAN HORNE Total		15.00		
A010150	5785	2656	U S FOREST SERVICE	3/22/41	0.50	Nevada	KING WOOLFORD SPRING
A010439	6011	2888	U S FOREST SERVICE	5/6/42	0.70	Nevada	FOWLER SPRING
A010504	6101	4977	U S FOREST SERVICE	7/15/42	10.50	Nevada	MULE SPRING
			U S FOREST SERVICE Total		11.70		
A025211	17449	12756	UNITED AUBURN INDIAN DEVELOPMENT CORP	12/13/76	49.90	Placer	UNST
			UNITED AUBURN INDIAN DEVELOPMENT CORP Total		49.90		
A028170	19598	13007	William Scott	6/25/84	0.10	Nevada	UNST
			William Scott Total		0.10		
A028138	19417		WILLIAM M DONNELLY JR	5/23/84	2.00	Nevada	UNST
			WILLIAM M DONNELLY JR Total		2.00		
			Grand Total		436,025.40		

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
A010397	5958	3042	AL RENKER	3/11/1942	0.10	El Dorado	SOUTH FORK AMERICAN RIVER
			AL RENKER Total		0.10		
A007905	4344	1801	ALBERT E CASH	4/12/1934	0.20	El Dorado	BULL CREEK
			ALBERT E CASH Total		0.20		
A027366	19846		ALBERT R DAVIDSON	6/21/1982	30.00	El Dorado	UNST
			ALBERT R DAVIDSON Total		30.00		
A016894	11321	7150	ALLEN E NEWTON	2/14/1956	18.20	Placer	UNST
			ALLEN E NEWTON Total		18.20		
A013849	8397	5518	ALLEN FAMILY TRUST	7/17/1950	53.30	Placer	UNST
			ALLEN FAMILY TRUST Total		53.30		
A026457	18473	12786	American River Conservancy	7/15/1980	49.00	El Dorado	GRANITE CREEK
			American River Conservancy Total		49.00		
A013296	8191	6304	ANN BATEY	8/15/1949	137.00	El Dorado	INDIAN CREEK
			ANN BATEY Total		137.00		
A029219	20482		ANTHONY J FREITAS	4/7/1988	21.20	El Dorado	JOHNTOWN CREEK
			ANTHONY J FREITAS Total		21.20		
A027928	19263	12703	APPLE MOUNTAIN LP	12/7/1983	11.80	El Dorado	SOUTH CANYON, UNST
			APPLE MOUNTAIN LP Total		11.80		
A011184	6479	3390	ARDEN HALL	10/16/1945	0.10	El Dorado	SOUTH FORK AMERICAN RIVER
			ARDEN HALL Total		0.10		
A011516	6699	3383	ARTHUR S DEAN	8/15/1946	36.20	El Dorado	UNSP
			ARTHUR S DEAN Total		36.20		
A021648	14938	11111	AUBURN LAKE TRAILS PROPERTY OWNERS ASSOC	2/21/1964	34.00	El Dorado	MAINE BAR CANYON
A023556	16296	11112	AUBURN LAKE TRAILS PROPERTY OWNERS ASSOC	7/14/1970	20.00	El Dorado	MAINE BAR CANYON
A026410	18279	12013	AUBURN LAKE TRAILS PROPERTY OWNERS ASSOC	6/10/1980	14.00	El Dorado	MAINE BAR CANYON
			AUBURN LAKE TRAILS PROPERTY OWNERS ASSOC Total		68.00		
A011817	6920	6045	BAKER FAMILY TRUST 1999	4/8/1947	13.70	El Dorado	HANGTOWN CREEK
A011850	6959	3357	BAKER FAMILY TRUST 1999	5/1/1947	3.40	El Dorado	HANGTOWN CREEK
			BAKER FAMILY TRUST 1999 Total		17.10		
A019125	12391	7458	BARBARA ELLEN HOLLAND	12/8/1959	5.30	El Dorado	UNSP, UNST
			BARBARA ELLEN HOLLAND Total		5.30		
A020256B	13189	9778	BARBAREE JERNIGAN	5/5/1971	2.20	El Dorado	WHITE ROCK CREEK
			BARBAREE JERNIGAN Total		2.20		
A017420	11173	6289	BEADLE LIVING TRUST DATED SEPTEMBER 12,1995	1/11/1957	5.90	Placer	UNST
			BEADLE LIVING TRUST DATED SEPTEMBER 12,1995 Total		5.90		
A027752	19827		BEAR STATE WATER WORKS	5/10/1983	37.00	El Dorado	UNSP
			BEAR STATE WATER WORKS Total		37.00		
A021855	14852	9503	BENJAMIN KEH	7/20/1964	4.00	Placer	MINERS RAVINE
			BENJAMIN KEH Total		4.00		
A022037	15105	9621	Berry Patty LLC	2/4/1965	2.20	El Dorado	UNSP (2)
			Berry Patty LLC Total		2.20		
A018182	11853	6484	BERTABELLE STEAD	6/13/1958	0.50	El Dorado	NEW WORLD TUNNEL
			BERTABELLE STEAD Total		0.50		
A014263	8672	4696	BISHOP FAMILY TRUST	4/20/1951	0.30	El Dorado	UNSP

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A015346	9640	7253	BISHOP FAMILY TRUST	5/18/1953	0.40	El Dorado	UNSP
A016123	10244	10898	BISHOP FAMILY TRUST	11/4/1954	2.20	El Dorado	UNSP
A018515	13834	10899	BISHOP FAMILY TRUST	2/3/1959	1.20	El Dorado	UNSP
			BISHOP FAMILY TRUST Total		4.10		
A010731	6307	5449	BLACK ROCK RANCH	11/17/1943	715.10	El Dorado	HASTINGS CREEK (AKA BLACK ROCK CREEK)
A013123	7488	5450	BLACK ROCK RANCH	5/31/1949	52.00	El Dorado	HASTING CREEK (AKA BLACK ROCK CREEK)
A019943	13983	9915	BLACK ROCK RANCH	1/31/1961	104.60	El Dorado	BLACK ROCK CREEK
			BLACK ROCK RANCH Total		871.70		
A023438	16059	10241	BLUE CANYON PROPERTIES INC	1/16/1970	15.00	Placer	UNST
			BLUE CANYON PROPERTIES INC Total		15.00		
A004365	2048	1112	BORIS T YEN	12/15/1924	2.80	El Dorado	EVANS CREEK
			BORIS T YEN Total		2.80		
A025841	17711	12427	BRETTE MARK GREEN	10/3/1978	1.30	El Dorado	UNST
			BRETTE MARK GREEN Total		1.30		
A016974	10644	5862	Brian P Tucker	3/28/1956	9.60	Placer	UNDR
			Brian P Tucker Total		9.60		
A006999	2797	1419	BRIAN K BRAY	7/7/1931	0.30	El Dorado	UNST
			BRIAN K BRAY Total		0.30		
A014138	8583	4878	BURNS LIVING TRUST	1/22/1951	0.20	El Dorado	BULL CREEK
A020543	13567	9133	BURNS LIVING TRUST	12/29/1961	0.40	El Dorado	UNSP (3)
			BURNS LIVING TRUST Total		0.60		
A013971	8391	6961	BYRON D SHER	9/29/1950	76.00	El Dorado	UNXX
			BYRON D SHER Total		76.00		
A004868	2458	945	BYRON W BACCHI IRREVOCABLE TRUST, THE	12/19/1925	36.20	El Dorado	NORTH INDIAN CREEK
			BYRON W BACCHI IRREVOCABLE TRUST, THE Total		36.20		
A013766	8755	5825	C A JONES	5/31/1950	12.00	El Dorado	NORTON RAVINE
			C A JONES Total		12.00		
A021806	15127	9611	CARDWELL R CURREN	6/8/1964	4.70	El Dorado	WEST FORK SAWMILL CREEK
			CARDWELL R CURREN Total		4.70		
A022052	15107	9622	CAROL BERCIER	2/24/1965	1.00	El Dorado	UNSP (2)
			CAROL BERCIER Total		1.00		
A005806	3036	1071	CAROL WARD	1/16/1928	79.60	Placer	ANTELOPE CREEK
A009500	5335	3137	CAROL WARD	1/31/1939	90.30	Placer	ANTELOPE CREEK
			CAROL WARD Total		169.90		
A007586	4189	3154	CECIL L WESTEL JR	6/14/1933	5.00	El Dorado	LONG CANYON
			CECIL L WESTEL JR Total		5.00		
A026475	18404	12899	CHARLES DAVIS	7/28/1980	0.30	Placer	UNST
			CHARLES DAVIS Total		0.30		
A023990	16722	10947	CHARLES D BRADARIC	3/7/1972	4.50	Placer	UNST
			CHARLES D BRADARIC Total		4.50		
A018053	11628	10069	CHARLES K MCCLATCHY	3/17/1958	6.00	El Dorado	UNST
			CHARLES K MCCLATCHY Total		6.00		
A026380	19259		CHI WEST INC	5/22/1980	72,397.80	El Dorado	ROCK CREEK
A027353	19260		CHI WEST INC	6/4/1982	67,478.70	El Dorado	ROCK CREEK
			CHI WEST INC Total		139,876.50		
A023939	16492	11032	CHRIS BEAUCHAMP	12/6/1971	3.90	El Dorado	UNST
			CHRIS BEAUCHAMP Total		3.90		

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A018929	12275	10064	CHRISTIAN CHURCHES OF N CALIF-W NEVADA	8/20/1959	12.30	Placer	UNSP
			CHRISTIAN CHURCHES OF N CALIF-W NEVADA Total		12.30		
A025097	17594	11694	CINDY WHITE	7/9/1976	0.60	El Dorado	UNST
			CINDY WHITE Total		0.60		
A012149	7201	4847	CITY OF PLACERVILLE	11/4/1947	10.00	El Dorado	UNST
A014708	9209	6282	CITY OF PLACERVILLE	3/11/1952	6.60	El Dorado	BIG CANYON CREEK
			CITY OF PLACERVILLE Total		16.60		
A001853	859	1070	CITY OF SACRAMENTO	5/29/1920	2.10	El Dorado	SAYLES CANYON
A012140	11358		CITY OF SACRAMENTO	10/29/1947	271,739.50	Sacramento	AMERICAN RIVER
A012321	11359		CITY OF SACRAMENTO	2/13/1948	443,478.50	El Dorado	BRUSH CREEK, SILVER CREEK, SOUTH FORK SILVER CREEK
A016060	11361		CITY OF SACRAMENTO	5/7/1958	95,108.80	Sacramento	AMERICAN RIVER
A012622	11360		CITY OF SACRAMENTO	10/30/2000	966,174.80	El Dorado	BRUSH CREEK, GERLE CREEK, LOON LAKE, ROCKBOUND LAKE, RUBICON RIVER, SILVER CREEK, SOUTH FORK RUBICON RIVER
			CITY OF SACRAMENTO Total		1,776,503.70		
A004062	1853	1434	CITY OF STOCKTON	9/21/1939	12.20	Amador	UNCR
A007952	4514	2248	CITY OF STOCKTON	5/25/1934	0.40	Amador	UNCR
			CITY OF STOCKTON Total		12.60		
A025809	17623	12579	CLARENCE DILTS	8/21/1978	2.40	El Dorado	UNSP
			CLARENCE DILTS Total		2.40		
A019791	12964	8081	CLARIS GOULART	10/4/1960	62.40	Placer	UNST
			CLARIS GOULART Total		62.40		
A029657			COUNTY OF SAN JOAQUIN	2/9/1990	147,000.00		
			COUNTY OF SAN JOAQUIN Total		147,000.00		
A017398	10943	6893	Dale Capper	12/17/1956	31.00	El Dorado	UNST
			Dale Capper Total		31.00		
A019975	13230	10022	DALE B COOK	3/16/1973	14.70	El Dorado	UNST
			DALE B COOK Total		14.70		
A024427	16890	11259	DANIEL E LITTLE	8/3/1973	2.80	El Dorado	UNST
			DANIEL E LITTLE Total		2.80		
A013521	8424	4467	Daniel J Peterson	12/27/1949	145.00	El Dorado	UNST
			Daniel J Peterson Total		145.00		
A024575	16850	11161	DARREL PEARSON	3/21/1974	2.90	El Dorado	KELLEY CREEK
			DARREL PEARSON Total		2.90		
A017571B	11120	9732	DAVE TOGNETTI	4/25/1957	4.10	Placer	ANTELOPE CREEK
			DAVE TOGNETTI Total		4.10		
A005704	3038	1884	DAVID B BARTHOLOMEW	9/30/1927	0.30	El Dorado	UNSP (2)
			DAVID B BARTHOLOMEW Total		0.30		
A017571A	11120	9731	DAVID C MOORE	4/25/1957	3.90	Placer	ANTELOPE CREEK
			DAVID C MOORE Total		3.90		
A005024	2663	857	DAVID HAYNES MERING	5/18/1926	0.30	El Dorado	UNSP
			DAVID HAYNES MERING Total		0.30		
A012462	7434	3529	DAVID W GIRARD	4/6/1948	4.00	El Dorado	CHUNK RAVINE
			DAVID W GIRARD Total		4.00		
A016289	10247	5507	David William Barton	3/18/1955	14.60	Placer	UNSP
			David William Barton Total		14.60		
A026778	19076	12620	DE ANZA PLACER GOLD MINING COMPANY	4/6/1981	9.80	Placer	PAGGE CREEK

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A027566	19829	13841	DE ANZA PLACER GOLD MINING COMPANY	11/8/2011	215.20	Placer	NORTH FORK FORBES CREEK
A029364	20777	13844	DE ANZA PLACER GOLD MINING COMPANY	12/9/2011	11.20	Placer	PAGGE CREEK
			DE ANZA PLACER GOLD MINING COMPANY Total		236.20		
A021763	15075	8882	DEAN P A ELBERT	5/6/1964	9.00	El Dorado	THIRD OTTER CREEK
			DEAN P A ELBERT Total		9.00		
A011689	6706	5205	DEER HILLS PROPERTY OWNERS ASSN	1/9/1947	45.00	El Dorado	UNST
			DEER HILLS PROPERTY OWNERS ASSN Total		45.00		
A016995	11491	7992	DENNIS R DALTON	4/9/1956	3.00	Placer	UNST
			DENNIS R DALTON Total		3.00		
A018211B	11657	9367	DIAMANTE DEVELOPMENT LLC	7/9/1958	0.50	El Dorado	UNSP
A022791	15500	10062	DIAMANTE DEVELOPMENT LLC	5/18/1967	0.30	El Dorado	UNST
			DIAMANTE DEVELOPMENT LLC Total		0.80		
A009134	5059	3790	DIANE COSGROVE	10/2/1937	0.10	El Dorado	COLD STREAM
			DIANE COSGROVE Total		0.10		
A021857	15201	10018	DIANE W BUCHHOLZ	7/20/1964	16.00	El Dorado	BEAR CREEK
			DIANE W BUCHHOLZ Total		16.00		
A028208A	019433A	13035	DIANNA NEWBORN	3/8/1991	5.50	El Dorado	UNST
A029958	20856	13724	DIANNA NEWBORN	6/6/2007	14.50	El Dorado	UNST
			DIANNA NEWBORN Total		20.00		
A004357	2047	1348	DINO E ANDREOTTI	12/9/1924	1.80	El Dorado	UNCR
A022596	15410	9637	DINO E ANDREOTTI	9/30/1966	0.20	El Dorado	UNST
			DINO E ANDREOTTI Total		2.00		
A026436	18729	12676	DOBBAS RANCH	6/30/1980	0.50	El Dorado	UNSP
A026438	18731	12677	DOBBAS RANCH	6/30/1980	0.40	El Dorado	UNSP
			DOBBAS RANCH Total		0.90		
A005413	2955	3008	DON K AND J A TAYLOR, TRUSTEES	4/11/1927	137.60	Placer	RED RAVINE (AKA BUCKEYE RAVINE)
			DON K AND J A TAYLOR, TRUSTEES Total		137.60		
A023032	15758	10314	Donald Ray Neal	4/19/1968	12.60	Placer	UNST
			Donald Ray Neal Total		12.60		
A014328	9289	5017	DONALD DEAN HUTCHISON	5/29/1951	43.90	Placer	ANTELOPE CREEK
			DONALD DEAN HUTCHISON Total		43.90		
A012598	7431	4049	DONALD G RHODES	7/19/1948	2.50	El Dorado	UNSP
A018559	12063	8421	DONALD G RHODES	2/26/1959	2.50	El Dorado	UNST
			DONALD G RHODES Total		5.00		
A013752	8200	4756	DONALD W FIELDS	5/23/1950	4.10	El Dorado	WEBER CREEK
			DONALD W FIELDS Total		4.10		
A009952	5622	2563	DONNA MCTAGGART	7/12/1940	0.20	El Dorado	PYRAMID CREEK
			DONNA MCTAGGART Total		0.20		
A024705	17798	12232	DOROTHY A MARTIN	11/6/1974	1.80	El Dorado	WHITE ROCK CREEK
			DOROTHY A MARTIN Total		1.80		
A028159	20087	13231	DOUGLAS A NICKELL	6/12/1984	0.10	Placer	UNSP
			DOUGLAS A NICKELL Total		0.10		
A030352	20882		DOUGLAS B VEERKAMP	4/14/1994	88.00	El Dorado	UNST
			DOUGLAS B VEERKAMP Total		88.00		
A021696	14623	9202	Douglas R. Gingerich	3/17/1964	20.00	Placer	UNST
			Douglas R. Gingerich Total		20.00		
A018590	13585	8107	DRONE GRANT INVESTMENT GROUP	3/12/1959	61.30	El Dorado, Placer	DEVILS CANYON CREEK
			DRONE GRANT INVESTMENT GROUP Total		61.30		

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A024514C	16976	11411	DWIGHT R DENTON	1/25/1984	6.00	El Dorado	SWEETWATER CREEK
A024514D	16976	11412	DWIGHT R DENTON	1/25/1984	20.00	El Dorado	SWEETWATER CREEK
A027630	18901	12613	DWIGHT R DENTON	1/13/1983	9.00	El Dorado	SWEETWATER CREEK
A027703	19034	12615	DWIGHT R DENTON	4/4/1983	5.00	El Dorado	SWEETWATER CREEK
			DWIGHT R DENTON Total		40.00		
A025711	17843	12515	ECHO LANE INVESTORS	4/6/1978	110.00	El Dorado	INDIAN CREEK
			ECHO LANE INVESTORS Total		110.00		
A013369	8403	5210	EDWARD MACKAY	9/28/1949	9.50	El Dorado	UNCR
			EDWARD MACKAY Total		9.50		
A026573	19066	12660	EDWARD L PURKEY	10/8/1980	1.40	El Dorado	UNST
			EDWARD L PURKEY Total		1.40		
A012475	7386	3889	EDWARD P AKIN	4/14/1948	40.00	El Dorado	UNST
			EDWARD P AKIN Total		40.00		
A001692	1053	2184	EL DORADO IRRIGATION DISTRICT	3/25/2008	1,125.00	El Dorado	NORTH FORK WEBER CREEK
			EL DORADO IRRIGATION DISTRICT Total		1,125.00		
A019532	13536	8231	ELAINE BARKER	7/8/1960	1.20	Placer	UNST
			ELAINE BARKER Total		1.20		
A012875	7654	4021	ELISABETH MILLER	12/23/1948	25.00	El Dorado	COLD SPRINGS CREEK
A014603	8953	5587	ELISABETH MILLER	12/14/1951	15.00	El Dorado	UNST
			ELISABETH MILLER Total		40.00		
A022364	15320	9022	ELIZABETH CRONIN	1/13/1966	0.10	El Dorado	UNST
			ELIZABETH CRONIN Total		0.10		
A011628	6789	3206	ELIZABETH A NILES	11/18/1946	0.80	El Dorado	UNSP
			ELIZABETH A NILES Total		0.80		
A018541	12027	9676	EMIGRANT GAP MUTUAL WATER CO	2/19/1959	73.00	Placer	BLUE CANYON CREEK, UNST
			EMIGRANT GAP MUTUAL WATER CO Total		73.00		
A024535	17217	11424	ERLINE M MELLO	1/25/1974	16.00	El Dorado	COLOMA CANYON CREEK
			ERLINE M MELLO Total		16.00		
A011523B	6700	005447B	Estate of Rudolf K. Sachau	8/21/1946	36.40	Placer	UNSP
A025016	17647	11750	Estate of Rudolf K. Sachau	3/5/1976	1.00	Placer	UNSP
			Estate of Rudolf K. Sachau Total		37.40		
A026825	18611	12395	ESTHER E TOWNZEN	5/11/1981	2.10	El Dorado	UNST
			ESTHER E TOWNZEN Total		2.10		
A019826	12972	9337	EUGENE FILEV	10/24/1960	2.00	El Dorado	UNSP (3)
			EUGENE FILEV Total		2.00		
A006431	3395	1287	EUGENE LANGENBACH	9/10/1929	0.10	El Dorado	UNST
			EUGENE LANGENBACH Total		0.10		
A016037	10068	5822	EUGENE A WILSON	9/8/1954	1.40	El Dorado	UNST
			EUGENE A WILSON Total		1.40		
A025631	17347	11246	EUGENE H MEYER	1/3/1978	0.20	El Dorado	BURNT SHANTY CREEK
			EUGENE H MEYER Total		0.20		
A000548	258	176	EVELYN T WICKS	12/28/1916	53.70	Placer	SECRET RAVINE
			EVELYN T WICKS Total		53.70		
A012318	7162	4341	EVERETT B DYER III	2/11/1948	2.00	El Dorado	SOUTH FORK TENNESSEE CREEK
			EVERETT B DYER III Total		2.00		
A019553	12930	7751	FARHAD MORTAZAVI	7/18/1960	1.70	Placer	UNST
			FARHAD MORTAZAVI Total		1.70		
A016544	10554	6167	FAY F CARVER	8/23/1955	1.60	Placer	UNST
			FAY F CARVER Total		1.60		
A018211A	11657	9366	FAY LOUIE LIVING REVOCABLE TRUST OF 5/11/01	7/9/1958	10.00	El Dorado	GREEN SPRING CREEK

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A022226	15448	9324	FAY LOUIE LIVING REVOCABLE TRUST OF 5/11/01	7/16/1965	17.00	El Dorado	GREEN SPRINGS CREEK
			FAY LOUIE LIVING REVOCABLE TRUST OF 5/11/01 Total		27.00		
A031074	21172		FLA Roseville LP	8/5/2005	49.00	Placer	UNST
			FLA Roseville LP Total		49.00		
A018551	13584	9959	FORESTHILL PUBLIC UTILITY DISTRICT	2/24/1959	81.00	Placer	MILL CREEK
A021945	15375		FORESTHILL PUBLIC UTILITY DISTRICT	10/22/1964	24,075.80	Placer	NORTH SHIRTTAIL CANYON
A024596	16644	13038	FORESTHILL PUBLIC UTILITY DISTRICT	4/22/1974	166.80	Placer	MILL CREEK
			FORESTHILL PUBLIC UTILITY DISTRICT Total		24,323.60		
A012131	7200	5976	FOUR CORNERS LANDOWNERS ASSOC	10/16/1947	587.00	El Dorado	JACOBS CREEK
			FOUR CORNERS LANDOWNERS ASSOC Total		587.00		
A007776	4364	2233	FRANCINE MARQUIS	12/5/1933	0.40	El Dorado	UNST
			FRANCINE MARQUIS Total		0.40		
A029955	20661		FRANCIS P ALLEN TRUST	5/15/1991	2.50	El Dorado	PEACOCK RAVINE
			FRANCIS P ALLEN TRUST Total		2.50		
A006540	3509	1119	FRANK D MORILLAS	1/20/1930	61.10	Placer	SECRET RAVINE
			FRANK D MORILLAS Total		61.10		
A020339	13427	8239	FRANK P ROMANO	8/2/1961	3.40	El Dorado	UNSP
			FRANK P ROMANO Total		3.40		
A024683	17146	11477	FRED H RUSSELL III	8/30/1974	6.00	El Dorado	UNST
			FRED H RUSSELL III Total		6.00		
A011588A	6729	003374A	FREDERICK R MCLAREN	9/20/1982	8.80	El Dorado	INDIAN CREEK
A011588B	6729	003374B	FREDERICK R MCLAREN	9/20/1982	8.80	El Dorado	INDIAN CREEK
A011588C02	6729	003374C02	FREDERICK R MCLAREN	12/13/1985	75.70	El Dorado	INDIAN CREEK
A016368A	10290	008701A	FREDERICK R MCLAREN	9/20/1982	3.80	El Dorado	INDIAN CREEK
A016368B	10290	008701B	FREDERICK R MCLAREN	9/20/1982	3.80	El Dorado	INDIAN CREEK
A016368C02	10290	008701C02	FREDERICK R MCLAREN	12/13/1985	43.60	El Dorado	INDIAN CREEK
			FREDERICK R MCLAREN Total		144.50		
A003405	2329	2053	GAEL M BARSOTTI	5/18/1923	188.40	El Dorado	BRUSH CANYON
A020305	14796	9696	GAEL M BARSOTTI	7/18/1961	70.20	El Dorado	BRUSH CANYON
A020306	14797	9679	GAEL M BARSOTTI	7/18/1961	70.20	El Dorado	BRUSH CANYON
A020307	14798	9680	GAEL M BARSOTTI	7/18/1961	70.20	El Dorado	BRUSH CANYON
			GAEL M BARSOTTI Total		399.00		
A026060	18050	11935	GAIL IRENE WHITE	8/8/1979	0.40	Placer	UNST
			GAIL IRENE WHITE Total		0.40		
A007013	3806	1699	GALE A MCGUIRE	7/20/1931	0.30	El Dorado	BULL CREEK
			GALE A MCGUIRE Total		0.30		
A018657	12072	6495	GARY T MATSON	4/21/1959	9.00	El Dorado	UNST
			GARY T MATSON Total		9.00		
A018158	11644	8402	GEOFF H JOHNSON	5/26/1958	72.20	El Dorado	UNSP, UNST
			GEOFF H JOHNSON Total		72.20		
A015252	9538	7761	George Popescu	3/24/1953	15.00	El Dorado	KELLEY CREEK
			George Popescu Total		15.00		
A015522	10016	7542	George & Geri Grant LP	9/2/1953	36.20	Placer	OWL CREEK, UNST
			George & Geri Grant LP Total		36.20		
A002458	1632	486	GEORGE A FARIS	7/27/1921	0.40	El Dorado	UNSP (2)
			GEORGE A FARIS Total		0.40		
A016763	10509	5508	GEORGE A LAY	12/5/1955	11.00	Placer	UNDR
			GEORGE A LAY Total		11.00		

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A022996	15659	10207	GEORGE ANGELO TSAKOPOULOS	2/28/1968	15.00	Sacramento	ALDER CREEK
			GEORGE ANGELO TSAKOPOULOS Total		15.00		
A018004	11546	8163	GEORGE L COX	2/18/1958	36.70	Placer	UNST
A021211	14210	8855	GEORGE L COX	3/29/1963	8.60	Placer	UNST
			GEORGE L COX Total		45.30		
A013131	7830	3813	GEORGE W SHRIVER	6/2/1949	0.20	El Dorado	SOUTH FORK AMERICAN RIVER
			GEORGE W SHRIVER Total		0.20		
A005644A	12827		GEORGETOWN DIVIDE PUBLIC UTILITY DISTRICT	3/24/2000	74,347.90	El Dorado	PILOT CREEK
A016212	11304		GEORGETOWN DIVIDE PUBLIC UTILITY DISTRICT	3/24/2000	20,000.00	El Dorado	BACON CANYON, BRANCH OF FIRST CANYON OTTER CREEK, BRANCH OF SECOND CANYON OTTER CREEK, BRANCH OF THIRD CANYON OTTER CREEK, DEEP CANYON, PILOT CREEK, UNXX, UNXX (2)
A016688	11306		GEORGETOWN DIVIDE PUBLIC UTILITY DISTRICT	10/24/1955	20,363.90	El Dorado	ONION CREEK
			GEORGETOWN DIVIDE PUBLIC UTILITY DISTRICT Total		114,711.80		
A018487	11895	7157	GERALD E HAWKINS	1/23/1959	8.10	El Dorado	UNSP
			GERALD E HAWKINS Total		8.10		
A002944	1193	296	Gerald R Decamp	7/26/1922	0.30	El Dorado	COLD STREAM
			Gerald R Decamp Total		0.30		
A007305	3982	1701	GILBERT A ALBIANI	6/27/1932	0.20	El Dorado	UNSP
			GILBERT A ALBIANI Total		0.20		
A018566	11912	6634	GLEN EASTMAN	3/4/1959	0.90	El Dorado	UNSP, UNST
			GLEN EASTMAN Total		0.90		
A015804	9984	8171	GORDON J VICINI	3/30/1954	98.80	El Dorado	BURNT SHANTY CREEK, UNST
			GORDON J VICINI Total		98.80		
A011588C01	6729	003374C01	GREENSTONE COUNTRY OWNER'S ASSOC	12/13/1985	101.80	El Dorado	INDIAN CREEK
A016368C01	10290	008701C01	GREENSTONE COUNTRY OWNER'S ASSOC	12/13/1985	210.90	El Dorado	INDIAN CREEK
A026722	18583	12463	GREENSTONE COUNTRY OWNER'S ASSOC	2/20/1981	30.00	El Dorado	UNST
A026815	18584	12461	GREENSTONE COUNTRY OWNER'S ASSOC	5/1/1981	1.70	El Dorado	UNST
A026816	18585	12599	GREENSTONE COUNTRY OWNER'S ASSOC	5/1/1981	3.80	El Dorado	UNST
A026817	18586	12600	GREENSTONE COUNTRY OWNER'S ASSOC	5/1/1981	39.00	El Dorado	UNST
A026818	18587	12462	GREENSTONE COUNTRY OWNER'S ASSOC	5/1/1981	4.10	El Dorado	UNST
			GREENSTONE COUNTRY OWNER'S ASSOC Total		391.30		
A003793	1743	590	GREGORY D HAWES	1/10/1924	0.60	El Dorado	COLD STREAM
			GREGORY D HAWES Total		0.60		
A015043	9282	6572	GREGORY M WATSON	10/7/1952	5.00	Placer	UNST
			GREGORY M WATSON Total		5.00		
A016508	10555	5837	GREGORY W PAINTER	10/22/1959	0.10	El Dorado	UNSP (2)
			GREGORY W PAINTER Total		0.10		
A027615	18865	12406	HARLEY DELANO	12/20/1982	0.90	El Dorado	UNST
			HARLEY DELANO Total		0.90		
A026099	18080	11266	HENRIETTA DENNIS	9/27/1979	1.30	El Dorado	UNSP
			HENRIETTA DENNIS Total		1.30		
A006797	3653	1400	HENRIK KAM	9/17/1930	0.20	El Dorado	FORNI CREEK
			HENRIK KAM Total		0.20		
A014439	8850	4857	HENRY TEICHERT	8/23/1951	3.00	Placer	UNXX

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A015338	9553	5071	HENRY TEICHERT	5/12/1953	20.00	Placer	GRAPEVINE RAVINE
			HENRY TEICHERT Total		23.00		
A013839	8361	5452	HENRY WALTHER	7/6/1950	38.00	Placer	UNST
A015077	9273	5687	HENRY WALTHER	11/5/1952	16.00	Placer	UNST
			HENRY WALTHER Total		54.00		
A013419	7692	5430	HIDDEN VALLEY COMMUNITY ASSOC	10/26/1949	165.50	Placer	MINERS RAVINE
A014525	8892	5431	HIDDEN VALLEY COMMUNITY ASSOC	10/16/1951	57.30	Placer	MINERS RAVINE, UNST
			HIDDEN VALLEY COMMUNITY ASSOC Total		222.80		
A012364	8127	4118	JACALYN GAY WINJE	2/27/1948	12.30	El Dorado	UNST
			JACALYN GAY WINJE Total		12.30		
A024351A	017135A	12736	JACK E DEL CONTE	4/27/1990	1.40	Sacramento	LINDA CREEK
			JACK E DEL CONTE Total		1.40		
A008756	4822	2431	JACK R WEAVER	8/8/1936	0.20	El Dorado	UNSP
			JACK R WEAVER Total		0.20		
A025930	17740	11751	JAMES HART	2/28/1979	15.00	El Dorado	UNST
			JAMES HART Total		15.00		
A014370	8994	5229	JAMES PETRIKIN	6/27/1951	50.70	Placer	DIRTY FACE RAVINE
			JAMES PETRIKIN Total		50.70		
A025854	17735	12594	JAMES A CROFF	10/13/1978	6.80	El Dorado	UNST
			JAMES A CROFF Total		6.80		
A007294	3973	1684	JAMES A WATT	6/16/1932	0.20	Alpine	UNSP
			JAMES A WATT Total		0.20		
A009643	5394	2489	JAMES D & JANIS L ALDEA REVOKABLE TRUST	6/26/1939	0.10	El Dorado	UNST
A010477	6004	2967	JAMES D & JANIS L ALDEA REVOKABLE TRUST	6/12/1942	0.30	El Dorado	UNST
			JAMES D & JANIS L ALDEA REVOKABLE TRUST Total		0.40		
A028184	19584	12693	JAMES D MCLAIN	7/6/1984	0.30	El Dorado	UNST
			JAMES D MCLAIN Total		0.30		
A028474	19727	13389	JAMES G CLARK	6/12/1985	0.50	El Dorado	UNST
			JAMES G CLARK Total		0.50		
A012124	7129	6648	JAMES W ARNOLD	10/8/1947	14.00	El Dorado	NORTON RAVINE
			JAMES W ARNOLD Total		14.00		
A019052A	12310	10056	JAMI MANDEL	10/29/1959	7.10	Placer	UNST
			JAMI MANDEL Total		7.10		
A023041	15939	11075	JANICE M SUTHERLAND	5/10/1968	45.00	El Dorado, Placer	CLIPPER CREEK, UNST
			JANICE M SUTHERLAND Total		45.00		
A004597B		000948B	JASON CARDINET	8/20/2004	16.30	Placer	AUBURN RAVINE
			JASON CARDINET Total		16.30		
A004781	2403	943	JEFF LITTLE	9/24/1925	0.40	El Dorado	SOUTH FORK AMERICAN RIVER
			JEFF LITTLE Total		0.40		
A020490	13614	8160	JEFF WEAVER	11/10/1961	1.40	El Dorado	MOSQUITO CREEK
			JEFF WEAVER Total		1.40		
A010751	6237	3966	JEFFREY TILFORD	1/18/1944	149.30	Placer	UNST
A014545	9004	5160	JEFFREY TILFORD	11/1/1951	21.20	Placer	UNXX
			JEFFREY TILFORD Total		170.50		
A022817	15561	11707	JEFFREY C OLSON	6/14/1967	23.00	El Dorado	MARTEL CREEK, UNST
			JEFFREY C OLSON Total		23.00		
A013542	8041	4134	JEFFREY R LEONG	1/18/1950	85.30	Placer	UNCR
			JEFFREY R LEONG Total		85.30		
A014884	9127	8123	JEFFREY S HUBER	7/1/1952	12.00	Placer	CAPS RAVINE

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			JEFFREY S HUBER Total		12.00		
A005601	2905	1003	JEREMIAH FLYNN	7/11/1927	0.30	El Dorado	UNSP
			JEREMIAH FLYNN Total		0.30		
A013502	8031	4853	Jerome Vickrey	12/7/1949	0.80	El Dorado	UNST
			Jerome Vickrey Total		0.80		
A024109	16523	10713	JERRY DUNCAN	7/6/1972	9.00	Placer	UNST
			JERRY DUNCAN Total		9.00		
A019185	12425	7817	JERRY JOHNSON	1/18/1960	35.00	Placer	UNST
			JERRY JOHNSON Total		35.00		
A019392	13781	8664	JERRY W BALLEW	4/26/1960	2.80	El Dorado	UNSP
			JERRY W BALLEW Total		2.80		
A025855	17736	11800	JOANNE K BATEMAN	10/13/1978	15.00	El Dorado	UNST
			JOANNE K BATEMAN Total		15.00		
A012156	7142	3777	JOHN BRIGGS	11/17/1947	10.00	El Dorado	UNST
			JOHN BRIGGS Total		10.00		
A015662	9733	6523	JOHN METROPULOS III	12/28/1953	5.30	El Dorado	SOUTH FORK AMERICAN RIVER
			JOHN METROPULOS III Total		5.30		
A009199	5174	2571	John A. Cunningham	12/3/1937	0.10	El Dorado	COLD STREAM
			John A. Cunningham Total		0.10		
A011813	6852	4317	JOHN C SUNDIN	4/4/1947	1.10	El Dorado	CHUNK CREEK
			JOHN C SUNDIN Total		1.10		
A020259	13374	8114	JOHN E MARLOW	6/12/1961	16.20	El Dorado	UNST
A020514	13836	10791	JOHN E MARLOW	12/5/1961	15.60	El Dorado	UNST
			JOHN E MARLOW Total		31.80		
A007662	4251	1980	JOHN H PETERSON	9/6/1933	0.20	El Dorado	UNSP
			JOHN H PETERSON Total		0.20		
A021802	14569	9251	JOHN P HENDERSON	5/29/1964	28.00	El Dorado	IRISH CREEK
			JOHN P HENDERSON Total		28.00		
A018157	11643	8687	John Ryan Neil	5/26/1958	185.30	El Dorado	UNST
			John Ryan Neil Total		185.30		
A017223	11314	6248	JOHN T LUKKONEN	8/9/1956	266.50	Placer	SAILORS RAVINE
			JOHN T LUKKONEN Total		266.50		
A002190	1003	510	JON KNUDSEN	11/16/1948	87.00	Placer	CAPS RAVINE
			JON KNUDSEN Total		87.00		
A023302	15955	11159	JOSEPH MALONEY	7/2/1969	14.70	El Dorado	UNST
			JOSEPH MALONEY Total		14.70		
A030402	20968	13804	JOSEPH M KEATING	4/6/2010	14.00	El Dorado	UNST
			JOSEPH M KEATING Total		14.00		
A012999	7757	4363	JOSEPH S LANZA	3/24/1949	173.80	El Dorado	FISH CREEK
			JOSEPH S LANZA Total		173.80		
A018684	12034	7387	JOSH L WILSON JR	4/30/1959	3.40	Placer	UNSP
			JOSH L WILSON JR Total		3.40		
A025560	17345	12476	KARL HEMPFLING	11/10/1977	4.00	El Dorado	UNST
A025567	17346	11420	KARL HEMPFLING	11/15/1977	2.40	El Dorado	UNST
			KARL HEMPFLING Total		6.40		
A012240	7239	6374	KATHERINE A TUTTLE	1/13/1948	70.00	El Dorado	WHITE ROCK CANYON
			KATHERINE A TUTTLE Total		70.00		
A025728	17560	12394	KEN JOSEPH	3/17/1989	1.10	El Dorado	UNST
			KEN JOSEPH Total		1.10		
A024875	16908	13688	KENNETH PIMENTEL	12/13/2006	2.50	El Dorado	BRUSHY CANYON

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			KENNETH PIMENTEL Total		2.50		
A013616	8147	3839	KENNETH SAYLOR	3/6/1950	0.20	El Dorado	UNST
			KENNETH SAYLOR Total		0.20		
A027651	19312		KENNETH WILSON	2/10/1983	8,398.10	El Dorado	CANYON CREEK
			KENNETH WILSON Total		8,398.10		
A006685	3565	1290	KENNETH J MAGRI	5/21/1930	0.30	El Dorado	UNCR
			KENNETH J MAGRI Total		0.30		
A018579	11931	7229	KENNETH J TURTON	3/30/1965	15.00	Placer	MORMON RAVINE
			KENNETH J TURTON Total		15.00		
A012885	7656	4479	KENNETH S HILL	12/29/1948	36.00	El Dorado	UNST
			KENNETH S HILL Total		36.00		
A013146	7822	3824	KEVIN CAIRNS	6/9/1949	0.20	El Dorado	EVANS CREEK
			KEVIN CAIRNS Total		0.20		
A010212	5851	3524	KIRKWOOD MOUNTAIN RESORT LLC	5/28/1941	0.20	Alpine	UNSP
A030062	20851		KIRKWOOD MOUNTAIN RESORT LLC	2/7/1992	250.00	Alpine	CAPLES LAKE
A030453	20852		KIRKWOOD MOUNTAIN RESORT LLC	6/8/1995	250.00	Alpine	CAPLES LAKE
			KIRKWOOD MOUNTAIN RESORT LLC Total		500.20		
A010484	6044	3289	KRISTAN OTTO	6/26/1942	0.10	El Dorado	SOUTH FORK AMERICAN RIVER
			KRISTAN OTTO Total		0.10		
A008623	4765	3541	KYBURZ MUTUAL WATER COMPANY	3/30/1936	1.10	El Dorado	SOUTH FORK AMERICAN RIVER
A026486	18511		KYBURZ MUTUAL WATER COMPANY	8/7/1980	146.00	El Dorado	UNST, UNST (2)
			KYBURZ MUTUAL WATER COMPANY Total		147.10		
A013718	8159	4471	LAGUNA HOMEOWNERS ASSOCIATION	5/3/1950	10.00	Placer	UNST
			LAGUNA HOMEOWNERS ASSOCIATION Total		10.00		
A016650	10445	7204	LAKEVIEW HILLS COMMUNITY ASSOCIATION	3/10/1965	113.60	Placer	CARROLL CREEK, MINERS RAVINE
			LAKEVIEW HILLS COMMUNITY ASSOCIATION Total		113.60		
A012040	7093	4445	LARANE INVESTMENTS	8/13/1947	18.00	Placer	GRAPEVINE RAVINE
			LARANE INVESTMENTS Total		18.00		
A025667	17805	11717	LARISA LYSAK	2/2/1978	0.90	Placer	UNST
			LARISA LYSAK Total		0.90		
A021888	15625	10773	Larry Bowser	8/31/1964	2.10	Placer	UNST
			Larry Bowser Total		2.10		
A018617	12314	7997	LARRY JONES	3/31/1959	7.80	Placer	UNST
			LARRY JONES Total		7.80		
A024514A	16976	11409	LARRY R GOULDEN	1/25/1984	12.00	El Dorado	UNST
			LARRY R GOULDEN Total		12.00		
A007316	4014	1942	LAWRENCE E SWENSON	7/8/1932	0.10	El Dorado	UNST
			LAWRENCE E SWENSON Total		0.10		
A021225	14566	10002	LAWRENCE L CABODI	4/8/1963	2.20	El Dorado	UNSP
			LAWRENCE L CABODI Total		2.20		
A008356	4626	1933	LAWRENCE T WELDEN	6/11/1935	0.10	El Dorado	UNSP
			LAWRENCE T WELDEN Total		0.10		
A028467	19739		LEE A CHIUSANO	6/4/1985	2.80	El Dorado	UNST
			LEE A CHIUSANO Total		2.80		
A025315	17212	11457	LEE F SMITH	3/31/1977	7.00	El Dorado	TENNESSEE CREEK
			LEE F SMITH Total		7.00		
A020840	13791	8411	LEO E FINNERAN	7/3/1962	4.00	El Dorado	UNCR
			LEO E FINNERAN Total		4.00		
A013519	8104	5414	LEON M GASTALDI	12/27/1949	83.00	El Dorado	UNST

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			LEON M GASTALDI Total		83.00		
A013292	7867	3787	LEV V RIKOFF	8/11/1949	0.30	El Dorado	UNSP
			LEV V RIKOFF Total		0.30		
A002011	937	152	LEZLIE ELAINE DORSETT	9/18/1920	0.20	El Dorado	UNSP
			LEZLIE ELAINE DORSETT Total		0.20		
A026523	18777	12447	LINDA D WALDECK	9/11/1980	0.30	Placer	UNST
			LINDA D WALDECK Total		0.30		
A019325	12555	8113	LINDA R MURRAY	3/24/1960	9.00	Placer	UNST
			LINDA R MURRAY Total		9.00		
A021407	14357	8866	LINZY L COTHAM JR	7/24/1963	26.60	El Dorado	UNST
			LINZY L COTHAM JR Total		26.60		
A019825	12971	8225	Lionell Williams Trust	10/24/1960	4.50	El Dorado	UNSP
			Lionell Williams Trust Total		4.50		
A013318	7868	3788	LOIS PENMAN	8/29/1949	0.30	El Dorado	UNSP
			LOIS PENMAN Total		0.30		
A018512	12002	7506	LORI JANOWSKI	1/29/1959	25.00	El Dorado	UNCR
A030239	20915		LORI JANOWSKI	3/23/1993	6.00	El Dorado	UNST
			LORI JANOWSKI Total		31.00		
A029223	20717	13677	LOUIS W HEBERT	11/27/2006	1.20	Placer	UNST
			LOUIS W HEBERT Total		1.20		
A013612	8402	3842	LUCILLE HONIG	3/1/1950	10.00	El Dorado	DUTCH MARY RAVINE
			LUCILLE HONIG Total		10.00		
A003910	1970	586	LYDIA BACA	3/18/1924	0.10	El Dorado	UNSP
			LYDIA BACA Total		0.10		
A026406	18219	12068	MARC ALLISON	6/6/1980	0.20	Placer	UNST
			MARC ALLISON Total		0.20		
A019764	12790	7667	MARCIA C TAFFY WARNER	9/30/1960	19.00	El Dorado	MOSQUITO CREEK
			MARCIA C TAFFY WARNER Total		19.00		
A014410	9394	5598	MARK FOSTER	7/30/1951	29.20	Placer	SECRET RAVINE
			MARK FOSTER Total		29.20		
A011258B	6528	9363	MARK HANNUM	1/10/1946	11.80	Placer	UNST
			MARK HANNUM Total		11.80		
A026934	18880	12449	MARTHA J CROWL	7/30/1981	0.60	Placer	UNST
			MARTHA J CROWL Total		0.60		
A010344	5940	3071	Mary Hillabrand	12/12/1941	0.10	El Dorado	UNSP
			Mary Hillabrand Total		0.10		
A008163	4500	3553	MARY WOOD	11/20/1934	3.40	El Dorado	UNSP
			MARY WOOD Total		3.40		
A007070	3919	1555	Mary Leslie Rev. Trust	9/1/1931	0.10	El Dorado	UNST
			Mary Leslie Rev. Trust Total		0.10		
A020796	13838	8489	MELINDA S LAU	5/29/1962	149.50	El Dorado	SHENOGLE CREEK
			MELINDA S LAU Total		149.50		
A019880	13228	10465	MHC TT, INC.	12/16/1960	152.00	Placer	KELLY CREEK
A021480	14567	10466	MHC TT, INC.	10/1/1963	44.00	Placer	KELLY CREEK
			MHC TT, INC. Total		196.00		
A009026	5162	2557	MICHAEL HICKOX	6/28/1937	0.20	El Dorado	UNST
			MICHAEL HICKOX Total		0.20		
A027979	19335	12741	Michael K Baughman	2/17/1984	6.00	Placer	UNST
			Michael K Baughman Total		6.00		
A014244	9003	4648	Michael K Baughman	4/10/1951	161.30	Placer	UNXX

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			Michael K Baughman Total		161.30		
A026057	17953	12833	MICHAEL KIM	7/30/1979	30.00	El Dorado	UNST
			MICHAEL KIM Total		30.00		
A018653	12245	7914	MICHAEL MCCARTY	4/20/1959	3.80	Placer	UNST
			MICHAEL MCCARTY Total		3.80		
A009463	5323	2485	MICHAEL CARL VISMAN	8/4/1942	543.00	El Dorado	COON GULCH
			MICHAEL CARL VISMAN Total		543.00		
A014620	9007	5860	MICHAEL R POSEHN	1/15/1952	1.00	Placer	UNST
			MICHAEL R POSEHN Total		1.00		
A030430	20999		Michael W Dennis	11/22/1994	10.00	Placer	UNST
			Michael W Dennis Total		10.00		
A017382	10898	7668	Michelle D. Menard	12/7/1956	19.00	El Dorado	UNST
			Michelle D. Menard Total		19.00		
A020086	13353	9954	MICHIGAN BLUFF MUTUAL WATER COMPANY	4/13/1961	2.50	Placer	UNXX
A020653	13784	9955	MICHIGAN BLUFF MUTUAL WATER COMPANY	3/14/1962	8.10	Placer	UNSP
A024997	17213	11598	MICHIGAN BLUFF MUTUAL WATER COMPANY	2/18/1976	8.10	Placer	UNSP
A027642	19719	13254	MICHIGAN BLUFF MUTUAL WATER COMPANY	1/31/1983	3.40	Placer	UNSP (AKA BOHEA MINE TUNNEL)
			MICHIGAN BLUFF MUTUAL WATER COMPANY Total		22.10		
A024514B	16976	11410	MIKE LEMIRE	1/25/1984	10.00	El Dorado	SWEETWATER CREEK
A027602	18877	12443	MIKE LEMIRE	4/25/1989	7.00	El Dorado	SWEETWATER CREEK
			MIKE LEMIRE Total		17.00		
A026427	18499	13619	MINERS COVE HOMEOWNERS ASSOCIATION	11/21/2005	15.00	Placer	MINERS RAVINE
			MINERS COVE HOMEOWNERS ASSOCIATION Total		15.00		
A021616	14965	9252	MINERS RAVINE ESTATES HOMEOWNERS ASSOCIATION	1/24/1964	21.00	Placer	MINERS RAVINE
			MINERS RAVINE ESTATES HOMEOWNERS ASSOCIATION Total		21.00		
A017414	12359	7015	MITCHELL D HOPE	3/20/1964	25.50	Placer	MINERS RAVINE
			MITCHELL D HOPE Total		25.50		
A011264	6934	10829	MT RALSTON PROPERTIES ASSN INC	8/2/2005	13.20	El Dorado	TAMARACK CREEK
A015623	10214	10830	MT RALSTON PROPERTIES ASSN INC	8/2/2005	6.00	El Dorado	TAMARACK CREEK
A026577	18519	12457	MT RALSTON PROPERTIES ASSN INC	8/2/2005	23.60	El Dorado	UNSP
			MT RALSTON PROPERTIES ASSN INC Total		42.80		
A018485	12089	9025	N JON NELSON	1/21/1959	3.10	El Dorado	CHINA CREEK
			N JON NELSON Total		3.10		
A009358	5288	2246	NANCY BAUER	7/29/1938	0.10	El Dorado	UNST
			NANCY BAUER Total		0.10		
A011097	6445	3024	NANCY BALCH-PRICE FISCHER	7/5/1945	0.10	Alpine	UNSP
			NANCY BALCH-PRICE FISCHER Total		0.10		
A004027	1878	893	NANCY E DOLCINI	6/14/1924	0.70	El Dorado	UNSP
			NANCY E DOLCINI Total		0.70		
A006529	5805	4403	NEVADA IRRIGATION DISTRICT	1/9/1930	3,411.60	Placer	AUBURN RAVINE
A008177	5812	12801	NEVADA IRRIGATION DISTRICT	11/27/1934	1,580.00	Placer	UNST (AKA WILSON CRK)
			NEVADA IRRIGATION DISTRICT Total		4,991.60		
A019872	13025	8108	New Forestry, LLC	12/9/1960	3.70	Placer	UNSP
			New Forestry, LLC Total		3.70		
A017207	10885	8289	NIKOLAI BARADIN	8/3/1956	35.00	El Dorado	UNST
			NIKOLAI BARADIN Total		35.00		

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A025424	17385	12027	NORMA JEAN SCHNEIDER	7/11/1977	2.10	El Dorado	UNST
A025425	17386	11497	NORMA JEAN SCHNEIDER	7/11/1977	2.00	El Dorado	UNST
			NORMA JEAN SCHNEIDER Total		4.10		
A025144	19837	13175	NORTH CANYON LAKE ASSOCIATION	9/10/1976	35.00	El Dorado	NORTH CANYON CREEK
			NORTH CANYON LAKE ASSOCIATION Total		35.00		
A014794	9291	9738	NORTH FORK ASSOCIATION	5/5/1952	22.00	Placer	FREEMAN CREEK
			NORTH FORK ASSOCIATION Total		22.00		
A011836	6927	4243	NORTHERN CALIFORNIA CONFERENCE ASSOC OF 7TH DAY ADVENTISTS	4/22/1947	13.00	El Dorado	MOUND SPRINGS CREEK
A013592	8214	4244	NORTHERN CALIFORNIA CONFERENCE ASSOC OF 7TH DAY ADVENTISTS	2/20/1950	20.00	El Dorado	MOUND SPRINGS CREEK
			NORTHERN CALIFORNIA CONFERENCE ASSOC OF 7TH DAY ADVENTISTS Total		33.00		
A004219	2598	941	ORENO J TONARELLI	9/17/1924	0.20	El Dorado	COLD STREAM
			ORENO J TONARELLI Total		0.20		
A026078	17930	11863	ORVILLE F SLINGSBY	8/28/1979	0.30	Placer	UNST
			ORVILLE F SLINGSBY Total		0.30		
A026633	18492	12411	OSCAR R CAMPBELL JR	11/25/1980	0.20	El Dorado	UNST
			OSCAR R CAMPBELL JR Total		0.20		
A014229	8620	6653	OUR LADY OF THE OAKS, A CALIF CORP	4/5/1951	63.00	Placer	UNST
			OUR LADY OF THE OAKS, A CALIF CORP Total		63.00		
A004597A		000948A	PATRIC JAMES HILLENBRAND LIVING TRUST	8/20/2004	21.00	Placer	AUBURN RAVINE
			PATRIC JAMES HILLENBRAND LIVING TRUST Total		21.00		
A021423	14598	8781	PATRICIA MCCORMICK	8/8/1963	0.20	El Dorado	STATION CREEK
			PATRICIA MCCORMICK Total		0.20		
A016326	11492	7303	Patty A Hooper	6/9/1965	318.60	Placer	UNST (2)
			Patty A Hooper Total		318.60		
A013994	8520	5323	PATTY BERRY	10/13/1950	2.50	El Dorado	UNSP
A022051	15106	9620	PATTY BERRY	2/24/1965	0.60	El Dorado	UNSP (2)
A022053	15108	9625	PATTY BERRY	2/24/1965	0.10	El Dorado	UNSP (2)
			PATTY BERRY Total		3.20		
A020326	13199	9365	Paul Perron	7/26/1961	23.00	Placer	UNST
			Paul Perron Total		23.00		
A006842	3735	1467	PAUL HEWES	12/6/1930	0.90	El Dorado	FORNI CREEK
			PAUL HEWES Total		0.90		
A017571C	11120	9733	PAUL NIPPERT	4/25/1957	4.10	Placer	ANTELOPE CREEK
			PAUL NIPPERT Total		4.10		
A024146	16670	10954	PAUL THOMASSON	8/17/1972	2.00	El Dorado	OTTER CREEK
			PAUL THOMASSON Total		2.00		
A004344	2305	1423	Paul A Zanetta	4/10/1934	18.10	El Dorado	MILL CREEK
			Paul A Zanetta Total		18.10		
A025973	17940	11867	PAUL S BURNS	4/16/1979	0.10	Placer	UNST
			PAUL S BURNS Total		0.10		
A013160	8316	4332	PAULA S DWELLY	6/17/1949	11.60	Placer	LIVE OAK RAVINE (AKA LIVE OAK CREEK)
			PAULA S DWELLY Total		11.60		
A007018	3808	1837	PAULINE RODGERS	7/25/1931	0.30	El Dorado	UNSP
			PAULINE RODGERS Total		0.30		
A016327	11493	7912	PETE JENSON	4/7/1967	32.00	Placer	UNST

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			PETE JENSON Total		32.00		
A018858	12718	7828	PETER M LA TONA	7/15/1959	2.30	Placer	MINERS RAVINE
			PETER M LA TONA Total		2.30		
A001923	843	352	PETER N BERBOHM	5/12/1924	30.30	Placer	SAILORS RAVINE
			PETER N BERBOHM Total		30.30		
A003982	1791	1111	PETER R BOHLEY	5/8/1924	2.70	El Dorado	EVANS CREEK
A022299	15076	10250	PETER R BOHLEY	10/1/1965	0.20	El Dorado	EVANS CREEK
			PETER R BOHLEY Total		2.90		
A013576	8457	4797	PILOT HILL ESTATES HOMEOWNERS ASSOC	2/9/1950	57.00	El Dorado	UNST
			PILOT HILL ESTATES HOMEOWNERS ASSOC Total		57.00		
A018085	13856		PLACER COUNTY WATER AGENCY	4/7/1958	839,438.40	Placer, Sacramento	DUNCAN CANYON, MIDDLE FORK AMERICAN RIVER, NORTH FORK AMERICAN RIVER, RUBICON RIVER
A018087	13858		PLACER COUNTY WATER AGENCY	4/8/1958	451,592.40	Placer, Sacramento	MIDDLE FORK AMERICAN RIVER, NORTH FORK AMERICAN RIVER, NORTH FORK LONG CANYON, RUBICON RIVER, SOUTH FORK LONG CANYON
			PLACER COUNTY WATER AGENCY Total		1,291,030.80		
A003887A		001093A	PLASSE HOMESTEAD WATER ASSOCIATION	1/29/2003	1.10	Amador	UNSP, UNST
			PLASSE HOMESTEAD WATER ASSOCIATION Total		1.10		
A003887B		001093B	PLASSE'S MEADOW GROUP LLC	1/29/2003	1.90	Amador	UNSP, UNST
			PLASSE'S MEADOW GROUP LLC Total		1.90		
A018095	11572	10371	QUINTETTE SERVICE	4/17/1958	9.30	El Dorado	CRYSTAL SPRING
			QUINTETTE SERVICE Total		9.30		
A019052B	12310	10057	R W VELON	7/20/2004	7.10		
			R W VELON Total		7.10		
A013520	8423	3833	RALPH MILLER	12/27/1949	40.00	El Dorado	UNST
			RALPH MILLER Total		40.00		
A026940	18496	12409	Randolph G Wilson	8/4/1981	1.00	El Dorado	UNST
			Randolph G Wilson Total		1.00		
A006801	3746	1802	RAYMOND BENDER	9/20/1930	0.30	El Dorado	UNSP
			RAYMOND BENDER Total		0.30		
A018189	11652	6789	RAYMOND KRINGEL	6/10/1963	1.70	El Dorado	UNST
			RAYMOND KRINGEL Total		1.70		
A006414	3366	1803	RAYMOND A YOUNG	8/19/1929	0.10	El Dorado	UNSP
			RAYMOND A YOUNG Total		0.10		
A013644	8219	5979	RAYMOND BEST PATCHEN	3/22/1950	110.00	El Dorado	MANHATTAN CREEK
			RAYMOND BEST PATCHEN Total		110.00		
A006410	3669	1904	RAYMOND W LARSEN	8/16/1929	362.00	El Dorado	SOUTH FORK BRUSH CANYON
			RAYMOND W LARSEN Total		362.00		
A019633	12835	7725	RICHARD E. FREY	8/1/1960	42.50	Placer	UNST
			RICHARD E. FREY Total		42.50		
A007647	4207	1652	RICHARD FIELLEN	8/14/1933	1.10	El Dorado	ROCKY CANYON
			RICHARD FIELLEN Total		1.10		
A013829	8347	4092	RICHARD C PAYNE & RUTH L PAYNE FAMILY TRUST	7/5/1950	0.10	El Dorado	UNSP

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			RICHARD C PAYNE & RUTH L PAYNE FAMILY TRUST Total		0.10		
A012184	7096	3602	RICHARD E AKIN	12/3/1947	29.20	El Dorado	UNST
			RICHARD E AKIN Total		29.20		
A008698	4803	2471	RICHARD K JONES	6/8/1936	0.10	El Dorado	UNST
			RICHARD K JONES Total		0.10		
A002262	938	491	RICHARD L GALLAGHER	3/15/1921	1.20	El Dorado	COLD STREAM
			RICHARD L GALLAGHER Total		1.20		
A028122	19361	12714	RICHARD SCOTT HEER	4/26/1984	3.00	El Dorado	UNST
			RICHARD SCOTT HEER Total		3.00		
A019328	12673	7810	RICK MANICA	3/28/1960	21.00	El Dorado	OTTER CREEK
			RICK MANICA Total		21.00		
A001778	819	789	RICK MASSIE	4/17/1975	27.00	Placer	CLOVER VALLEY CREEK
			RICK MASSIE Total		27.00		
A014377	8812	4865	Robert Aichele	6/28/1951	0.10	El Dorado	ROCKY CANYON
			Robert Aichele Total		0.10		
A009728	5617	2573	ROBERT BRUCIA	9/18/1939	0.10	El Dorado	STATION CREEK
			ROBERT BRUCIA Total		0.10		
A020627A	13629	008487A	ROBERT DEITZ II	8/13/1992	4.50	El Dorado	UNST
			ROBERT DEITZ II Total		4.50		
A024672	16897	11435	ROBERT B JORDAN	8/16/1974	14.90	El Dorado	JOHNTOWN CREEK
			ROBERT B JORDAN Total		14.90		
A024888	17819	12469	ROBERT D BERGTHOLD	9/29/1975	1.00	Placer	MINERS RAVINE
			ROBERT D BERGTHOLD Total		1.00		
A011142	6453	3354	ROBERT E JONES	5/24/1963	0.10	El Dorado	SOUTH FORK AMERICAN RIVER
			ROBERT E JONES Total		0.10		
A013740	8740	5312	Robert E Woodward, Jr	5/15/1950	33.00	Placer	UNST
			Robert E Woodward, Jr Total		33.00		
A024948	16889	11244	ROBERT H AND ERIKA L ANDERSON REVOCABLE TRUST	12/3/1975	4.30	El Dorado	UNST
			ROBERT H AND ERIKA L ANDERSON REVOCABLE TRUST Total		4.30		
A012181	7152	4478	ROBERT H POWELL	12/1/1947	7.00	El Dorado	UNST
			ROBERT H POWELL Total		7.00		
A025495	17339	13232	ROBERT I RIDGWAY	9/2/1977	1.40	El Dorado	UNST
			ROBERT I RIDGWAY Total		1.40		
A025453	17375	12048	ROBERT N DUPRIEST	8/10/1977	0.40	Placer	UNST
			ROBERT N DUPRIEST Total		0.40		
A006263	3318	1122	ROBERT P STANLEY	4/20/1929	0.10	El Dorado	UNSP
			ROBERT P STANLEY Total		0.10		
A020018	13096	7970	Roberta Kanter	3/6/1961	1.00	Placer	UNST
			Roberta Kanter Total		1.00		
A020827	13966	9648	RODNEY PIMENTAL	6/22/1962	5.00	El Dorado	UNST
			RODNEY PIMENTAL Total		5.00		
A028821	19942	13743	ROGER E TURNER	10/31/2007	1.30	Placer	DRY CREEK
			ROGER E TURNER Total		1.30		
A008951	4960	2152	ROLF W MORROW	4/22/1937	0.10	El Dorado	UNSP
			ROLF W MORROW Total		0.10		
A003934	1848	2369	RONALD JAVOR	3/31/1924	0.40	El Dorado	UNSP
			RONALD JAVOR Total		0.40		

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A007387	4140	1820	RONALD E MINER	9/23/1932	0.20	El Dorado	UNSP
			RONALD E MINER Total		0.20		
A003496	1509	488	RONALD J BELL	7/2/1923	0.30	El Dorado	UNSP
			RONALD J BELL Total		0.30		
A017173	11536	6987	RONALD J COLEMAN	7/12/1956	25.50	Placer	UNST
			RONALD J COLEMAN Total		25.50		
A012463	7383	3771	RONALD N HUSTON	4/7/1948	24.00	El Dorado	INDIAN CREEK, UNST
			RONALD N HUSTON Total		24.00		
A021171	14326	9258	RONALD ROSS CLOVER	2/27/1963	1.70	Placer	SECRET RAVINE
			RONALD ROSS CLOVER Total		1.70		
A013233	7831	10052	ROSE ANN GUTIERREZ	7/13/1949	121.00	El Dorado	PILOT CREEK
A023937	16494	11030	ROSE ANN GUTIERREZ	12/6/1971	19.00	El Dorado	PILOT CREEK
A023938	16493	11031	ROSE ANN GUTIERREZ	12/6/1971	16.00	El Dorado	UNST
			ROSE ANN GUTIERREZ Total		156.00		
A021876	14859	9227	RSC DEVELOPMENT CORPORATION	8/24/1964	57.10	Placer	DUTCH RAVINE
			RSC DEVELOPMENT CORPORATION Total		57.10		
A023903	16642	10803	RYAN ENNIS	10/22/1971	0.90	El Dorado	UNSP
			RYAN ENNIS Total		0.90		
A025122	16986	11267	S360 Granite Lakes LLC	8/2/1976	10.00	Placer	UNST
			S360 Granite Lakes LLC Total		10.00		
A008011	4474	2509	SACRAMENTO MOUNTAINEERS	7/5/1934	1.00	El Dorado	UNSP
			SACRAMENTO MOUNTAINEERS Total		1.00		
A025316	17145	11453	SACRAMENTO VALLEY TEEN CHALLENGE INC	3/31/1976	6.00	Placer	UNST
			SACRAMENTO VALLEY TEEN CHALLENGE INC Total		6.00		
A026969	18764	13757	Saeed Zarakani	3/20/2008	3.00	Placer	UNST
			Saeed Zarakani Total		3.00		
A026137	18210	12245	SALLY MARKSTEIN	11/19/1979	1.40	Placer	UNST
			SALLY MARKSTEIN Total		1.40		
A005830	4009	6324	San Juan Water District	2/11/1928	4,581.90	Placer	NORTH FORK AMERICAN RIVER
			San Juan Water District Total		4,581.90		
A022515	15318	9950	SCHOENNAUER FAMILY PARTNERSHIP	6/30/1966	12.00	El Dorado	RINGOLD CREEK
			SCHOENNAUER FAMILY PARTNERSHIP Total		12.00		
A011917	7176	10135	SCHUBIN RANCH LP	6/5/1947	83.00	El Dorado	UNST
A013663	8222	10134	SCHUBIN RANCH LP	3/30/1950	150.00	El Dorado	UNST
A014778	9141	10136	SCHUBIN RANCH LP	4/25/1952	90.00	El Dorado	UNST
			SCHUBIN RANCH LP Total		323.00		
A003321	1554	5488	SCIOTS TRACT CABIN OWNERS ASSN	3/23/1923	15.60	El Dorado	CODY CREEK
			SCIOTS TRACT CABIN OWNERS ASSN Total		15.60		
A005683	3035	1201	SCOTT E ADAMS	9/7/1927	0.10	El Dorado	UNSP
			SCOTT E ADAMS Total		0.10		
A018320	11778	6978	SCOTT KRIGER	9/16/1958	1.30	El Dorado	CHINA CREEK
			SCOTT KRIGER Total		1.30		
A007340	4026	2295	Sharon Warden	8/6/1932	0.10	El Dorado	UNSP
A007341	4027	1584	Sharon Warden	8/6/1932	0.10	El Dorado	UNSP
			Sharon Warden Total		0.20		
A010325	5939	3291	SHARON L CAMERON	11/21/1941	0.10	El Dorado	UNSP
A020256A	13189	9779	SHARON L CAMERON	5/5/1971	2.60	El Dorado	WHITE ROCK CREEK
			SHARON L CAMERON Total		2.70		

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A028993	20394	13325	SHIRLAND LAKEVIEW ESTATES HOMEOWNERS ASSOC	3/24/1987	6.60	Placer	UNST
			SHIRLAND LAKEVIEW ESTATES HOMEOWNERS ASSOC Total		6.60		
A018955	12217	8621	SHIRLIE ROBERTS	9/1/1959	9.70	El Dorado	JOHNTOWN CREEK
			SHIRLIE ROBERTS Total		9.70		
A020601	14248		SIERRA LAKES COUNTY WATER DISTRICT	1/3/1964	1,177.00	Placer	ICE LAKES
			SIERRA LAKES COUNTY WATER DISTRICT Total		1,177.00		
A019114	12541	9031	SIERRA PACIFIC INDUSTRIES	12/2/1959	1.10	El Dorado	ONION CREEK
			SIERRA PACIFIC INDUSTRIES Total		1.10		
A028208B	019433B	13036	SILVER SPRINGS LLC	3/8/1991	0.50	El Dorado	UNST
			SILVER SPRINGS LLC Total		0.50		
A019119	12388	9032	SLEEPY HOLLOW OWNERS ASSOCIATION	12/3/1959	47.50	El Dorado	UNST
			SLEEPY HOLLOW OWNERS ASSOCIATION Total		47.50		
A010012	5671	7195	SOUTHFORK PARTNERSHIP	9/24/1940	23.00	Placer	BADGER RAVINE, UNST
			SOUTHFORK PARTNERSHIP Total		23.00		
A012180	7151	4477	STAR-CREST LUMBER, INC	12/1/1947	49.00	El Dorado	UNST
A013257	8373	4480	STAR-CREST LUMBER, INC	7/25/1949	7.70	El Dorado	UNST
			STAR-CREST LUMBER, INC Total		56.70		
A025310	17844	11713	STEPHEN HOFFMAN	3/29/1977	4.50	El Dorado	UNST
			STEPHEN HOFFMAN Total		4.50		
A006080	3181	2038	STEPHEN RULAND	10/3/1928	0.10	El Dorado	UNSP
			STEPHEN RULAND Total		0.10		
A021185	14483	10075	STEPHEN C MARIANOS	3/8/1963	6.00	El Dorado	WEBER CREEK
			STEPHEN C MARIANOS Total		6.00		
A025380	17876	12386	STEPHEN W BEAM	6/2/1977	0.60	El Dorado	UNST
			STEPHEN W BEAM Total		0.60		
A006549	3477	1888	STEVEN BENNETTS	2/4/1930	20.40	El Dorado	EMIGRANT RAVINE CREEK
			STEVEN BENNETTS Total		20.40		
A019922	13052	9923	STEVEN FORD	1/17/1961	3.20	El Dorado	UNST
			STEVEN FORD Total		3.20		
A015298	9533	5660	STONEWORTH INC	4/17/1953	73.30	Placer	SOUTH FORK DRY CREEK
A018752	12366	7519	STONEWORTH INC	5/29/1959	152.00	Placer	SOUTH FORK DRY CREEK
			STONEWORTH INC Total		225.30		
A020144	13369	8089	Susan McElhone	5/23/1961	0.10	Placer	UNST
			Susan McElhone Total		0.10		
A016885	10910	7612	SUSAN A FREDERICKS	2/8/1956	15.00	El Dorado	UNST
A021232	14404	10098	SUSAN A FREDERICKS	4/10/1963	7.20	El Dorado	UNST
			SUSAN A FREDERICKS Total		22.20		
A025340	17257	11601	Susan D Hobbs	4/22/1977	8.00	El Dorado	UNST
			Susan D Hobbs Total		8.00		
A026023	18081	11847	SWANSBORO COUNTRY PROPERTY OWNERS ASSOCIATION INC	6/13/1979	23.00	El Dorado	UNST
A026024	18082	11928	SWANSBORO COUNTRY PROPERTY OWNERS ASSOCIATION INC	6/13/1979	40.50	El Dorado	UNST
A026025	18083	11848	SWANSBORO COUNTRY PROPERTY OWNERS ASSOCIATION INC	6/13/1979	17.00	El Dorado	REDBIRD CREEK

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A026026	18084	11984	SWANSBORO COUNTRY PROPERTY OWNERS ASSOCIATION INC	6/13/1979	7.10	El Dorado	UNST
A026027	18085	11849	SWANSBORO COUNTRY PROPERTY OWNERS ASSOCIATION INC	6/13/1979	40.00	El Dorado	UNST
A028792	20056	13240	SWANSBORO COUNTRY PROPERTY OWNERS ASSOCIATION INC	2/3/1986	9.00	El Dorado	UNST
			SWANSBORO COUNTRY PROPERTY OWNERS ASSOCIATION INC Total		136.60		
A009269	5187	2694	SWORD & SANDALS INC	4/13/1938	0.60	El Dorado	UNCR
			SWORD & SANDALS INC Total		0.60		
A024351B	017135B	13157	TANYA M BOYD	4/27/1990	0.80	Sacramento	LINDA CREEK
			TANYA M BOYD Total		0.80		
A008791	4877	3191	TAYLOR T WHEELER	9/14/1936	0.10	El Dorado	UNSP
			TAYLOR T WHEELER Total		0.10		
A022478	15551	10769	TERENCE A HALL	5/27/1966	15.00	El Dorado	EMPIRE CREEK
			TERENCE A HALL Total		15.00		
A029233	20340		TERRIL R LUKENS EXEMPTION TRUST & LUKEN SURVIVOR'S TRUST UDT	4/19/1988	181.00	Placer	UNSP
			TERRIL R LUKENS EXEMPTION TRUST & LUKEN SURVIVOR'S TRUST UDT Total		181.00		
A007036	3799	1416	Terry D. Herringshaw	8/10/1931	0.20	El Dorado	UNSP
			Terry D. Herringshaw Total		0.20		
A011055	6442	3324	THE BRUCE & PAT BLAIKIE FAMILY TRUST DATED 5/20/1993	5/22/1945	0.20	El Dorado	SOUTH FORK AMERICAN RIVER
			THE BRUCE & PAT BLAIKIE FAMILY TRUST DATED 5/20/1993 Total		0.20		
A022465	15447	9913	The Pepper Family Trust	5/13/1966	1.50	El Dorado	BURNT SHANTY CREEK
			The Pepper Family Trust Total		1.50		
A006440	3396	1549	THE RITO S CASTANON FAMILY TRUST	9/18/1929	0.10	El Dorado	UNST
			THE RITO S CASTANON FAMILY TRUST Total		0.10		
A020627D	13629	008487D	THOMAS WALTERS	8/13/1992	25.20	El Dorado	UNST
			THOMAS WALTERS Total		25.20		
A020627B	13629	008487B	THOMAS E WALTERS	8/13/1992	1.30	El Dorado	UNST
			THOMAS E WALTERS Total		1.30		
A026981	19271	12888	THOMAS L PIATANESI	9/2/1981	7.00	El Dorado	UNST
			THOMAS L PIATANESI Total		7.00		
A017411	11024	6810	THOMAS S VAN HORNE	12/27/1956	17.00	Placer	UNST
			THOMAS S VAN HORNE Total		17.00		
A004510	2315	776	TIFFANY HOLBROOK	3/19/1925	6.50	El Dorado	UNSP
			TIFFANY HOLBROOK Total		6.50		
A017108	11013	7716	TIMBERLAKE ESTATES HOMEOWNERS ASSOC	5/29/1956	12.00	Placer	UNST
			TIMBERLAKE ESTATES HOMEOWNERS ASSOC Total		12.00		
A007788	4294	1674	TIMOTHY B COLLINS	12/26/1933	0.20	El Dorado	UNSP
			TIMOTHY B COLLINS Total		0.20		
A022062	15099	9129	TIMOTHY J MANDELLA	3/1/1965	0.40	El Dorado	UNSP (2)
			TIMOTHY J MANDELLA Total		0.40		
A006817	3718	1906	TONY PLANCHON	10/8/1930	0.20	El Dorado	UNST
			TONY PLANCHON Total		0.20		
A006988	3836	1343	TRACY ANN BRENNAN-MULLIGAN	6/29/1931	0.10	El Dorado	ROCK CREEK

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A018807	12161	6790	TRACY ANN BRENNAN-MULLIGAN	6/17/1959	0.10	El Dorado	SOUTH FORK AMERICAN RIVER
			TRACY ANN BRENNAN-MULLIGAN Total		0.20		
A016402	10552	6008	TROOP #1 B S A	6/2/1955	0.50	El Dorado	CODY LAKE, UNSP
			TROOP #1 B S A Total		0.50		
A004597C		000948C	Trudy Reed, et al	8/20/2004	8.20	Placer	AUBURN RAVINE
			Trudy Reed, et al Total		8.20		
A022914	15682	13080	TRUST OF WILLIAM & MARY ROTHAUS	9/29/1967	3.00	El Dorado	JOHNTOWN CREEK
A025406	17863	13081	TRUST OF WILLIAM & MARY ROTHAUS	6/24/1977	15.00	El Dorado	JOHNTOWN CREEK
			TRUST OF WILLIAM & MARY ROTHAUS Total		18.00		
A018106	11630	6767	TRUSTEN B WADSWORTH	4/28/1958	2.00	El Dorado	UNST
			TRUSTEN B WADSWORTH Total		2.00		
A021880	14767	9277	TWILIGHT RIDE LLC	8/26/1964	0.80	Placer	UNST
			TWILIGHT RIDE LLC Total		0.80		
A012046	7203	6975	Tyson Muncher	1/28/1964	31.10	El Dorado	EAST FORK SAWMILL CREEK, SAWMILL CREEK
			Tyson Muncher Total		31.10		
A002141	936	245	U S ELDORADO NATL FOREST	12/17/1920	1.20	El Dorado	COLD STREAM
A003879	1719	534	U S ELDORADO NATL FOREST	2/28/1924	0.10	El Dorado	ATWOOD SPRING
A004722	2382	1420	U S ELDORADO NATL FOREST	8/6/1925	0.30	El Dorado	UNSP
A004740	2383	2102	U S ELDORADO NATL FOREST	8/19/1925	2.30	El Dorado	UNST
A005142	2644	1001	U S ELDORADO NATL FOREST	8/4/1926	0.50	El Dorado	UNST
A006730	3585	2405	U S ELDORADO NATL FOREST	4/14/1930	0.50	El Dorado	UNSP
A007196	3959	1679	U S ELDORADO NATL FOREST	2/27/1932	3.00	Amador	UNST
A007304	4010	2441	U S ELDORADO NATL FOREST	6/27/1932	0.10	El Dorado	UNSP
A007498	4170	4543	U S ELDORADO NATL FOREST	2/7/1933	0.80	El Dorado	UNST
A007522	4163	4099	U S ELDORADO NATL FOREST	3/24/1933	0.60	Alpine	UNST
A008271	4576	1856	U S ELDORADO NATL FOREST	3/4/1935	0.40	El Dorado	UNSP
A008582	4761	3767	U S ELDORADO NATL FOREST	3/11/1936	0.50	El Dorado	ASPEN CREEK
A008929	4944	2159	U S ELDORADO NATL FOREST	3/30/1937	3.30	El Dorado	COX CREEK
A008936	4984	3972	U S ELDORADO NATL FOREST	4/3/1937	3.40	Amador	UNSP
A009058	5052	2161	U S ELDORADO NATL FOREST	7/29/1937	0.40	El Dorado	UNSP
A009086	5020	2164	U S ELDORADO NATL FOREST	8/21/1937	2.60	El Dorado	FRY CREEK
A009087	5021	2165	U S ELDORADO NATL FOREST	8/21/1937	1.30	El Dorado	UNST
A009120	5050	3254	U S ELDORADO NATL FOREST	9/18/1937	1.00	El Dorado	ROCKY CANYON
A009122	5051	2336	U S ELDORADO NATL FOREST	9/21/1937	0.60	El Dorado	ROCKY CANYON
A009128	5100	2166	U S ELDORADO NATL FOREST	9/27/1937	0.20	El Dorado	PYRAMID CREEK
A009129	5101	2167	U S ELDORADO NATL FOREST	9/27/1937	0.20	El Dorado	PYRAMID CREEK
A009189	5104	2168	U S ELDORADO NATL FOREST	11/27/1937	0.70	El Dorado	UNSP
A009251	5195	3922	U S ELDORADO NATL FOREST	3/4/1938	5.20	Amador	BLACK ROCK SPRING
A009289	5177	4059	U S ELDORADO NATL FOREST	5/6/1938	1.10	El Dorado	OATES SPRING
A009298	5178	3129	U S ELDORADO NATL FOREST	5/19/1938	0.70	El Dorado	OLANIE SPRING
A009310	5191	3256	U S ELDORADO NATL FOREST	6/6/1938	0.50	El Dorado	SNOW SLIDE CREEK
A009399	5261	3388	U S ELDORADO NATL FOREST	8/26/1938	0.90	El Dorado	UNSP
A009408	5251	4016	U S ELDORADO NATL FOREST	9/10/1938	0.30	El Dorado	UNST
A009425	5273	2337	U S ELDORADO NATL FOREST	9/24/1938	0.30	El Dorado	UNSP
A009655	5407	2864	U S ELDORADO NATL FOREST	7/5/1939	1.80	Placer	BUCKEYE SPRING
A009843	5566	3273	U S ELDORADO NATL FOREST	2/28/1940	1.00	El Dorado	UNSP
A009869	5580	2865	U S ELDORADO NATL FOREST	4/9/1940	0.50	El Dorado	UNST
A009884	5581	2866	U S ELDORADO NATL FOREST	4/26/1940	1.30	El Dorado	UNCR
A009890	5588	2867	U S ELDORADO NATL FOREST	5/8/1940	1.10	El Dorado	ASPEN CREEK

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A009955	5646	3502	U S ELDORADO NATL FOREST	7/20/1940	1.90	El Dorado	BRYANT FORK CREEK
A010110	5844	5870	U S ELDORADO NATL FOREST	2/5/1941	5.30	Amador	SHEEP CORRAL CREEK
A010192	5858	3161	U S ELDORADO NATL FOREST	4/29/1941	0.20	Alpine	ROSS SPRING
A010289	5907	2921	U S ELDORADO NATL FOREST	9/24/1941	0.20	El Dorado	UNST
A010360	5977	4095	U S ELDORADO NATL FOREST	1/13/1942	0.20	El Dorado	UNST
A010385	5979	2948	U S ELDORADO NATL FOREST	2/6/1942	0.30	El Dorado	STATION CREEK
A010405	5980	3288	U S ELDORADO NATL FOREST	3/16/1942	2.00	El Dorado	UNSP
A010463	5975	2933	U S ELDORADO NATL FOREST	5/16/1942	2.00	El Dorado	UNST
A010593	6143	4548	U S ELDORADO NATL FOREST	1/25/1943	1.80	El Dorado	CHAMPAGNE CANYON, UNST
A010604	6178	3643	U S ELDORADO NATL FOREST	2/24/1943	0.20	El Dorado	ASPEN CREEK
A010608	6179	4044	U S ELDORADO NATL FOREST	3/4/1943	0.70	El Dorado	UNSP
A010614	6144	3297	U S ELDORADO NATL FOREST	3/16/1943	6.90	El Dorado	ALDER CREEK
A010773	6281	2940	U S ELDORADO NATL FOREST	2/23/1944	0.10	El Dorado	UNST
A010821	6282	4870	U S ELDORADO NATL FOREST	5/19/1944	12.70	El Dorado	CODY CREEK
A010823	6283	3084	U S ELDORADO NATL FOREST	5/26/1944	1.00	El Dorado	UNSP, UNST
A010827	6284	5654	U S ELDORADO NATL FOREST	6/5/1944	5.20	El Dorado	UNSP
A011256	6733	7767	U S ELDORADO NATL FOREST	1/10/1946	44.90	El Dorado	TAMARACK FLAT CREEK
A011370	6734	3497	U S ELDORADO NATL FOREST	4/12/1946	0.20	El Dorado	UNST
A011464	6682	3573	U S ELDORADO NATL FOREST	7/10/1946	0.10	El Dorado	FORNI CREEK
A011608	6759	3330	U S ELDORADO NATL FOREST	11/6/1946	0.20	El Dorado	FRY CREEK
A011742	6881	3419	U S ELDORADO NATL FOREST	2/25/1947	0.20	El Dorado	ROCKY CANYON
A011867	7003	3395	U S ELDORADO NATL FOREST	5/9/1947	0.10	El Dorado	UNSP
A011893	6976	4861	U S ELDORADO NATL FOREST	5/26/1947	0.70	El Dorado	ASPEN CREEK
A011971	7009	4744	U S ELDORADO NATL FOREST	7/3/1947	0.50	El Dorado	SAYLES CANYON
A012000	7051	3346	U S ELDORADO NATL FOREST	7/21/1947	0.70	El Dorado	UNST
A012057	7081	3399	U S ELDORADO NATL FOREST	8/26/1947	0.20	El Dorado	UNSP
A012397	7324	3721	U S ELDORADO NATL FOREST	3/12/1948	0.20	El Dorado	PYRAMID CREEK
A012552	7449	5535	U S ELDORADO NATL FOREST	6/22/1948	1.20	El Dorado	BULL CREEK
A013383	7911	3834	U S ELDORADO NATL FOREST	10/5/1949	0.50	El Dorado	UNSP
A013410	8004	3797	U S ELDORADO NATL FOREST	10/24/1949	0.10	Alpine	JONES SPRING
A013653	8136	6630	U S ELDORADO NATL FOREST	3/27/1950	1.70	El Dorado	BRYAN CREEK
A014409	9031	4382	U S ELDORADO NATL FOREST	7/27/1951	0.10	El Dorado	UNSP
A014452	9026	4713	U S ELDORADO NATL FOREST	8/29/1951	0.40	El Dorado	UNSP
A014902	9262	4533	U S ELDORADO NATL FOREST	7/10/1952	483.70	El Dorado	ASPEN CREEK
A015490	10028	4996	U S ELDORADO NATL FOREST	8/31/1953	55.00	El Dorado	SMITH LAKE
A015492	10029	4997	U S ELDORADO NATL FOREST	8/31/1953	54.00	El Dorado	CLYDE LAKE
A015493	10030	4998	U S ELDORADO NATL FOREST	8/31/1953	30.00	El Dorado	TOEM LAKE
A015494	10031	4999	U S ELDORADO NATL FOREST	8/31/1953	160.00	El Dorado	WRIGHTS LAKE
A015495	10032	5000	U S ELDORADO NATL FOREST	8/31/1953	80.00	El Dorado	ROPI LAKE
A015496	10033	5001	U S ELDORADO NATL FOREST	8/31/1953	85.40	El Dorado	LOIS LAKE
A015497	10034	5002	U S ELDORADO NATL FOREST	8/31/1953	203.60	El Dorado	LAKE SCHMIDELL
A015498	10035	5003	U S ELDORADO NATL FOREST	8/31/1953	40.00	El Dorado	LYONS LAKE
A015499	10036	6199	U S ELDORADO NATL FOREST	8/31/1953	110.00	El Dorado	BUCK ISLAND LAKE
A015500	10037	5004	U S ELDORADO NATL FOREST	8/31/1953	38.00	El Dorado	LAWRENCE LAKE
A015501	10038	6058	U S ELDORADO NATL FOREST	8/31/1953	190.00	El Dorado	SPIDER LAKE
A015503	10040	5005	U S ELDORADO NATL FOREST	8/31/1953	30.00	El Dorado	BARRETT LAKE
A015506	10043	5006	U S ELDORADO NATL FOREST	8/31/1953	148.40	El Dorado	MIDDLE VELMA LAKE
A015509	10046	6025	U S ELDORADO NATL FOREST	8/31/1953	160.00	Alpine	WINNEMUCCA LAKE
A015512	10049	5011	U S ELDORADO NATL FOREST	8/31/1953	60.00	El Dorado	ISLAND LAKE
A015513	10050	4985	U S ELDORADO NATL FOREST	8/31/1953	21.00	El Dorado	UPPER TWIN LAKE

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A015514	10051	5164	U S ELDORADO NATL FOREST	8/31/1953	26.00	El Dorado	LOWER TWIN LAKE
A015616	10052	6200	U S ELDORADO NATL FOREST	11/23/1953	440.00	El Dorado	ROCKBOUND LAKE
A016564	10564	5531	U S ELDORADO NATL FOREST	8/31/1955	0.20	El Dorado	UNST
A017521	11280	8645	U S ELDORADO NATL FOREST	3/22/1957	2.80	El Dorado	GERLE CREEK
A017846	11577	6935	U S ELDORADO NATL FOREST	10/11/1957	0.20	El Dorado	ROCKY CANYON
A018022	11627	7172	U S ELDORADO NATL FOREST	3/3/1958	2.90	Amador	UNSP
A019541	12806	7807	U S ELDORADO NATL FOREST	7/13/1960	3.50	El Dorado	PILLIKEN SPRING
A019544	12808	7971	U S ELDORADO NATL FOREST	7/13/1960	0.40	Placer	JERRYS CANYON SPRING
A019546	12810	7972	U S ELDORADO NATL FOREST	7/13/1960	0.40	Placer	CHIPMUNK RIDGE SPRING
A019547	12811	7973	U S ELDORADO NATL FOREST	7/13/1960	0.40	Placer	LYNCHBURG SPRING
A019548	12812	7974	U S ELDORADO NATL FOREST	7/13/1960	0.40	Placer	BEAR SPRINGS
A019549	12813	7975	U S ELDORADO NATL FOREST	7/13/1960	0.40	Placer	DESERT COLD SPRING
A020659	13789	8325	U S ELDORADO NATL FOREST	3/19/1962	0.40	El Dorado	UNST
A020675	13795	8324	U S ELDORADO NATL FOREST	3/26/1962	0.20	El Dorado	OWENS CAMP SPRING
A023420	16189	10597	U S ELDORADO NATL FOREST	12/23/1969	4.50	Placer	SOUTH FORK LONG CANYON
A028204	19518	12944	U S ELDORADO NATL FOREST	8/3/1984	2.20	El Dorado	UNSP
			U S ELDORADO NATL FOREST Total		2,565.40		
A007629	4209	1702	U S FOREST SERVICE	7/26/1933	0.10	El Dorado	UNST
A007848	4350	2138	U S FOREST SERVICE	2/14/1934	0.40	Placer	GREEK STORE SPRING
A009114	5095	2611	U S FOREST SERVICE	9/14/1937	13.40	Placer	BLUE CANYON RANGER STATION SP
A009816	5536	2599	U S FOREST SERVICE	1/29/1940	4.30	Placer	UNSP
A010126	5779	2886	U S FOREST SERVICE	2/20/1941	4.70	Placer	TEXAS HILL SPRING
A010129	5782	2655	U S FOREST SERVICE	2/20/1941	0.60	Placer	DAWSON SPRING
A010442	6014	4181	U S FOREST SERVICE	5/6/1942	0.10	Placer	NORTH FORK SPRING
A010443	6015	3037	U S FOREST SERVICE	5/6/1942	5.50	Placer	ONION VALLEY SPRING NO 3
A010445	6017	2890	U S FOREST SERVICE	5/6/1942	0.60	Placer	LONG VALLEY SPRING
A011157	6589	3207	U S FOREST SERVICE	9/19/1945	1.00	Placer	TADPOLE SPRING
A011787	6897	4862	U S FOREST SERVICE	3/19/1947	0.30	Placer	UNSP
A012036	7055	3250	U S FOREST SERVICE	8/12/1947	1.10	Placer	PAGGE CREEK
A014193	8704	4112	U S FOREST SERVICE	3/14/1951	11.00	Placer	ELLIOTT MEADOW SPRING
A014194	8705	4113	U S FOREST SERVICE	6/28/1955	34.10	Placer	ELLIOTT RANCH SPRING
A014195	9308	4964	U S FOREST SERVICE	3/14/1951	1.40	Placer	BEAR SPRING
A014196	8706	4126	U S FOREST SERVICE	3/14/1951	0.40	Placer	CHICKEN HAWK SPRING
A014197	8707	4127	U S FOREST SERVICE	3/14/1951	0.30	Placer	ORCHARD SPRING
A014198	8708	4876	U S FOREST SERVICE	3/14/1951	0.20	Placer	SECRET HOUSE SPRING
A016517	10278	7335	U S FOREST SERVICE	8/11/1955	96.80	Placer	CODY CREEK
A016691	10621	7367	U S FOREST SERVICE	10/26/1955	6.10	Placer	FULDA SPRING
A017304	11837	7098	U S FOREST SERVICE	1/14/1965	84.90	Placer	POWDERHORN CREEK
A021489	14495	8892	U S FOREST SERVICE	10/7/1963	5.20	Placer	BEARTRAP SPRING
A023221	16016	10309	U S FOREST SERVICE	1/30/1969	0.40	Placer	DELLER SPRING
A023222	16177	10620	U S FOREST SERVICE	1/30/1969	1.10	Placer	MT MILDRED CREEK
A023223	16178	10611	U S FOREST SERVICE	1/30/1969	4.20	Placer	DOLLY CREEK
A023224	16179	10618	U S FOREST SERVICE	1/30/1969	3.90	Placer	FRENCH MEADOW CREEK
A023227	16013	10543	U S FOREST SERVICE	1/30/1969	0.80	Placer	WILLMONT SPRING
A023228	16012	10310	U S FOREST SERVICE	1/30/1969	0.50	Placer	GIANT GAP SPRING #1
A023229	16011	10311	U S FOREST SERVICE	1/30/1969	0.50	Placer	GIANT GAP SPRING #2
			U S FOREST SERVICE Total		283.90		
A013103	7803	4220	U.S. BUREAU OF RECLAMATION	3/21/1956	4.00	El Dorado	KNICKERBOCKER CREEK
A013370	11315		U.S. BUREAU OF RECLAMATION	4/22/1958	5,347,832.00	Contra Costa, Sacramento	AMERICAN RIVER, OLD RIVER, SACRAMENTO RIVER

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A013371	11316		U.S. BUREAU OF RECLAMATION	7/29/2002	680,435.30	Contra Costa, Sacramento	AMERICAN RIVER, Sacramento River
A013629	8151	6654	U.S. BUREAU OF RECLAMATION	3/1/1963	30.00	El Dorado	UNST
A014165	8572	4221	U.S. BUREAU OF RECLAMATION	3/21/1956	22.00	El Dorado	KNICKERBOCKER CREEK
A014515	8887	4798	U.S. BUREAU OF RECLAMATION	10/24/1957	14.30	El Dorado	UNST
A015028	9246	5878	U.S. BUREAU OF RECLAMATION	11/17/1959	15.00	El Dorado	UNST
A017371	10923	5824	U.S. BUREAU OF RECLAMATION	10/22/1959	19.60	El Dorado	MIDDLE FORK AMERICAN RIVER
A018196	12706	7596	U.S. BUREAU OF RECLAMATION	3/9/1966	0.10	Placer	UNSP (2)
A019977	13093	8229	U.S. BUREAU OF RECLAMATION	2/8/1961	21.70	Placer	CARLTON SPRING, NORTH FORK AMERICAN RIVER
A020011	13161		U.S. BUREAU OF RECLAMATION	2/28/1961	22.00	El Dorado	KNICKERBOCKER CREEK
A020478	13934	8588	U.S. BUREAU OF RECLAMATION	11/7/1961	0.10	Placer	NORTH FORK AMERICAN RIVER
A021189	14220	8871	U.S. BUREAU OF RECLAMATION	3/13/1963	18.00	El Dorado	UNST
			U.S. BUREAU OF RECLAMATION Total		6,028,434.10		
A005214	2776	1075	ULF ASPENLIND	9/17/1926	231.70	Placer	CANYON CREEK
			ULF ASPENLIND Total		231.70		
A023318	15937	11043	UNION PACIFIC RAILROAD COMPANY	6/4/1980	4.00	Placer	UNXX
			UNION PACIFIC RAILROAD COMPANY Total		4.00		
A027266	18612		US BUREAU OF LAND MANAGEMENT	11/4/1982	2,533.90	Placer	DARDANELLES CREEK, POND CREEK
			US BUREAU OF LAND MANAGEMENT Total		2,533.90		
A005981	3152	5560	USDA-FOREST SERVICE, LAKE TAHOE BASIN MANAGEMENT UNIT	7/16/1928	4.30	El Dorado	HAWLEY SPRING
A010290	5988	6099	USDA-FOREST SERVICE, LAKE TAHOE BASIN MANAGEMENT UNIT	9/24/1941	0.70	El Dorado	BENWOOD CREEK
A015510	10047	5009	USDA-FOREST SERVICE, LAKE TAHOE BASIN MANAGEMENT UNIT	8/31/1953	141.80	El Dorado	HEATHER LAKE
A027518	19091	12562	USDA-FOREST SERVICE, LAKE TAHOE BASIN MANAGEMENT UNIT	9/15/1982	0.30	El Dorado	HAWLEY SPRING
			USDA-FOREST SERVICE, LAKE TAHOE BASIN MANAGEMENT UNIT Total		147.10		
A004026	1899	738	VERYL T KUCHAR	10/5/1928	113.10	Placer	BIG CHIEF CREEK, BOULDER CREEK
A011258A	6528	9362	VERYL T KUCHAR	1/10/1946	61.00	Placer	UNST
			VERYL T KUCHAR Total		174.10		
A015953	9902	5786	VICKIE L LONGO	7/26/1954	3.80	El Dorado	SOUTH FORK AMERICAN RIVER
			VICKIE L LONGO Total		3.80		
A005535	3114	1098	VICTOR HERRERO	6/17/1927	0.10	El Dorado	UNSP
			VICTOR HERRERO Total		0.10		
A017916	11348	7619	VINCENT J GRAVES	12/16/1957	2.20	Placer	BABIE CREEK
			VINCENT J GRAVES Total		2.20		
A028603	20086	13242	WAYNE BRUMMOND	10/28/1985	2.50	Placer	UNXX
			WAYNE BRUMMOND Total		2.50		
A011162	6477	3032	WAYNE HILLARD	9/27/1945	0.20	El Dorado	SOUTH FORK AMERICAN RIVER
			WAYNE HILLARD Total		0.20		
A024241	16911	12453	WILLIAM FAWX	11/8/1972	0.10	Placer	DUTCH RAVINE
			WILLIAM FAWX Total		0.10		
A027705	19112	12678	WILLIAM OZAWA	4/5/1983	1.30	El Dorado	UNST
			WILLIAM OZAWA Total		1.30		
A027173	18747	13544	WILLIAM SMITH	7/11/2003	19.00	El Dorado	ACORN CREEK

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			WILLIAM SMITH Total		19.00		
A016891	10691	7265	WILLIAM WHITAKER	2/14/1956	0.40	El Dorado	UNST
			WILLIAM WHITAKER Total		0.40		
A019850	13243		WILLIAM B ASHTON	11/21/1960	37.00	El Dorado	SILVER FORK OF SOUTH FORK AMERICAN RIVER, SUGAR LOAF CREEK
			WILLIAM B ASHTON Total		37.00		
A001963	935	428	WILLIAM B TIMBERLAKE	8/11/1920	2.90	El Dorado	NILSSON SPRING
			WILLIAM B TIMBERLAKE Total		2.90		
A005989	3394	1436	WILLIAM C SAWTELL	7/19/1928	0.20	El Dorado	UNST
			WILLIAM C SAWTELL Total		0.20		
A027491	19229	13413	WILLIAM P KLEIN JR	8/31/1982	0.80	Placer	UNST
A028034	20068	13411	WILLIAM P KLEIN JR	3/15/1984	12.00	Placer	UNST
A028035	20069	13412	WILLIAM P KLEIN JR	3/15/1984	11.00	Placer	UNST
			WILLIAM P KLEIN JR Total		23.80		
A027520	19118	13269	WILLIAM V DALLAS	9/16/1982	0.20	Placer	UNST
			WILLIAM V DALLAS Total		0.20		
A010121	5976	3045	WILLIS H LAMBERT	2/20/1941	0.70	El Dorado	UNST
			WILLIS H LAMBERT Total		0.70		
A014086	8441	4369	WILLOMAE DOBBS	12/1/1950	0.40	El Dorado	UNSP
A015918	9886	5630	WILLOMAE DOBBS	6/18/1954	0.70	El Dorado	UNSP
			WILLOMAE DOBBS Total		1.10		
A022029	15275	10683	WILSON GRANAT	1/15/1965	3.30	Placer	UNST
			WILSON GRANAT Total		3.30		
A013893	8603	4079	WOODBRIDGE RANCH HOMEOWNERS ASSOCIATION	8/14/1950	33.00	Sacramento	UNCR
			WOODBRIDGE RANCH HOMEOWNERS ASSOCIATION Total		33.00		
A008015	4390	2604	YANKEE HILL ESTATES OWNERS ASSOCIATION	7/9/1934	287.90	Placer	ANTELOPE CREEK
A013394	8207	4781	YANKEE HILL ESTATES OWNERS ASSOCIATION	10/11/1949	25.00	Placer	ANTELOPE CREEK
A016437	10551	5511	YANKEE HILL ESTATES OWNERS ASSOCIATION	6/23/1955	142.70	Placer	ANTELOPE CREEK
			YANKEE HILL ESTATES OWNERS ASSOCIATION Total		455.60		
			Grand Total		9,560,977.90		

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A009802	5719	2809	BIRD HAVEN RANCH LLC	1/11/1940	852.90	Glenn	BUTTE CREEK
			BIRD HAVEN RANCH LLC Total		852.90		
A002234	1114	5236	BUTTE VALLEY IRRIGATION DISTRICT	2/28/1921	17,163.80	Siskiyou	BUTTE CREEK
A023025	16330	10776	BUTTE VALLEY IRRIGATION DISTRICT	4/10/1968	10,000.00	Siskiyou	BUTTE CREEK
			BUTTE VALLEY IRRIGATION DISTRICT Total		27,163.80		
A013794	8624	8176	CAMERON PARK COMMUNITY SERVICES DISTRICT	6/14/1950	240.00	El Dorado	DEER CREEK
			CAMERON PARK COMMUNITY SERVICES DISTRICT Total		240.00		
A009216	5153	6113	CITY OF CHICO	12/30/1937	258.90	Butte	BIG CHICO CREEK
			CITY OF CHICO Total		258.90		
A013675	8194	7075	COLUSA SHOOTING CLUB	4/7/1950	853.90	Colusa	BUTTE CREEK
A013728	8195	7076	COLUSA SHOOTING CLUB	5/10/1950	1,386.90	Colusa	BUTTE CREEK
			COLUSA SHOOTING CLUB Total		2,240.80		
A009625	5717	2984	Dept of Fish and Game	6/19/1939	5,474.50	Butte, Glenn	BUTTE CREEK
A013008	7747	8712	Dept of Fish and Game	7/24/1968	5,182.50	Butte, Glenn	BUTTE CREEK
A013323	7885	4793	Dept of Fish and Game	10/24/1957	2,554.80	Glenn	BUTTE CREEK DRAINAGE DISTRICT DITCH
A014354	9663	4794	Dept of Fish and Game	10/24/1957	2,700.70	Butte	BUTTE CREEK
A015467	14438	9973	Dept of Fish and Game	12/21/1972	5,463.00	Glenn	BUTTE CREEK DRAINAGE DISTRICT DITCH
A015468	14439	9974	Dept of Fish and Game	12/21/1972	5,463.00	Butte	BUTTE CREEK
A024590	17233		Dept of Fish and Game	4/10/1974	7,428.00	Butte	BUTTE CREEK
			Dept of Fish and Game Total		34,266.50		
A022564	16029	10433	GAIL BROWN	8/29/1966	493.00	Butte	BUTTE CREEK
			GAIL BROWN Total		493.00		
A002777	1779	2389	GORRILL LAND COMPANY	3/6/1922	4,581.90	Butte	BUTTE CREEK, HAMLIN SLOUGH
A004664	2448	2390	GORRILL LAND COMPANY	6/30/1925	4,523.50	Butte	HAMLIN SLOUGH
A004665	2449	2391	GORRILL LAND COMPANY	3/13/1942	3,930.10	Butte	BUTTE CREEK
A022321	16018	11044	GORRILL LAND COMPANY	10/25/1965	2,500.00	Butte	BUTTE CREEK
A025717	17845	11996	GORRILL LAND COMPANY	4/12/1978	4,400.00	Butte	HAMLIN SLOUGH
			GORRILL LAND COMPANY Total		19,935.50		
A022799	15502	9911	LOUIS A PAYEN	5/31/1967	45.00	Sacramento	LITTLE DEER CREEK
			LOUIS A PAYEN Total		45.00		
A023298	15950	10194	LUCIAN B VANDEGRIFT TRUST	6/17/1969	45.00	Butte	LITTLE BUTTE CREEK
			LUCIAN B VANDEGRIFT TRUST Total		45.00		
A005109	3210	2614	M & T INCORPORATED	7/17/1926	5,060.00	Butte	BUTTE CREEK
A008188	4700	2617	M & T INCORPORATED	12/1/1934	5,060.00	Butte	BUTTE CREEK
A008565	4744		M & T INCORPORATED	2/27/1936	3,074.40	Butte	BIG BUTTE CREEK

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A009735	5847		M & T INCORPORATED	9/22/1939	13,587.00	Butte	BIG BUTTE CREEK
A015866	10390	9267	M & T INCORPORATED	5/10/1954	500.00	Butte	BUTTE CREEK
			M & T INCORPORATED Total		27,281.40		
A014546	9664	5394	MCPHERRIN LAND CO	11/2/1951	6,396.80	Butte	BUTTE CREEK
A015710	14021	8676	MCPHERRIN LAND CO	6/25/1968	2,122.40	Butte	BUTTE CREEK
			MCPHERRIN LAND CO Total		8,519.20		
A019743	13039	10035	MELVIN D MYERS	9/19/1960	142.00	Lassen	BUTTE CREEK
			MELVIN D MYERS Total		142.00		
A023084	15727	10197	MICHAEL HARRIS	7/15/1968	32	Butte	LITTLE CHICO CREEK
			MICHAEL HARRIS Total		32		
A000476	271		Paradise Irrigation District	5/3/1917	9,500.00	Butte	LITTLE BUTTE CREEK
A022061	16040		Paradise Irrigation District	6/17/1970	8,800.00	Butte	LITTLE BUTTE CREEK
			Paradise Irrigation District Total		18,300.00		
A005110	3211	2615	PARROTT INVESTMENT COMPANY	7/17/1926	5,060.00	Butte	BUTTE CREEK
A008187	4699	2616	PARROTT INVESTMENT COMPANY	12/1/1934	5,060.00	Butte	BUTTE CREEK
A008559	4743		PARROTT INVESTMENT COMPANY	2/19/1936	3,074.40	Butte	BIG BUTTE CREEK
A009736	5848		PARROTT INVESTMENT COMPANY	9/22/1939	13,587.00	Butte	BIG BUTTE CREEK
A015867	10391	9268	PARROTT INVESTMENT COMPANY	5/10/1954	500.00	Butte	BUTTE CREEK
			PARROTT INVESTMENT COMPANY Total		27,281.40		
A001656	794	880	RANCHO ESQUON INC	2/5/1920	3,665.45	Butte	HAMLIN SLOUGH
A002576	1722	1027	RANCHO ESQUON INC	10/6/1921	1,832.80	Butte	BUTTE CREEK
A002805	1872	1028	RANCHO ESQUON INC	3/24/1922	3,832.10	Butte	BUTTE CREEK
A002909	2027	1029	RANCHO ESQUON INC	6/27/1922	3,014.90	Butte	BUTTE CREEK
A004663	2447	1030	RANCHO ESQUON INC	6/30/1925	4,598.48	Butte	HAMLIN SLOUGH
A022039	16039	11046	RANCHO ESQUON INC	2/5/1965	5,540.00	Butte	BUTTE CREEK
			RANCHO ESQUON INC Total		22,483.73		
A023201	16771		RECLAMATION DISTRICT #1004	12/1/1978	36,000.00	Colusa, Sutter	BUTTE CREEK, BUTTE SLOUGH
			RECLAMATION DISTRICT #1004 Total		36,000.00		
A007925	4365	1797	RECLAMATION DISTRICT #833	5/1/1934	2,217.20	Colusa	BUTTE CREEK
			RECLAMATION DISTRICT #833 Total		2,217.20		
A004989	2706	837	SIERRA PACIFIC INDUSTRIES	1/8/1965	1,831.70	Butte	WEST BRANCH BUTTE CREEK
			SIERRA PACIFIC INDUSTRIES Total		1,831.70		
A001041	542	485	STANFORD VINA RANCH IRRIGATION CO	8/5/1918	4,581.90	Tehama	DEER CREEK
			STANFORD VINA RANCH IRRIGATION CO Total		4,581.90		
A020531			STATE WATER RESOURCES CONTROL BOARD	12/19/1961	0.00	Lassen, Modoc	ASH CREEK, BUTTE CREEK, UNST, WILLOW CREEK
			STATE WATER RESOURCES CONTROL BOARD Total		0.00		
A022534	16022	10432	Stephen Meline IV	7/27/1966	1,695.00	Butte	BUTTE CREEK

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			Stephen Meline IV Total		1,695.00		
A012437	7368	3458	U S FISH & WILDLIFE SERVICE	3/25/1948	1,097.00	Colusa	BUTTE CREEK
A013540	8838	4472	U S FISH & WILDLIFE SERVICE	1/12/1950	44,162.60	Shasta, Tehama	BATTLE CREEK
A014316	9662	7053	U S FISH & WILDLIFE SERVICE	5/21/1951	590.30	Colusa	BUTTE CREEK
A017862	11615	6591	U S FISH & WILDLIFE SERVICE	10/25/1957	7,963.80	Shasta	BATTLE CREEK
A020288	13384	7993	U S FISH & WILDLIFE SERVICE	7/3/1961	21,719.30	Shasta	BATTLE CREEK, Battle Creek
A022227	15046	9561	U S FISH & WILDLIFE SERVICE	7/19/1965	14,479.60	Shasta	BATTLE CREEK, Battle Creek
			U S FISH & WILDLIFE SERVICE Total		90,012.60		
A031071	21277		U S KLAMATH NATIONAL FOREST - GOOSENEST RECLAMATION DISTRICT	6/6/2011	185.00	Siskiyou	BUTTE CREEK
			U S KLAMATH NATIONAL FOREST - GOOSENEST RECLAMATION DISTRICT Total		185.00		
			Grand Total		326,104.54		

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A017927	11586	9898	ANTHONY D CRUYSEN	12/26/1957	23.00	Shasta	CLEAR CREEK
			ANTHONY D CRUYSEN Total		23.00		
A023232	16007	10906	BENNETT FAMILY TRUST	2/6/1969	74.00	Shasta	SOUTH FORK CLEAR CREEK
			BENNETT FAMILY TRUST Total		74.00		
A016145	10125	9563	BILL GIBSON	11/18/1954	627.00	Shasta, Tehama	COTTONWOOD CREEK
			BILL GIBSON Total		627.00		
A013972	8537	4100	CALIF DEPT OF TRANSPORTATION	9/29/1950	5.80	Shasta	MIDDLE FORK COTTONWOOD CREEK
			CALIF DEPT OF TRANSPORTATION Total		5.80		
A016373D		006033D	CARPENTER FAMILY REVOCABLE TRUST	6/3/1991	167.20	Tehama	COTTONWOOD CREEK
			CARPENTER FAMILY REVOCABLE TRUST Total		167.20		
A016373C		006033C	CEVASCO ROBT CEVASCO REVOC TRUST 2/18/9	6/3/1991	45.70	Tehama	COTTONWOOD CREEK
			CEVASCO ROBT CEVASCO REVOC TRUST 2/18/9 Total		45.70		
A012074	7559	6320	CONAWAY PRESERVATION GROUP LLC	9/8/1947	3,728.93	Yolo	WILLOW SLOUGH
A026695	19372		CONAWAY PRESERVATION GROUP LLC	1/27/1981	10,000.00	Yolo	CACHE CREEK, YOLO BYPASS
			CONAWAY PRESERVATION GROUP LLC Total		13,728.93		
A027382	20308		COUNTY OF COLUSA	7/8/1982	10.00	Colusa	STONY CREEK UNDERFLOW
			COUNTY OF COLUSA Total		10.00		
A016373A		006033A	DENNIS C DIERKSEN	6/3/1991	64.10	Shasta	COTTONWOOD CREEK
			DENNIS C DIERKSEN Total		64.10		
A013764	8578	4460	DONALD KRENN	5/29/1950	18.30	Tehama	SOUTH FORK COTTONWOOD CREEK
			DONALD KRENN Total		18.30		
A024723	16873	11283	FRENCH GULCH-WHISKEYTOWN SCHOOL DISTRICT	12/11/1974	10.20	Shasta	CLEAR CREEK
			FRENCH GULCH-WHISKEYTOWN SCHOOL DISTRICT Total		10.20		
A007284	4198	2006	HAMMER FAMILY TRUST	6/8/1932	1,463.80	Tehama	SOUTH FORK COTTONWOOD CREEK
			HAMMER FAMILY TRUST Total		1,463.80		
A021223	14272	8831	HARRY A BAKER REVOCABLE TRUST	4/8/1963	2.70	Tehama	SOUTH FORK COTTONWOOD CREEK
			HARRY A BAKER REVOCABLE TRUST Total		2.70		
A030232	20993		Heart Consciousness Church, Inc.	3/8/1993	245.00	Lake	CRAZY CREEK, PUTAH CREEK, UNST
			Heart Consciousness Church, Inc. Total		245.00		
A013976	8588	6976	IGO ONO COMMUNITY SERVICE DISTRICT	10/3/1950	341.20	Shasta	COTTONWOOD CREEK
			IGO ONO COMMUNITY SERVICE DISTRICT Total		341.20		
A000334	157	153	JOSHUA L SOSKE JR	5/11/1916	24.60	Glenn, Sonoma	NORTH FORK STONY CREEK
			JOSHUA L SOSKE JR Total		24.60		
A013701	8225	4312	KENT W PFRIMMER	4/24/1950	122.20	Tehama	COTTONWOOD CREEK
			KENT W PFRIMMER Total		122.20		
A016373B		006033B	KEVIN J DEVINE	6/3/1991	41.30	Tehama	COTTONWOOD CREEK
			KEVIN J DEVINE Total		41.30		
A013110	7843	4736	LEMA 1992 TRUST	5/24/1949	219.90	Tehama	COTTONWOOD CREEK
			LEMA 1992 TRUST Total		219.90		
A023234	16005	10921	MARY ANN SMITH	2/6/1969	1.20	Shasta	SOUTH FORK CLEAR CREEK
			MARY ANN SMITH Total		1.20		
A031558			MIDDLETOWN FARM & CATTLE COMPANY	3/30/2007	434.00	Lake	HARBIN CREEK, PUTAH CREEK, UNST
			MIDDLETOWN FARM & CATTLE COMPANY Total		434.00		
A023233	16000	10540	ROBERT W ANDERSON	2/6/1969	69.00	Shasta	SOUTH FORK CLEAR CREEK

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A024785	16939	11368	ROBERT W ANDERSON	3/24/1975	2.20	Shasta	SOUTH FORK CLEAR CREEK, UNST
			ROBERT W ANDERSON Total		71.20		
A025261	17823		STONY CREEK WATER DISTRICT	2/14/1977	3,000.00	Colusa, Glenn	LITTLE STONY CREEK, STONY CREEK
			STONY CREEK WATER DISTRICT Total		3,000.00		
A020104	13490	8028	THE REVOCABLE TRUST OF ROBERT F RETZLOFF	4/27/1961	271.70	Glenn	STONY CREEK UNDERFLOW
			THE REVOCABLE TRUST OF ROBERT F RETZLOFF Total		271.70		
A019104	12653	7454	U S NATIONAL PARK SERVICE	11/24/1959	3.20	Shasta	CLEAR CREEK
			U S NATIONAL PARK SERVICE Total		3.20		
A002212	2339	2652	U.S. BUREAU OF RECLAMATION	2/17/1921	50,200.00	Glenn	STONY CREEK
A018115	13776		U.S. BUREAU OF RECLAMATION	4/30/1958	160,000.00	Contra Costa, Tehama	STONY CREEK
A017376	12364		U.S. BUREAU OF RECLAMATION	7/28/1960	1,335,371.20	Contra Costa, Shasta	CLEAR CREEK
A015424	12363	9957	U.S. BUREAU OF RECLAMATION	4/15/2002	1,230,761.80	Shasta	CLEAR CREEK
			U.S. BUREAU OF RECLAMATION Total		2,776,333.00		
A016373E		006033E	WAYNE ROCHLITZ	6/3/1991	85.00	Tehama	COTTONWOOD CREEK
			WAYNE ROCHLITZ Total		85.00		
A012994	7469	3822	WILLIAM T GRAY	3/23/1949	114.60	Shasta	COTTONWOOD CREEK
			WILLIAM T GRAY Total		114.60		
A011389	12848		YOLO COUNTY F C & W C DISTRICT	5/3/1946	431,000.00	Lake, Yolo	CACHE CREEK, NORTH FORK CACH
			YOLO COUNTY F C & W C DISTRICT Total		431,000.00		
			Grand Total		3,228,548.83		

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A011384	6629	3641	A & L AG RENTAL & LEASING INC	4/25/1946	1,094.90	Colusa	SACRAMENTO RIVER
			A & L AG RENTAL & LEASING INC Total		1,094.90		
A000657	338	237	ALICE K MARKS	4/27/1917	136.50	Sutter	SACRAMENTO RIVER
			ALICE K MARKS Total		136.50		
A001976	1243	1206	ALLEN A EHRKE	5/31/1932	158.80	Colusa	SACRAMENTO RIVER
			ALLEN A EHRKE Total		158.80		
A012469A	7267	003722A	Anna C. Byrd 1997 Trust	4/13/1948	1,598.50	Sutter	SACRAMENTO RIVER
			Anna C. Byrd 1997 Trust Total		1,598.50		
A008931	4985	3169	ARNOLD ANDREOTTI	4/1/1937	1,094.90	Colusa	SACRAMENTO RIVER
A011618	6793	3170	ARNOLD ANDREOTTI	11/14/1946	2,007.30	Colusa	SACRAMENTO RIVER
			ARNOLD ANDREOTTI Total		3,102.20		
A013454	8010	7251	ARTHUR ANDREOTTI	11/9/1949	4,927.00	Colusa	SACRAMENTO RIVER
			ARTHUR ANDREOTTI Total		4,927.00		
A012482	7399	3655	BARRY A MCCLAIN	4/23/1948	182.50	Sacramento	SACRAMENTO RIVER
			BARRY A MCCLAIN Total		182.50		
A005100	2609	989	BURTIS RANCH	7/13/1926	140.50	Sutter	SACRAMENTO RIVER
			BURTIS RANCH Total		140.50		
A010900	6375	3569	BURTON H LAUPPE	10/9/1944	1,069.10	Sutter	SACRAMENTO RIVER
			BURTON H LAUPPE Total		1,069.10		
A000186	72	1753	CACHIL DEHE BAND OF WINTUN INDIANS OF	11/22/1915	3,198.40	Colusa	SACRAMENTO RIVER
			CACHIL DEHE BAND OF WINTUN INDIANS OF Total		3,198.40		
A014445A	16481		CALIF DEPT OF WATER RESOURCES	8/25/1951	1,575,212.40	Contra Costa, Sacramento	ITALIAN SLOUGH, SACRAMENTO RIVER DELTA CHANNELS
A017512	16482		CALIF DEPT OF WATER RESOURCES	3/15/1957	1,100,000.00	Madera, Merced, Sacramento	ITALIAN SLOUGH, SACRAMENTO RIVER DELTA CHANNELS, SAN LUIS CREEK
			CALIF DEPT OF WATER RESOURCES Total		2,675,212.40		
A014682	9061	6380	CARTER FAMILY TRUST & CARTER FAMILY MARTIAL TRUST	2/15/1952	2,498.20	Colusa	SACRAMENTO RIVER
			CARTER FAMILY TRUST & CARTER FAMILY MARTIAL TRUST Total		2,498.20		
A000230B	204	001788B	CHARLES W SEAVER	1/10/1916	1,568.10	Colusa	SACRAMENTO RIVER
			CHARLES W SEAVER Total		1,568.10		
A001179	609	1478	CHARLES W TUTTLE JR	2/15/1919	4,169.50	Colusa	SACRAMENTO RIVER
			CHARLES W TUTTLE JR Total		4,169.50		
A006716	3630	1849	CITY OF REDDING	6/30/1930	53.70	Shasta	SACRAMENTO RIVER
A008884	5163	2640	CITY OF REDDING	1/26/1937	3,619.90	Shasta	SACRAMENTO RIVER
A010320	5921	2736	CITY OF REDDING	11/18/1941	325.80	Shasta	SACRAMENTO RIVER

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A015197	9821	5677	CITY OF REDDING	2/16/1953	211.70	Shasta	SACRAMENTO RIVER
			CITY OF REDDING Total		4,211.10		
A001743	992		CITY OF SACRAMENTO	10/30/2000	81,800.00	Sacramento	SACRAMENTO RIVER
			CITY OF SACRAMENTO Total		81,800.00		
A025616	18150		CITY OF WEST SACRAMENTO	12/22/1977	18,350.00	Yolo	SACRAMENTO RIVER
			CITY OF WEST SACRAMENTO Total		18,350.00		
A010363	5952	3585	COLUSA DRAIN MUTUAL WATER COMPANY	1/16/1942	5,668.10	Glenn	SACRAMENTO RIVER
A016305	14595	12087	COLUSA DRAIN MUTUAL WATER COMPANY	4/7/1955	3,660.00	Yolo	SACRAMENTO RIVER
			COLUSA DRAIN MUTUAL WATER COMPANY Total		9,328.10		
A015452	9647	7332	COLUSA PROPERTIES INC	8/6/1953	2,032.70	Colusa	SACRAMENTO RIVER
			COLUSA PROPERTIES INC Total		2,032.70		
A001199	614	904	CONAWAY PRESERVATION GROUP LLC	3/1/1919	43,557.70	Yolo	SACRAMENTO RIVER
A001588	792	905	CONAWAY PRESERVATION GROUP LLC	4/18/1930	5,354.00	Yolo	SACRAMENTO RIVER
A012073	7234	5487	CONAWAY PRESERVATION GROUP LLC	9/8/1947	70,143.50	Yolo	SACRAMENTO RIVER
			CONAWAY PRESERVATION GROUP LLC Total		119,055.20		
A001061	513	1062	COUNTY OF SACRAMENTO	6/6/1931	2,715.30	Sacramento	SACRAMENTO RIVER
A014494	8921	4060	COUNTY OF SACRAMENTO	8/19/1982	479.60	Sacramento	SACRAMENTO RIVER
			COUNTY OF SACRAMENTO Total		3,194.90		
A017210	13872	9926	Cranmore Farms LLC	8/6/1956	100.00	Sutter	SACRAMENTO RIVER
			Cranmore Farms LLC Total		100.00		
A004376	2021	1241	DANIEL A SERPA REV TRUST	12/15/1932	116.10	Sacramento	SACRAMENTO RIVER
			DANIEL A SERPA REV TRUST Total		116.10		
A017134	10734	6192	DIAMOND LANDS CORPORATION	6/14/1956	650.00	Tehama	SACRAMENTO RIVER
			DIAMOND LANDS CORPORATION Total		650.00		
A016199	13860	8205	DIANNE E BUTLER	9/7/1967	721.60	Colusa, Sutter	SACRAMENTO RIVER
			DIANNE E BUTLER Total		721.60		
A012469B	7267	003722B	DOLORES AZEVEDO	4/13/1948	91.20	Sutter	SACRAMENTO RIVER
			DOLORES AZEVEDO Total		91.20		
A005993	3112	2393	DONNA L REED	3/19/1942	857.70	Yolo	SACRAMENTO RIVER
			DONNA L REED Total		857.70		
A014314	8782	5080	DRISCOLL STRAWBERRY ASSOCIATES	5/21/1951	240.90	Tehama	SACRAMENTO RIVER
			DRISCOLL STRAWBERRY ASSOCIATES Total		240.90		
A007641A	4215	006389A	E D WILLEY & SON INC	8/4/1933	9,582.70	Sutter	SACRAMENTO RIVER

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			E D WILLEY & SON INC Total		9,582.70		
A011274	6725	3527	EASTSIDE MUTUAL WATER COMPANY	2/4/1946	5,474.50	Colusa	SACRAMENTO RIVER
			EASTSIDE MUTUAL WATER COMPANY Total		5,474.50		
A013796	8337	4758	ELLIS FAMILY TRUST	6/16/1950	580.40	Sutter	SACRAMENTO RIVER
			ELLIS FAMILY TRUST Total		580.40		
A005916	3066	1994	EMERY BURKE POUNDSTONE	5/16/1928	2,717.70	Colusa	SACRAMENTO RIVER
A009987	5664	2763	EMERY BURKE POUNDSTONE	8/22/1940	2,788.40	Colusa	SACRAMENTO RIVER
			EMERY BURKE POUNDSTONE Total		5,506.10		
A006672	3588	10019	Erdman Family Trust	5/8/1930	1,400.00	Colusa	SACRAMENTO RIVER
			Erdman Family Trust Total		1,400.00		
A017150	13871	10221	Faraz A Saeed	6/25/1956	997.00	Yolo	SACRAMENTO RIVER
			Faraz A Saeed Total		997.00		
A009032	5004	3674	FEDORA FARMS INC	7/8/1937	547.50	Colusa, Sutter	SACRAMENTO RIVER
A013511	8061	3675	FEDORA FARMS INC	12/15/1949	328.50	Colusa, Sutter	SACRAMENTO RIVER
A013512	8062	3676	FEDORA FARMS INC	12/15/1949	587.60	Colusa, Sutter	SACRAMENTO RIVER
			FEDORA FARMS INC Total		1,463.60		
A006670	3654	1516	Frank J. O'Brien Family Trust	5/6/1930	1,681.40	Sutter	SACRAMENTO RIVER
			Frank J. O'Brien Family Trust Total		1,681.40		
A014584	9188	5432	FRANK LAMB TRUST	11/20/1951	1,527.30	Sutter	SACRAMENTO RIVER
			FRANK LAMB TRUST Total		1,527.30		
A013487	7835	7216	GARY J RUMIANO	11/29/1949	726.00	Tehama	SACRAMENTO RIVER
			GARY J RUMIANO Total		726.00		
A000018	29	2871	GLENN-COLUSA IRRIGATION DISTRICT	5/3/2006	53,673.00	Yuba	SACRAMENTO RIVER
A001554	796	7208	GLENN-COLUSA IRRIGATION DISTRICT	12/3/1919	28,078.20	Glenn	SACRAMENTO RIVER
A001624	797	7209	GLENN-COLUSA IRRIGATION DISTRICT	1/14/1920	10,793.60	Glenn	SACRAMENTO RIVER
A008688	4795	5387	GLENN-COLUSA IRRIGATION DISTRICT	5/28/1936	674.38	Colusa	HUNTERS CREEK
A012125	8272	4340	GLENN-COLUSA IRRIGATION DISTRICT	10/8/1947	3,360.00	Colusa	STONE CORRAL CREEK
A023005	15687	10635	GLENN-COLUSA IRRIGATION DISTRICT	3/12/1968	415.00	Colusa	UNST
A030838	21101		GLENN-COLUSA IRRIGATION DISTRICT	2/18/1999	182,900.00	Glenn	SACRAMENTO RIVER
			GLENN-COLUSA IRRIGATION DISTRICT Total		279,894.18		
A001653	1248	439	GREEN VALLEY CORPORATION A CA CORP	2/5/1920	2,106.70	Colusa	SACRAMENTO RIVER
			GREEN VALLEY CORPORATION A CA CORP Total		2,106.70		
A011281	7288	5261	HAMMOND RESERVOIR IRRIGATION ASSN	2/11/1946	5,742.20	Siskiyou	NORTH FORK SACRAMENTO RIVER
A016219	10679	6531	HAMMOND RESERVOIR IRRIGATION ASSN	1/26/1955	348.00	Siskiyou	NORTH FORK SACRAMENTO RIVER
			HAMMOND RESERVOIR IRRIGATION ASSN Total		6,090.20		
A006696	3589	3566	HAROLD ARMSTRONG	6/12/1930	1,885.10	Colusa	SACRAMENTO RIVER
			HAROLD ARMSTRONG Total		1,885.10		
A003466	1552	646	Heidrick & Heidrick Properties LP	6/5/1923	345.20	Sutter	SACRAMENTO RIVER
			Heidrick & Heidrick Properties LP Total		345.20		

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A018154	14510	8798	HEIDRICK & MCGINNIS PROP LP	1/2/1969	484.00	Sutter	SACRAMENTO RIVER
			HEIDRICK & MCGINNIS PROP LP Total		484.00		
A006146	3234	1484	HENLE FAMILY LIMITED PARTNERSHIP	12/27/1928	3,503.70	Sutter	SACRAMENTO RIVER
			HENLE FAMILY LIMITED PARTNERSHIP Total		3,503.70		
A006418A		001799A	HENRY D RICHTER JR	6/20/1991	3,178.80	Sutter	SACRAMENTO RIVER
A013646	8156	7218	HENRY D RICHTER JR	3/22/1950	239.80	Yolo	SACRAMENTO RIVER
			HENRY D RICHTER JR Total		3,418.60		
A016361A	013861A		HERSHEY LAND COMPANY ROW CROP LLC	6/10/2002	4,195.00	Sutter, Yolo	COLUSA BASIN DRAINAGE CANAL, SACRAMENTO RIVER
			HERSHEY LAND COMPANY ROW CROP LLC Total		4,195.00		
A001765B	1111	000613B	HIATT DOWNER RANCH LLC	4/9/1920	1,697.90	Sutter	SACRAMENTO RIVER
A003290B		002627B	HIATT DOWNER RANCH LLC	7/27/1990	1,184.30	Sutter	SACRAMENTO RIVER
			HIATT DOWNER RANCH LLC Total		2,882.20		
A001617	1888	1407	JACK W BABER	3/20/1934	1,959.90	Colusa	SACRAMENTO RIVER
			JACK W BABER Total		1,959.90		
A002317A	1259	001130A	JAMES T MUNSON	2/4/1980	82.50	Sutter	SACRAMENTO RIVER
			JAMES T MUNSON Total		82.50		
A012899	7681	3766	JOHN ZUPPAN	1/13/1949	275.20	Butte, Tehama	SACRAMENTO RIVER
A014447	8840	8011	JOHN ZUPPAN	8/27/1951	575.70	Tehama	SACRAMENTO RIVER
			JOHN ZUPPAN Total		850.90		
A017537	11071	5955	JOHN AND JANE FITZGERALD FAMILY REVOCABLE TRUST	4/2/1957	109.50	Sutter	OLD CHANNEL SACRAMENTO RIVER
			JOHN AND JANE FITZGERALD FAMILY REVOCABLE TRUST Total		109.50		
A003994	1850	651	Johnathan Tucker	1/13/1928	76.40	Glenn	SACRAMENTO RIVER
			Johnathan Tucker Total		76.40		
A007308	3980	1949	Joseph Alamo	6/29/1932	2,622.70	Colusa	SACRAMENTO RIVER
			Joseph Alamo Total		2,622.70		
A006418B		001799B	KENNETH L WALLACE	6/20/1991	1,127.70	Sutter	SACRAMENTO RIVER
A014728	9002	4951	KENNETH L WALLACE	3/24/1952	160.60	Sutter	SACRAMENTO RIVER
			KENNETH L WALLACE Total		1,288.30		
A014520	8928	5112	KENNETH R PYLMAN	10/15/1951	146.00	Yolo	SACRAMENTO RIVER
			KENNETH R PYLMAN Total		146.00		
A004364	2227	981	Knights Landing Investors LLC	12/13/1924	3,537.60	Sutter, Yolo	SACRAMENTO RIVER
			Knights Landing Investors LLC Total		3,537.60		
A006454	3388	1469	KRAMER RANCH	10/8/1929	474.50	Yolo	SACRAMENTO RIVER
			KRAMER RANCH Total		474.50		
A013667B	8303	11188	LAKE CALIFORNIA PROPERTY OWNERS ASSN INC	3/26/1982	1,220.00	Tehama	SACRAMENTO RIVER
A023140	16056	11186	LAKE CALIFORNIA PROPERTY OWNERS ASSN INC	9/23/1968	985.00	Tehama	SACRAMENTO RIVER
			LAKE CALIFORNIA PROPERTY OWNERS ASSN INC Total		2,205.00		
A004501	2285	1728	LAWRENCE SCHNEIDER AND RUTH SCHNEIDER FAMILY REV TRUST	4/19/1937	73.40	Yolo	SACRAMENTO RIVER
A012803	7563	4098	LAWRENCE SCHNEIDER AND RUTH SCHNEIDER FAMILY REV TRUST	11/17/1948	110.90	Yolo	SACRAMENTO RIVER
			LAWRENCE SCHNEIDER AND RUTH SCHNEIDER FAMILY REV TRUST Total		184.30		

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A000882A	429	001205A	LEE W RICHTER	12/30/1982	336.90	Sutter	SACRAMENTO RIVER
			LEE W RICHTER Total		336.90		
A001074A	591	004676A	LOMO COLD STORAGE A CAL GEN PARTNERSHIP	9/10/1918	1,951.80	Sutter	SACRAMENTO RIVER
A004613	2347	940	LOMO COLD STORAGE A CAL GEN PARTNERSHIP	11/28/1955	212.20	Sutter	SACRAMENTO RIVER
A004699	2364	1154	LOMO COLD STORAGE A CAL GEN PARTNERSHIP	3/21/1932	670.40	Sutter	SACRAMENTO RIVER
A006486	3615	4168	LOMO COLD STORAGE A CAL GEN PARTNERSHIP	11/14/1929	20,255.50	Sutter	SACRAMENTO RIVER
			LOMO COLD STORAGE A CAL GEN PARTNERSHIP Total		23,089.90		
A007232	3903	1651	LORNA KELSO	4/7/1932	64.10	Yolo	SACRAMENTO RIVER
			LORNA KELSO Total		64.10		
A003700	1633	1458	LOUISE A MARTIN-KOBELLAS	10/31/1923	558.70	Sutter	SACRAMENTO RIVER
			LOUISE A MARTIN-KOBELLAS Total		558.70		
A002707	1162	1729	M & H REALTY PARTNERS VI L P	12/29/1921	305.50	Sacramento	SACRAMENTO RIVER
			M & H REALTY PARTNERS VI L P Total		305.50		
A008213	4516	2618	M & T INCORPORATED	1/15/1935	1,450.00	Butte	SACRAMENTO RIVER
			M & T INCORPORATED Total		1,450.00		
A007641D2		006389D2	MARIA JOHN NICHOLAS KELLY RANCH LLC	1/5/2001	761.00	Sutter	SACRAMENTO RIVER
			MARIA JOHN NICHOLAS KELLY RANCH LLC Total		761.00		
A012120	7127	4666	MARIETTE B HOLLINS	10/7/1947	387.80	Colusa	SACRAMENTO RIVER
			MARIETTE B HOLLINS Total		387.80		
A008631	5128	7210	MAXWELL IRRIGATION DISTRICT	4/8/1936	28,990.80	Colusa	SACRAMENTO RIVER
A030445	21004		MAXWELL IRRIGATION DISTRICT	2/17/1995	13,630.00	Colusa	COLUSA BASIN DRAIN, LURLINE CREEK, SACRAMENTO RIVER, STONE CORRAL CREEK
A011956	8266	4586	MAXWELL IRRIGATION DISTRICT	6/24/1947	2,596.36	Colusa	RECLAMATION DISTRICT 2047 MAIN DRAIN
A014378	8808	4523	MAXWELL IRRIGATION DISTRICT	6/28/1951	1,636.36	Colusa	LATERAL DRAIN OF RECLAMATIN DISTRICT 2047
A011955	8265	4643	MAXWELL IRRIGATION DISTRICT	6/24/1957	4,720.66	Colusa	RECLAMATION DISTRICT 2047 MAIN DRAIN
A011597	8267	4644	MAXWELL IRRIGATION DISTRICT	6/24/1957	22,085.95	Colusa	LOGAN AND HUNTER CREEK, AND RECLAMATION DISTRICT 2047 MAIN DRAIN CANAL
A011958	8268	4694	MAXWELL IRRIGATION DISTRICT	6/24/1957	5,226.45	Colusa	STONE CORRAL CREEK
A013919	9042	5692	MAXWELL IRRIGATION DISTRICT	8/25/1950	4,946.78	Colusa	LURLINE CREEK
A030445	21004		MAXWELL IRRIGATION DISTRICT	5/30/1995	13,630.00	Colusa	SACRAMENTO RIVER, COLUSA BASIN DRAIN, STONE CORRAL CREEK, LURLINE CREEK
			MAXWELL IRRIGATION DISTRICT Total		97,463.36		
A015150	9391	4775	MCM PROPERTIES, A CALIF CORP	1/12/1953	1,094.90	Sutter	SACRAMENTO RIVER
A015152	9393	4776	MCM PROPERTIES, A CALIF CORP	1/12/1953	474.50	Sutter	SACRAMENTO RIVER
			MCM PROPERTIES, A CALIF CORP Total		1,569.40		

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A001074B	591	004676B	MERIDIAN FARMS WATER CO	9/10/1918	67,335.90	Sutter	SACRAMENTO RIVER
			MERIDIAN FARMS WATER CO Total		67,335.90		
A007641B	4215	006389B	MERILYN C SCHEIDEL	8/4/1933	3,484.60	Sutter	SACRAMENTO RIVER
			MERILYN C SCHEIDEL Total		3,484.60		
A004355A		002881A	MICHAEL E LONON	6/9/2000	822.00	Sutter	SACRAMENTO RIVER
			MICHAEL E LONON Total		822.00		
A007598	4220	1693	MILDRED HEIDRICK	6/23/1933	447.70	Yolo	SACRAMENTO RIVER
			MILDRED HEIDRICK Total		447.70		
A015811	9814	5407	Moore Bros.	3/31/1954	794.20	Colusa	SACRAMENTO RIVER
			Moore Bros. Total		794.20		
A004367	2012	1394	Narusuke Monguchi	12/15/1924	161.50	Yolo	SACRAMENTO RIVER UNDERFLOW
			Narusuke Monguchi Total		161.50		
A000534	247	1050	NATOMAS CENTRAL MUTUAL WATER CO	5/28/1931	15,394.20	Sacramento, Sutter	NATOMAS CROSS CANAL, SACRAMENTO RIVER
A001056	511	2814	NATOMAS CENTRAL MUTUAL WATER CO	8/22/1918	16,205.20	Sacramento, Sutter	NATOMAS CROSS CANAL, SACRAMENTO RIVER
A001203	580	3109	NATOMAS CENTRAL MUTUAL WATER CO	3/5/1919	58,394.20	Sacramento, Sutter	NATOMAS CROSS CANAL, SACRAMENTO RIVER
A001413	1129	3110	NATOMAS CENTRAL MUTUAL WATER CO	8/27/1919	36,655.10	Sacramento, Sutter	NATOMAS CROSS CANAL, SACRAMENTO RIVER
A015572	15150	9794	NATOMAS CENTRAL MUTUAL WATER CO	10/8/1953	11,846.00	Sacramento, Sutter	NATOMAS CROSS CANAL, SACRAMENTO RIVER
A022309	15314	9989	NATOMAS CENTRAL MUTUAL WATER CO	10/8/1965	2,627.00	Sacramento, Sutter	RECLAMATION DISTRICT 1000 EAST DRAIN, RECLAMATIN DISTRICT 1000 WEST DRAIN, RECLAMATION DISTRICT 1000 MAIN DRAIN
A025727	19400		NATOMAS CENTRAL MUTUAL WATER CO	2/7/1985	10,000.00	Sacramento, Sutter	NATOMAS CROSS CANAL, RD 1000 EAST DRAIN, RD 1000 MAIN DRAIN, RD 1000 WEST DRAIN, SACRAMENTO RIVER
			NATOMAS CENTRAL MUTUAL WATER CO Total		151,121.70		
A007641D1		006389D 1	NICOLI G NICHOLAS	1/5/2001	761.00	Sutter	SACRAMENTO RIVER
			NICOLI G NICHOLAS Total		761.00		
A000880B	418	002820B	OJI BROTHERS, A CO-PARTNERSHIP	3/6/1946	636.60	Sutter	SACRAMENTO RIVER
A000880C	418	002820C	OJI BROTHERS, A CO-PARTNERSHIP	1/3/1918	1,880.70	Sutter	SACRAMENTO RIVER
A003290A		002627A	OJI BROTHERS, A CO-PARTNERSHIP	7/27/1990	3,985.80	Sutter	SACRAMENTO RIVER
A010951	6377	3242	OJI BROTHERS, A CO-PARTNERSHIP	1/11/1945	2,854.00	Sutter	SACRAMENTO RIVER
A013590	8137	3835	OJI BROTHERS, A CO-PARTNERSHIP	2/20/1950	1,047.50	Sutter	SACRAMENTO RIVER
			OJI BROTHERS, A CO-PARTNERSHIP Total		10,404.60		
A001765A	1111	000613A	PELGER MUTUAL WATER COMPANY	3/13/1972	1,697.90	Sutter	SACRAMENTO RIVER
A012470B	007268B	008547B	PELGER MUTUAL WATER COMPANY	4/13/1948	22,815.20	Sutter	SACRAMENTO RIVER

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A030410	20933		PELGER MUTUAL WATER COMPANY	9/16/1994	5,000.00	Sutter	SACRAMENTO RIVER
			PELGER MUTUAL WATER COMPANY Total		29,513.10		
A000882B	429	001205B	PHIL KNOX LEISER TRUST	12/30/1982	307.10	Sutter	SACRAMENTO RIVER
			PHIL KNOX LEISER TRUST Total		307.10		
A000244	463	2646	PRINCETON-CODORA-GLENN IRRIGATION DISTRICT	12/17/2001	50,936.30	Glenn	SACRAMENTO RIVER
A000770	464	4161	PRINCETON-CODORA-GLENN IRRIGATION DISTRICT	12/17/2001	20,936.30	Glenn	SACRAMENTO RIVER
A017066	13869	8989	PRINCETON-CODORA-GLENN IRRIGATION DISTRICT	5/2/1956	15,074.38	Colusa, Glenn	COLUSA BASIN DRAIN
A030812	21132		PRINCETON-CODORA-GLENN IRRIGATION DISTRICT	11/19/1998	24,370.00	Colusa, Glenn	COLUSA BASIN DRAIN, SACRAMENTO RIVER
			PRINCETON-CODORA-GLENN IRRIGATION DISTRICT Total		111,316.98		
A000462	303	7205	PROVIDENT IRRIGATION DISTRICT	2/27/2001	88,000.00	Glenn	COLUSA DRAIN, DRAIN NO 13, DRAIN NO 55, SACRAMENTO RIVER, UNDR, WILLOW CREEK
A000640	304	7206	PROVIDENT IRRIGATION DISTRICT	2/27/2001	36,496.00	Glenn	COLUSA DRAIN, DRAIN NO 13, DRAIN NO 55, SACRAMENTO RIVER, UNDR, WILLOW CREEK
A000892	416	7207	PROVIDENT IRRIGATION DISTRICT	1/18/1918	40,146.00	Glenn	COLUSA DRAIN, DRAIN 13, DRAIN NO 55, SACRAMENTO RIVER, UNDR, WILLOW CREEK
A001422	847	1109	PROVIDENT IRRIGATION DISTRICT	9/2/1919	3,371.90	Glenn	COLUSA DRAIN
A030813	21133		PROVIDENT IRRIGATION DISTRICT	11/19/1998	26,747.00	Glenn	COLUSA BASIN DRAIN, DRAIN NO 13, DRAIN NO 55, SACRAMENTO RIVER, UNDR, WILLOWS CREEK
			PROVIDENT IRRIGATION DISTRICT Total		194,760.90		
A004226	2024	2790	PURHIRAN FARMS LLC	6/28/1945	525.40	Yolo	SACRAMENTO RIVER
			PURHIRAN FARMS LLC Total		525.40		
A018062	14507	8795	QUAD H RANCHES, INC	1/2/1969	307.70	Sutter	SACRAMENTO RIVER
			QUAD H RANCHES, INC Total		307.70		
A004372	2017	1393	R W ROSE	12/15/1924	80.70	Yolo	SACRAMENTO RIVER
			R W ROSE Total		80.70		
A010408	6118	2966	RALPH BECKLEY	3/18/1942	549.30	Colusa	SACRAMENTO RIVER
			RALPH BECKLEY Total		549.30		
A004355B		002881B	RAY E AND JANICE R ANDERSON FAMILY TRUST	6/9/2000	286.40	Sutter	SACRAMENTO RIVER
			RAY E AND JANICE R ANDERSON FAMILY TRUST Total		286.40		
A015151	9392	5596	Rebekah Leiser	1/12/1953	36.70	Sutter	SACRAMENTO RIVER
			Rebekah Leiser Total		36.70		
A000027	31	3165	RECLAMATION DISTRICT #1004	4/2/1915	56,000.00	Colusa, Glenn	SACRAMENTO RIVER
A023201	16771		RECLAMATION DISTRICT #1004	12/26/1968	21,000.00	Colusa	

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			RECLAMATION DISTRICT #1004 Total		77,000.00		
A000576	315	3065	RECLAMATION DISTRICT #108	1/25/1917	97,469.20	Colusa, Yolo	SACRAMENTO RIVER
A000763	388	3066	RECLAMATION DISTRICT #108	8/27/1917	270,747.80	Colusa, Yolo	SACRAMENTO RIVER
A001589	1885	3067	RECLAMATION DISTRICT #108	2/24/1950	77,968.40	Colusa, Yolo	SACRAMENTO RIVER
A011899	8251	7060	RECLAMATION DISTRICT #108	5/26/1947	27,371.90	Colusa	BACK LEVEE BORROW PIT OF RECLAMATION DISTRICTC NO. 108 (COLUSA BASIN DRAIN)
A031436	21274		RECLAMATION DISTRICT #108	10/18/2010	36,000.00	Colusa	SACRAMENTO RIVER
			RECLAMATION DISTRICT #108 Total		509,557.30		
A001666	884	1301	RECLAMATION DISTRICT #999	2/11/1920	58,394.20	Solano, Yolo	ELK SLOUGH, MINER SLOUGH, SACRAMENTO RIVER, SACRAMENTO RIVER DEEP WATER SHIP CHANNEL, SUTTER SLOUGH
A004099	1890	1302	RECLAMATION DISTRICT #999	4/1/1966	1,472.30	Yolo	SACRAMENTO RIVER DEEP WATER SHIP CHANNEL
A004100	1891	1303	RECLAMATION DISTRICT #999	4/1/1966	34,174.80	Solano, Yolo	ELK SLOUGH, MINER SLOUGH, SACRAMENTO RIVER, SACRAMENTO RIVER DEEP WATER SHIP CHANNEL, SUTTER SLOUGH
A004101	1892	1304	RECLAMATION DISTRICT #999	7/18/1924	3,909.90	Yolo	SACRAMENTO RIVER, SACRAMENTO RIVER DEEP WATER SHIP CHANNEL
			RECLAMATION DISTRICT #999 Total		97,951.20		
A020087	13942	9643	RICHARD SWIERSTRA	4/17/1961	45.10	Tehama	SACRAMENTO RIVER
			RICHARD SWIERSTRA Total		45.10		
A018061	14506	8794	RICHARD & SANDRA GIUSTI FAMILY TRUST DATED 8/13/90	1/2/1969	307.70	Sutter	SACRAMENTO RIVER
			RICHARD & SANDRA GIUSTI FAMILY TRUST DATED 8/13/90 Total		307.70		
A000575	314	1718	RIVER GARDEN FARMS COMPANY	1/25/1917	15,550.60	Yolo	SACRAMENTO RIVER
A000577	316	3123	RIVER GARDEN FARMS COMPANY	1/25/1917	13,745.70	Yolo	SACRAMENTO RIVER
A011910	8258	4636	RIVER GARDEN FARMS COMPANY	5/29/1947	6,331.24	Yolo	KNIGHTS LANDING RIDGE CUT, SACRAMENTO RIVER
			RIVER GARDEN FARMS COMPANY Total		35,627.54		
A013239	7849	5140	RIVER MAID LAND LTD	7/19/1949	63.40	Sacramento	SACRAMENTO RIVER
			RIVER MAID LAND LTD Total		63.40		
A007641C	4215	006389C	RIVER RANCH PARTNERSHIP	8/4/1933	2,795.00	Sutter	SACRAMENTO RIVER
			RIVER RANCH PARTNERSHIP Total		2,795.00		
A002317C	1259	001130C	ROBERTA SCHREINER	2/4/1980	36.70	Sutter	SACRAMENTO RIVER
			ROBERTA SCHREINER Total		36.70		
A003201	2172	1060	ROGER L MATTEOLI	12/27/1922	131.40	Yolo	SACRAMENTO RIVER

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			ROGER L MATTEOLI Total		131.40		
A014836	9153	5437	SACRAMENTO & SAN JOAQUIN DRAINAGE DISTRICT	6/2/1952	277.70	Sutter	SACRAMENTO RIVER
			SACRAMENTO & SAN JOAQUIN DRAINAGE DISTRICT Total		277.70		
A030454	21209		SACRAMENTO COUNTY WATER AGENCY	2/15/2008	71,000.00	Sacramento	SACRAMENTO RIVER
			SACRAMENTO COUNTY WATER AGENCY Total		71,000.00		
A003423	1646	9994	SACRAMENTO RIVER RANCH II LLC	5/17/1923	2,646.00	Yolo	KNIGHTS LANDING RIDGE CUT, SACRAMENTO RIVER
A004901	2514	9995	SACRAMENTO RIVER RANCH II LLC	3/1/1973	9,338.30	Yolo	KNIGHTS LANDING RIDGE CUT, SACRAMENTO RIVER
A004902	2515	9996	SACRAMENTO RIVER RANCH II LLC	3/1/1973	3,446.70	Yolo	KNIGHTS LANDING RIDGE CUT, SACRAMENTO RIVER
A005359	2811	9997	SACRAMENTO RIVER RANCH II LLC	2/17/1927	1,808.20	Yolo	KNIGHTS LANDING RIDGE CUT, SACRAMENTO RIVER
			SACRAMENTO RIVER RANCH II LLC Total		17,239.20		
A004351	2098	1200	SACRAMENTO RIVER RANCH LLC	12/4/1924	113.00	Sutter, Yolo	SACRAMENTO RIVER
			SACRAMENTO RIVER RANCH LLC Total		113.00		
A001060	512	1187	SIDDIQUI FAMILY PARTNERSHIP	8/28/1918	98.50	Sacramento	SACRAMENTO RIVER
A001094	518	570	SIDDIQUI FAMILY PARTNERSHIP	9/26/1918	1,198.70	Sacramento	SACRAMENTO RIVER
			SIDDIQUI FAMILY PARTNERSHIP Total		1,297.20		
A003200	2171	1653	SIOUX CREEK PROPERTY LLC	12/27/1922	351.30	Sutter	SACRAMENTO RIVER
A005696	2931	1157	SIOUX CREEK PROPERTY LLC	9/16/1927	311.60	Sutter	SACRAMENTO RIVER
			SIOUX CREEK PROPERTY LLC Total		662.90		
A022503	15151	9726	SISKIYOU COUNTY F C & W C D	6/22/1966	26,000.00	Siskiyou	SACRAMENTO RIVER
A023016	15992		SISKIYOU COUNTY F C & W C D	4/3/1968	14.00	Siskiyou	SCOTT CAMP CREEK
A024354	18371	12062	SISKIYOU COUNTY F C & W C D	6/20/1986	25.00	Siskiyou	LITTLE CASTLE CREEK
			SISKIYOU COUNTY F C & W C D Total		26,039.00		
A013658	8302	6169	SMITH RANCHES AND WOOD ORCHARD	3/29/1950	478.10	Tehama	SACRAMENTO RIVER
			SMITH RANCHES AND WOOD ORCHARD Total		478.10		
A006726	3621	4541	STEVE TARKE	7/10/1930	1,824.80	Sutter	SACRAMENTO RIVER
A011450	6726	4542	STEVE TARKE	6/27/1946	2,919.70	Sutter	SACRAMENTO RIVER
			STEVE TARKE Total		4,744.50		
A000230A	204	001788A	STEVEN J RUDEK	1/10/1916	484.00	Colusa	SACRAMENTO RIVER
A014205	8767	4390	STEVEN J RUDEK	3/20/1951	1,277.40	Colusa	SACRAMENTO RIVER
			STEVEN J RUDEK Total		1,761.40		
A005160B	002649B	001183B	SUTTER BASIN GROWERS COOPERATIVE	8/18/1926	182.50	Sutter	SACRAMENTO RIVER
			SUTTER BASIN GROWERS COOPERATIVE Total		182.50		
A000581	287	2817	SUTTER MUTUAL WATER COMPANY	2/1/1917	21,868.10	Sutter	SACRAMENTO RIVER
A000878	419	2818	SUTTER MUTUAL WATER COMPANY	1/3/1918	56,721.00	Sutter	SACRAMENTO RIVER
A000879	420	2819	SUTTER MUTUAL WATER COMPANY	1/3/1918	12,270.40	Sutter	SACRAMENTO RIVER
A000880A	418	002820A	SUTTER MUTUAL WATER COMPANY	1/3/1918	196,725.30	Sutter	SACRAMENTO RIVER
A001160	569	2822	SUTTER MUTUAL WATER COMPANY	1/24/1919	19,681.30	Sutter	SACRAMENTO RIVER
A001758	1103	552	SUTTER MUTUAL WATER COMPANY	4/9/1920	636.70	Sutter	SACRAMENTO RIVER

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A001763	1108	1110	SUTTER MUTUAL WATER COMPANY	4/9/1920	916.40	Sutter	SACRAMENTO RIVER
A001769	1117	547	SUTTER MUTUAL WATER COMPANY	6/22/1926	3,255.10	Sutter	SACRAMENTO RIVER
A001772	1120	657	SUTTER MUTUAL WATER COMPANY	1/31/1928	94.70	Sutter	SACRAMENTO RIVER
A003195	2169	882	SUTTER MUTUAL WATER COMPANY	11/30/1929	585.80	Sutter	SACRAMENTO RIVER
A007886	4354	2240	SUTTER MUTUAL WATER COMPANY	3/29/1934	3,121.60	Sutter	SACRAMENTO RIVER
A009760	5510	2821	SUTTER MUTUAL WATER COMPANY	11/3/1939	180,994.40	Sutter	SACRAMENTO RIVER
A010658	6189	2823	SUTTER MUTUAL WATER COMPANY	6/16/1943	3,654.40	Sutter	SACRAMENTO RIVER
A011953	7194	4562	SUTTER MUTUAL WATER COMPANY	6/23/1947	2,737.20	Sutter	SACRAMENTO RIVER, WEST BORROW PIT SUTTER BYPASS
A012470A	007268A	008547A	SUTTER MUTUAL WATER COMPANY	4/13/1948	15,309.70	Sutter	SACRAMENTO RIVER
A016677	13867	8220	SUTTER MUTUAL WATER COMPANY	9/7/1967	2,038.10	Sutter	SACRAMENTO RIVER
			SUTTER MUTUAL WATER COMPANY Total		520,610.20		
A013667A	8303	11187	SUZANNE GOELET	3/26/1982	410.00	Tehama	SACRAMENTO RIVER
			SUZANNE GOELET Total		410.00		
A001659	1981	8129	Sycamore Mutual Water Company	2/9/1920	42,521.20	Colusa	SACRAMENTO RIVER
A012412	8277	4056	Sycamore Mutual Water Company	3/17/1948	2,189.75	Colusa	R D 2047 MAIN CANAL
A013000	8285	5796	Sycamore Mutual Water Company	3/25/1949	1,824.79	Colusa	R D 2047 MAIN CANAL
A013001	8285	7062	Sycamore Mutual Water Company	3/25/1949	98.54	Colusa	R D 2047 MAIN CANAL
A013002	8285	4057	Sycamore Mutual Water Company	3/25/1949	364.96	Colusa	R D 2047 MAIN CANAL
A018372	14514	9977	Sycamore Mutual Water Company	12/22/1972	1,013.00	Colusa	SACRAMENTO RIVER
			Sycamore Mutual Water Company Total		48,012.24		
A014789	9069	7219	THOMAS L NELSON & HAZEL M NELSON TRUST	5/1/1952	656.70	Sutter	SACRAMENTO RIVER
			THOMAS L NELSON & HAZEL M NELSON TRUST Total		656.70		
A007641D3		006389D3	THOMAS S ATKINSON II	1/5/2001	761.00	Sutter	SACRAMENTO RIVER
			THOMAS S ATKINSON II Total		761.00		
A000742	382	1211	TISDALE IRRIGATION & DRAINAGE CO	7/26/1917	12,473.70	Sutter	SACRAMENTO RIVER
A016985	13868	9335	TISDALE IRRIGATION & DRAINAGE CO	4/3/1956	1,350.00	Sutter	SACRAMENTO RIVER
			TISDALE IRRIGATION & DRAINAGE CO Total		13,823.70		
A009169	5099	2695	TOWNE ENTERPRISES	11/3/1937	386.90	Sacramento	SACRAMENTO RIVER
			TOWNE ENTERPRISES Total		386.90		
A016168	14505	10001	TRILOGY HOMES INC	12/6/1954	1,450.00	Sacramento	SACRAMENTO RIVER
			TRILOGY HOMES INC Total		1,450.00		
A005625	12720		U.S. BUREAU OF RECLAMATION	7/30/1927	11,153,752.50	Shasta	SACRAMENTO RIVER
A005626	12721		U.S. BUREAU OF RECLAMATION	4/12/1961	7,998,004.00	Contra Costa, Glenn, Sacramento, Shasta, Tehama	OLD RIVER, SACRAMENTO RIVER

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A009363	12722		U.S. BUREAU OF RECLAMATION	4/12/1961	1,033,977.50	Contra Costa, Sacramento, San Joaquin, Shasta, Tehama	OLD RIVER, SACRAMENTO RIVER, Victoria Canal
A009364	12723		U.S. BUREAU OF RECLAMATION	8/2/1938	7,818,797.50	Contra Costa, Sacramento, San Joaquin, Shasta, Tehama	OLD RIVER, SACRAMENTO RIVER, Victoria Canal
			U.S. BUREAU OF RECLAMATION Total		28,004,531.50		
A006527	3597	2145	VAN RUITEN BROS	1/8/1930	1,094.90	Sutter, Yolo	SACRAMENTO RIVER
			VAN RUITEN BROS Total		1,094.90		
A000771	389	4160	W.A. YERXA	9/5/1917	9,084.40	Colusa	SACRAMENTO RIVER
			W.A. YERXA Total		9,084.40		
A015711	9751	5593	WALLACE L EDSON	2/2/1954	142.70	Sutter	OLD RIVER, SACRAMENTO RIVER
			WALLACE L EDSON Total		142.70		
A002317B	1259	001130B	WAYMON LYNCH	2/4/1980	30.60	Sutter	SACRAMENTO RIVER
			WAYMON LYNCH Total		30.60		
A004369	2014	1331	WILLIAM J CORREA	12/15/1924	44.00	Sacramento	SACRAMENTO RIVER
			WILLIAM J CORREA Total		44.00		
A002884	1347	968	WILLIAM P LOCKETT	6/17/1922	116.10	Sutter	SACRAMENTO RIVER
A005160A	2649	001183A	WILLIAM P LOCKETT	8/18/1926	365.00	Sutter	SACRAMENTO RIVER
			WILLIAM P LOCKETT Total		481.10		
A028238	20073	13351	WILLOW CREEK MUTUAL WATER CO	9/7/1984	5,000.00	Glenn	SACRAMENTO RIVER
			WILLOW CREEK MUTUAL WATER CO Total		5,000.00		
A008141	4459	2631	WILSON RANCH PARTNERSHIP	10/24/1934	2,717.40	Yolo	SACRAMENTO RIVER
			WILSON RANCH PARTNERSHIP Total		2,717.40		
A003247	1695	4255	WINDSWEPT LAND AND CATTLE COMPANY	3/21/1956	3,209.00	Sutter, Yolo	SACRAMENTO RIVER
			WINDSWEPT LAND AND CATTLE COMPANY Total		3,209.00		
A004257	2066	1939	Woodland Development Company, LLC	4/6/1939	666.50	Yolo	SACRAMENTO RIVER
			Woodland Development Company, LLC Total		666.50		
A030358	20281		Woodland-Davis Clean Water Agency	4/14/2011	45,000.00	Yolo	SACRAMENTO RIVER
			Woodland-Davis Clean Water Agency Total		45,000.00		
A013031	7461	4721	Yolo Land Trust	4/18/1949	1,011.60	Yolo	SACRAMENTO RIVER
			Yolo Land Trust Total		1,011.60		
A014619	8957	11038	ZUMWALT MUTUAL WATER COMPANY	1/14/1952	63.00	Colusa	SACRAMENTO RIVER
			ZUMWALT MUTUAL WATER COMPANY Total		63.00		
			Grand Total		33,492,590.01		

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A020496	13915	8274	ALEX NACCARATO	11/15/61	13.00			Tuolumne	OWL CREEK
A029917	20928		ALEX NACCARATO	3/14/91	20.00			Tuolumne	OWL CREEK
			ALEX NACCARATO Total		33.00				
A018809	12223	6502	ALMA A RYALS	6/18/59	1.10			Tuolumne	UNSP
			ALMA A RYALS Total		1.10				
A016295	10192	10158	BEAR VALLEY HOMEOWNERS ASSOCIATION	4/1/55	2.50			Alpine	UNSP
A022290	15190	10159	BEAR VALLEY HOMEOWNERS ASSOCIATION	9/17/65	1.30			Alpine	UNSP
A022291	15449	10160	BEAR VALLEY HOMEOWNERS ASSOCIATION	9/17/65	3.20			Alpine	UNSP
A029813	20542	13866	BEAR VALLEY HOMEOWNERS ASSOCIATION	8/20/12	7.80			Alpine	UNSP
			BEAR VALLEY HOMEOWNERS ASSOCIATION Total		14.80				
A018366	12170	7514	BERNICE JANE BOTTOMLEY	10/9/58	47.00			Calaveras	CARSON CREEK
			BERNICE JANE BOTTOMLEY Total		47.00				
A012550	7440	4929	BLUE LAKE SPRINGS HOMEOWNERS ASSOCIATION	6/16/48	45.00			Calaveras	MORAN CREEK
A014576	9049	4698	BLUE LAKE SPRINGS HOMEOWNERS ASSOCIATION	11/13/51	51.20			Calaveras	MORAN CREEK
			BLUE LAKE SPRINGS HOMEOWNERS ASSOCIATION Total		96.20				
A027131	18603	12280	BRETT D THOMSON	12/2/81	1.00			Calaveras	UNST
			BRETT D THOMSON Total		1.00				
A011792B	15013		CALAVERAS COUNTY WATER DISTRICT	3/24/47	78,500.00			Calaveras, Tuolumne	HIGHLAND CREEK, NORTH FORK STANISLAUS RIVER
A012911	15016		CALAVERAS COUNTY WATER DISTRICT	1/25/49	368,091.00			Calaveras, Tuolumne	HIGHLAND CREEK, NORTH FORK STANISLAUS RIVER
A012912	15017		CALAVERAS COUNTY WATER DISTRICT	1/25/49	3,373.90			Tuolumne	NORTH FORK STANISLAUS RIVER
A012912A	14769		CALAVERAS COUNTY WATER DISTRICT	1/25/49	1,446.00			Tuolumne	NORTH FORK STANISLAUS RIVER
A013091	15018		CALAVERAS COUNTY WATER DISTRICT	5/13/49	63,000.00			Tuolumne	HIGHLAND CREEK
A013092	15019		CALAVERAS COUNTY WATER DISTRICT	5/13/49	63,000.00			Tuolumne	HIGHLAND CREEK
A013093	15020		CALAVERAS COUNTY WATER DISTRICT	5/13/49	50,050.00			Alpine, Tuolumne	HIGHLAND CREEK, NORTH FORK STANISLAUS RIVER
A018727	15021		CALAVERAS COUNTY WATER DISTRICT	5/20/59	506,809.30			Tuolumne	BEAVER CREEK, NORTH FORK STANISLAUS RIVER
A019148	15023		CALAVERAS COUNTY WATER DISTRICT	12/23/59	732,538.90			Alpine, Tuolumne	BEAVER CREEK, HIGHLAND CREEK, NORTH FORK STANISLAUS RIVER
A019149	15024		CALAVERAS COUNTY WATER DISTRICT	12/23/59	50,050.00			Alpine, Tuolumne	HIGHLAND CREEK, NORTH FORK STANISLAUS RIVER
			CALAVERAS COUNTY WATER DISTRICT Total		1,916,859.10				
A018148	11642	6479	CASTLE & COOKE CALAVERAS INC	5/22/58	50.00			Calaveras	SAWMILL CREEK
			CASTLE & COOKE CALAVERAS INC Total		50.00				
A030100	20788		CASTLE & COOKE CALIFORNIA INC	4/8/92	98.00			Calaveras	SAW MILL CREEK
			CASTLE & COOKE CALIFORNIA INC Total		98.00				
A014898	9610	4993	CEDAR RIDGE IMPROVEMENT ASSOCIATION	7/9/52	27.50			Tuolumne	FIVEMILE CREEK
A018514	12003	9773	CEDAR RIDGE IMPROVEMENT ASSOCIATION	1/30/59	15.00			Tuolumne	UNSP (3)
			CEDAR RIDGE IMPROVEMENT ASSOCIATION Total		42.50				
A004895	2599	1308	CLIFFORD D CHENEY	1/26/26	3.40			Tuolumne	UNSP
			CLIFFORD D CHENEY Total		3.40				
A021647	14633	9120	COLD SPRINGS WATER COMPANY INC	2/20/64	106.00			Tuolumne	UNST
			COLD SPRINGS WATER COMPANY INC Total		106.00				
A019732	13038	8088	DANA KAUFFMANN	9/8/60	29.00			Tuolumne	KNIGHT CREEK
			DANA KAUFFMANN Total		29.00				
A018808	12222	6501	DAVE D FICKEL	6/18/59	0.80			Tuolumne	UNSP
			DAVE D FICKEL Total		0.80				
A020819	13802	10299	DAVIES PROPERTIES	6/14/62	6.40			Calaveras	LOVE CREEK
			DAVIES PROPERTIES Total		6.40				
A016982	10614	5887	Donald Paul Deshon	4/2/56	6.00			Tuolumne	UNST
			Donald Paul Deshon Total		6.00				
A019168	12437	7468	EARL D GARRISON	1/4/60	6.00			Calaveras	UNST
			EARL D GARRISON Total		6.00				
A012659	7486	4989	ESTATE OF E ALFORD	8/19/48	24.00			Calaveras	LOVE CREEK
			ESTATE OF E ALFORD Total		24.00				
A021338	14498	10248	Eureka Valley LLC	5/9/74	15.00			Tuolumne	UNST
			Eureka Valley LLC Total		15.00				
A025335	17026	11288	GEORGE A ATHERTON	4/21/77	32.00			Tuolumne	SOUTH FORK WILDCAT CREEK

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			GEORGE A ATHERTON Total		32.00				
A017554	11689	8666	GERALD B ENGLER	4/18/57	25.00			Tuolumne	MORMON CREEK
			GERALD B ENGLER Total		25.00				
A015583	9715	6899	GREENHORN CREEK ASSOCIATES L P	10/23/53	45.00			Calaveras	UNXX
			GREENHORN CREEK ASSOCIATES L P Total		45.00				
A029013	21114		GUADALUPE RAMIREZ	4/23/87	18.00			Calaveras	LOVE CREEK
			GUADALUPE RAMIREZ Total		18.00				
A009620	5396	5298	IRVING M TERZICH	6/15/39	426.50			Tuolumne	EAGLE CREEK
			IRVING M TERZICH Total		426.50				
A022343	15266	9934	JANICE M ZUKAL	11/24/65	7.00			Tuolumne	MINE TUNNEL
			JANICE M ZUKAL Total		7.00				
A019307	12552	7663	JEFF R WILSON	3/14/60	14.10			Tuolumne	UNST
			JEFF R WILSON Total		14.10				
A021779	15162	10782	JEROME P SOLARI	5/19/64	22.50			Tuolumne	DEADMAN GULCH
			JEROME P SOLARI Total		22.50				
A018573	11984	6635	JOANNA VIDITO	3/9/59	4.00			Tuolumne	UNST
			JOANNA VIDITO Total		4.00				
A025626	17480	11277	JOHN WILLMS RANCH INC	12/30/77	11.00			Stanislaus	UNST
			JOHN WILLMS RANCH INC Total		11.00				
A020041	13786	9752	JON H JANOFSKY	3/17/61	20.00			Calaveras	PENNY CREEK
			JON H JANOFSKY Total		20.00				
A013517	8095	4279	JON V ELLIS	12/27/49	35.00			Calaveras	UNST
			JON V ELLIS Total		35.00				
A019469	16009	10448	JOSEPH W MARTIN JR	6/2/60	9.60			Tuolumne	ANDREWS CREEK
			JOSEPH W MARTIN JR Total		9.60				
A018574	11985	7360	KAREN REESE	3/9/59	48.00			Tuolumne	GREEN SPRING RUN
			KAREN REESE Total		48.00				
A021149	14736	8849	KATHARINE K STEVENS	2/4/63	2.00			Tuolumne	UNSP
			KATHARINE K STEVENS Total		2.00				
A011661	6863	4230	KATHERINE R REID	12/16/46	36.90			Tuolumne	EAGLE CREEK
			KATHERINE R REID Total		36.90				
A020312	13903	10840	LAKE ALPINE WATER COMPANY	7/21/61	42.00			Alpine	UNSP
A021485	14541	11007	LAKE ALPINE WATER COMPANY	10/7/63	261.00			Alpine	BEAR CREEK
A005648G	21237		LAKE ALPINE WATER COMPANY	6/10/09	395.00			Alpine	BEAR CREEK
			LAKE ALPINE WATER COMPANY Total		698.00				
A020450	13818	12186	LELAND MEADOW WATER DISTRICT	10/24/61	2.30			Tuolumne	UNSP
A023195	16065	11345	LELAND MEADOW WATER DISTRICT	12/17/68	68.00			Tuolumne	LELAND CREEK
A026373	18277	12187	LELAND MEADOW WATER DISTRICT	5/21/80	2.70			Tuolumne	UNSP
			LELAND MEADOW WATER DISTRICT Total		73.00				
A008919	4961	2482	LENORA HOLMES	3/13/37	0.20			Alpine	UNSP
A009217	5129	2483	LENORA HOLMES	12/30/37	0.20			Alpine	UNSP
A009851	5546	3153	LENORA HOLMES	3/14/40	0.70			Alpine	UNSP
			LENORA HOLMES Total		1.10				
A003602	1849	895	MATTHEW T BLOOM	4/17/03	0.30			Tuolumne	UNST
			MATTHEW T BLOOM Total		0.30				
A015841	10169	6882	MICHAEL P TRACY	4/23/07	18.00			Tuolumne	MORMON CREEK
			MICHAEL P TRACY Total		18.00				
A026084	18024	12790	MIKEL C WILLIAMS	9/6/79	0.50			Tuolumne	MORMON CREEK, UNST
			MIKEL C WILLIAMS Total		0.50				
A000077A	1303	9966	Northern California Power Agency	8/4/15	4,062.00			Tuolumne	HIGHLAND CREEK
			Northern California Power Agency Total		4,062.00				
A001081	2104	2012	OAKDALE IRRIGATION DISTRICT	9/20/18	96,195.00			Calaveras	STANISLAUS RIVER
A003091	2106	2013	OAKDALE IRRIGATION DISTRICT	10/19/22	10,754.00			Calaveras	STANISLAUS RIVER
A005648A	13692	12385	OAKDALE IRRIGATION DISTRICT	7/30/27	60,000.00			Tuolumne	MIDDLE FORK STANISLAUS RIVER
A010872	9360	7856	OAKDALE IRRIGATION DISTRICT	8/31/01	80,000.00			Tuolumne	STANISLAUS RIVER
A010978	6448	3986	OAKDALE IRRIGATION DISTRICT	8/31/01	25,000.00			Calaveras	STANISLAUS RIVER
A011105	9361	7857	OAKDALE IRRIGATION DISTRICT	8/31/01	98,000.00			Tuolumne	MIDDLE FORK STANISLAUS RIVER
A012490	9362	10166	OAKDALE IRRIGATION DISTRICT	8/31/01	64,500.00			Tuolumne	MIDDLE FORK STANISLAUS RIVER
A012614	9363	7858	OAKDALE IRRIGATION DISTRICT	7/23/48	496,187.60			Tuolumne	MIDDLE FORK STANISLAUS RIVER
A012873	9364	10167	OAKDALE IRRIGATION DISTRICT	12/22/48	354,091.00			Tuolumne	MIDDLE FORK STANISLAUS RIVER
A013309	9365	7859	OAKDALE IRRIGATION DISTRICT	8/22/49	144,795.50			Tuolumne	MIDDLE FORK STANISLAUS RIVER
A013310	9366	7860	OAKDALE IRRIGATION DISTRICT	8/22/49	1,165,966.30			Tuolumne	STANISLAUS RIVER
A026791	19046		OAKDALE IRRIGATION DISTRICT	4/15/81	1,303,159.50			Calaveras	STANISLAUS RIVER

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A031502	21188		OAKDALE IRRIGATION DISTRICT	8/30/07	50,000.00			Tuolumne	MIDDLE FORK STANISLAUS RIVER
A031770	21299		OAKDALE IRRIGATION DISTRICT	4/25/12	506,000.00			Tuolumne	
			OAKDALE IRRIGATION DISTRICT Total		4,454,648.90				
A001339	668	1391	PACIFIC GAS AND ELECTRIC COMPANY	1/3/34	40,904.70			Tuolumne	SOUTH FORK STANISLAUS RIVER
A006129	3507	1541	PACIFIC GAS AND ELECTRIC COMPANY	12/4/28	3,919.00			Tuolumne	SOUTH FORK STANISLAUS RIVER
A006130	3508	1542	PACIFIC GAS AND ELECTRIC COMPANY	12/4/28	5,360.00			Tuolumne	SOUTH FORK STANISLAUS RIVER
A010122	6107	2862	PACIFIC GAS AND ELECTRIC COMPANY	2/19/41	115,836.40			Tuolumne	MIDDLE FORK STANISLAUS RIVER
A031405	21170		PACIFIC GAS AND ELECTRIC COMPANY	4/5/05	4,706.00			Tuolumne	SOUTH FORK STANISLAUS RIVER
			PACIFIC GAS AND ELECTRIC COMPANY Total		170,726.10				
A022245	15262	9709	PATRICIA D DAVEY	3/31/71	12.00			Tuolumne	UNST
			PATRICIA D DAVEY Total		12.00				
A023320	16216	12444	PETER G VON DER LINDE	7/29/69	11.10			Tuolumne	UNNAMED MINE TUNNEL
			PETER G VON DER LINDE Total		11.10				
A025177	17033	13451	RICHARD M GONZALES	10/20/76	10.00			Calaveras	YORK CREEK
			RICHARD M GONZALES Total		10.00				
A020416	13653	8499	RNE INVESTMENTS LLC	10/2/61	46.00			Calaveras	SAWMILL CREEK
			RNE INVESTMENTS LLC Total		46.00				
A024335	16788	11194	ROSS A CARKEET JR	4/3/73	0.20			Tuolumne	UNSP
			ROSS A CARKEET JR Total		0.20				
A013353	8073	10902	SHERMAN ACRES MUTUAL WATER ASSN	9/14/49	1.50			Calaveras	UNSP
			SHERMAN ACRES MUTUAL WATER ASSN Total		1.50				
A024930	17704	11731	Sierra Golf Management, Inc.	11/17/75	108.00			Calaveras	ANGELS CREEK
			Sierra Golf Management, Inc. Total		108.00				
A012739	7567	5256	SIERRA PACIFIC INDUSTRIES	10/8/48	8.10			Tuolumne	UNSP
			SIERRA PACIFIC INDUSTRIES Total		8.10				
A005648X01			SIX MILE LAND COMPANY	5/9/01	81.00			Calaveras	SIX MILE CREEK
A031182			SIX MILE LAND COMPANY	5/9/01	41.00			Calaveras	SIX MILE CREEK
			SIX MILE LAND COMPANY Total		122.00				
A002524	1147	604	SOUTH SAN JOAQUIN IRRIGATION DISTRICT	8/29/21	36,000.00			Calaveras	STANISLAUS RIVER
			SOUTH SAN JOAQUIN IRRIGATION DISTRICT Total		36,000.00				
A030603A			STOCKTON EAST WATER DISTRICT	9/10/04	111,900.00			Calaveras	STANISLAUS RIVER
A030603B			STOCKTON EAST WATER DISTRICT	9/10/04	407,000.00			Calaveras, Tuolumne	STANISLAUS RIVER
			STOCKTON EAST WATER DISTRICT Total		518,900.00				
A010168	5974	3560	TAMARACK CABIN OWNERS ASSN	3/25/41	7.30			Calaveras	UNSP
			TAMARACK CABIN OWNERS ASSN Total		7.30				
A016563	10518		TAMARACK SPRINGS MUTUAL WATER CO	8/31/55	4.60			Calaveras	UNSP (2), UNXX
			TAMARACK SPRINGS MUTUAL WATER CO Total		4.60				
A019990	13140	8194	The Donald A. Bottomley 1992 Trust	2/16/61	4.00			Calaveras	UNST
			The Donald A. Bottomley 1992 Trust Total		4.00				
A018815	12329	7401	THOMAS P KLEIN	6/22/59	2.20			Tuolumne	UNST
			THOMAS P KLEIN Total		2.20				
A005648X02			THOMSON FAMILY TRUST	10/26/00	28.10			Calaveras	SIXMILE CREEK, UNST
A031364			THOMSON FAMILY TRUST	10/2/02	28.10			Calaveras	SIXMILE CREEK, UNST
			THOMSON FAMILY TRUST Total		56.20				
A003912	1781	1182	U S STANISLAUS NATL FOREST	4/18/32	32.80			Tuolumne	GOOSEBERRY SPRING
A010384	5982	3941	U S STANISLAUS NATL FOREST	2/6/42	6.60			Tuolumne	COW CREEK
A010386	5983	3917	U S STANISLAUS NATL FOREST	2/6/42	4.50			Tuolumne	LELAND CREEK
A010421	5986	3561	U S STANISLAUS NATL FOREST	4/1/42	1.10			Calaveras	BIG MEADOW CREEK
A010437	5987	3931	U S STANISLAUS NATL FOREST	4/25/42	0.70			Alpine	BEE CREEK
A010490	6038	3282	U S STANISLAUS NATL FOREST	7/8/42	1.10			Tuolumne	UNSP
A010491	6039	3012	U S STANISLAUS NATL FOREST	7/8/42	1.00			Tuolumne	UNST
A010492	6040	3013	U S STANISLAUS NATL FOREST	7/9/42	0.90			Tuolumne	UNST
A010495	6041	2977	U S STANISLAUS NATL FOREST	7/15/42	3.10			Tuolumne	UNST
A010556	6104	5015	U S STANISLAUS NATL FOREST	11/12/42	3.00			Tuolumne	BUMBLEBEE CREEK
A010557	6105	2974	U S STANISLAUS NATL FOREST	11/12/42	1.60			Tuolumne	CASCADE CREEK
A010575	6159	2975	U S STANISLAUS NATL FOREST	12/28/42	0.80			Tuolumne	UNST
A010576	6160	3903	U S STANISLAUS NATL FOREST	12/28/42	0.90			Tuolumne	UNST
A010584	6161	3283	U S STANISLAUS NATL FOREST	1/2/43	2.10			Tuolumne	UNST
A013833	8360	3860	U S STANISLAUS NATL FOREST	7/5/50	3.10			Tuolumne	UNST
A014167	8618	4660	U S STANISLAUS NATL FOREST	2/20/51	1.90			Tuolumne	UNSP
A016980	10760	7337	U S STANISLAUS NATL FOREST	3/30/56	0.70			Tuolumne	UNST

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	Season	Purpose of Use	County	Source
A017484	11017	7115	U S STANISLAUS NATL FOREST	2/27/57	11.40			Alpine	UNST
A018680	12115	7497	U S STANISLAUS NATL FOREST	4/30/59	0.90			Alpine	INSPIRATION SPRING
A018882	12197	7863	U S STANISLAUS NATL FOREST	8/3/59	1.20			Tuolumne	CRANDALL SPRING
A018883	12198	7255	U S STANISLAUS NATL FOREST	8/3/59	1.20			Tuolumne	SCHAFER SPRING
A018893	12199	7260	U S STANISLAUS NATL FOREST	8/3/59	1.20			Tuolumne	FRASER SPRING
A019702	13033	8003	U S STANISLAUS NATL FOREST	8/22/60	2.30			Tuolumne	UNST
A019703	13034	7977	U S STANISLAUS NATL FOREST	8/22/60	0.70			Tuolumne	UNSP
A019704	13035	8232	U S STANISLAUS NATL FOREST	8/22/60	1.90			Alpine	UNST
A019706	13037	8142	U S STANISLAUS NATL FOREST	8/22/60	1.40			Tuolumne	UNST
A020426	13565	8080	U S STANISLAUS NATL FOREST	10/5/61	0.90			Calaveras	UNSP
A021918	14918	9098	U S STANISLAUS NATL FOREST	9/29/64	0.50			Tuolumne	UNSP
A022030	14969	9097	U S STANISLAUS NATL FOREST	1/18/65	0.20			Tuolumne	UNSP
			U S STANISLAUS NATL FOREST Total		89.70				
A014858A	16597		U.S. BUREAU OF RECLAMATION	4/4/73	980,000.00			Calaveras	STANISLAUS RIVER
A014858B	20245		U.S. BUREAU OF RECLAMATION	7/18/88	1,000,000.00			Calaveras, San Joaquin	STANISLAUS RIVER
A014859	16598		U.S. BUREAU OF RECLAMATION	6/16/52	5,323,865.00			Calaveras	STANISLAUS RIVER
A019303	16599		U.S. BUREAU OF RECLAMATION	7/19/73	1,420,000.00			Calaveras	STANISLAUS RIVER
A019304	16600		U.S. BUREAU OF RECLAMATION	3/11/60	1,420,000.00			Calaveras, Contra Costa	STANISLAUS RIVER
A027319	20246		U.S. BUREAU OF RECLAMATION	7/18/88	2,895,910.00			Calaveras	STANISLAUS RIVER
			U.S. BUREAU OF RECLAMATION Total		13,039,775.00				
A028182	20144		VENTURE 4 MINING, A PARTNERSHIP	7/3/84	2.50			Tuolumne	UNST (AKA GREENHORN GULCH)
			VENTURE 4 MINING, A PARTNERSHIP Total		2.50				
A025369	17409	11514	WILLIAM MICHAEL ROBISON	5/27/77	28.00			Tuolumne	OWL CREEK, UNST
A025370	17410	12006	WILLIAM MICHAEL ROBISON	5/27/77	48.00			Tuolumne	OWL CREEK
A025371	17411	12007	WILLIAM MICHAEL ROBISON	5/27/77	20.00			Tuolumne	NORTH FORK WILDCAT CREEK
A025386	17412	11515	WILLIAM MICHAEL ROBISON	6/9/77	0.70			Tuolumne	NORTH FORK WILDCAT CREEK
			WILLIAM MICHAEL ROBISON Total		96.70				
A028278	19471	12939	YOUNG BERTRAND TRUSTEE ETAL	10/2/84	0.10			Calaveras	LOVE CREEK
			YOUNG BERTRAND TRUSTEE ETAL Total		0.10				
			Grand Total		20,143,681.00				

Tuolumne River Watershed - Post-1914 Appropriative Water Rights

Application ID	Permit ID	License ID	Water Right Type	Status	Holder Name	Date	Face Amt	County	Source
A014162	9583	5049	Appropriative	Licensed	Aaron Lentz	2/15/51	3.7	Tuolumne	CURTIS CREEK
					Aaron Lentz Total		3.7		
A022486	15299	9177	Appropriative	Licensed	BANK OF AMERICA NT & SA	6/8/66	15	Tuolumne	UNST
A022487	15300	9161	Appropriative	Licensed	BANK OF AMERICA NT & SA	6/8/66	20	Stanislaus	UNST
					BANK OF AMERICA NT & SA Total		35		
A018644	12028	7382	Appropriative	Licensed	BARBARA THORNTON	4/14/59	9	Tuolumne	GARROTTE CREEK
					BARBARA THORNTON Total		9		
A020279	13976	10278	Appropriative	Licensed	BERNHARD KISSINGER	6/26/61	1.5	Tuolumne	UNST
					BERNHARD KISSINGER Total		1.5		
A020324	13395	8154	Appropriative	Licensed	BIG CREEK ASSOCIATES	7/25/61	24.5	Tuolumne	BIG CREEK DRAINAGE, UNST
					BIG CREEK ASSOCIATES Total		24.5		
A018738B	12118	008164B	Appropriative	Licensed	BOBBY E MADEWELL	5/25/59	1	Tuolumne	UNST
					BOBBY E MADEWELL Total		1		
A012961	7549	4032	Appropriative	Licensed	BOY SCOUT MEMORIAL FOUNDATION	3/4/49	6	Tuolumne	UNST
A016137	10124	6866	Appropriative	Licensed	BOY SCOUT MEMORIAL FOUNDATION	11/15/54	7.9	Tuolumne	UNST
					BOY SCOUT MEMORIAL FOUNDATION Total		13.9		
A012962	7550	4033	Appropriative	Licensed	BOY SCOUT OF AMERICA MEMORIAL FOUNDATION	3/4/49	2.7	Tuolumne	NORTH FORK TUOLUMNE RIVER
					BOY SCOUT OF AMERICA MEMORIAL FOUNDATION Total		2.7		
A019217	12502	7478	Appropriative	Licensed	BRENT LOOP	2/4/60	3.6	Tuolumne	UNST
					BRENT LOOP Total		3.6		
A021372	14266	9116	Appropriative	Licensed	BRENTWOOD LAKE CLUB INC	6/28/63	100	Tuolumne	UNST
					BRENTWOOD LAKE CLUB INC Total		100		
A010902	6346	3579	Appropriative	Licensed	CAMP TAWONGA-TAWONGA JEWISH COMMUNITY CORP	10/16/44	21.7	Tuolumne	MIDDLE FORK TUOLUMNE RIVER
A011108	6525	3743	Appropriative	Licensed	CAMP TAWONGA-TAWONGA JEWISH COMMUNITY CORP	7/17/45	11	Tuolumne	UNST
A013365	7958	4251	Appropriative	Licensed	CAMP TAWONGA-TAWONGA JEWISH COMMUNITY CORP	9/27/49	21.7	Tuolumne	UNST
A015078	9901	5326	Appropriative	Licensed	CAMP TAWONGA-TAWONGA JEWISH COMMUNITY CORP	11/6/52	12.3	Tuolumne	UNST
					CAMP TAWONGA-TAWONGA JEWISH COMMUNITY CORP Total		66.7		
A020332	13421	9601	Appropriative	Licensed	CAROLE CANEPA	7/28/61	22	Tuolumne	UNST
					CAROLE CANEPA Total		22		
A020841	14114	8616	Appropriative	Licensed	CAROLYN SUE MOSLEY	7/3/62	0.3	Tuolumne	CURTIS CREEK
					CAROLYN SUE MOSLEY Total		0.3		
A018757B	12099	006636B	Appropriative	Licensed	CHARLES G YONEDA	10/28/88	0.7	Tuolumne	UNST
					CHARLES G YONEDA Total		0.7		
A013101	7796	5279	Appropriative	Licensed	CHARLES J HURST	5/19/49	4	Tuolumne	WOODS CREEK
A023560	16134	10546	Appropriative	Licensed	CHARLES J HURST	7/17/70	8	Tuolumne	UNST
					CHARLES J HURST Total		12		
A016104	10108	9181	Appropriative	Licensed	CHRISTOPHER R ROSS	2/6/03	8	Tuolumne	UNST (AKA LITTLE SUGAR PINE CREEK)
					CHRISTOPHER R ROSS Total		8		
A020574	13616	8190	Appropriative	Licensed	CLIFTON E J HODGE	1/29/62	6	Tuolumne	UNST
					CLIFTON E J HODGE Total		6		
A020617	13658	8259	Appropriative	Licensed	COUNTY OF TUOLUMNE	2/15/62	10	Tuolumne	UNST
A028689	20146	13073	Appropriative	Licensed	COUNTY OF TUOLUMNE	1/3/86	2	Tuolumne	UNST
					COUNTY OF TUOLUMNE Total		12		
A018604	12335	7329	Appropriative	Licensed	CRAIG AND PATRICIA DAMBACHER 1993 FAMILY TRUST	3/20/59	16	Tuolumne	UNST (2)
					CRAIG AND PATRICIA DAMBACHER 1993 FAMILY TRUST Total		16		
A000862	516	283	Appropriative	Licensed	CROOK REVOCABLE 1992 TRUST	12/15/17	196.4	Tuolumne	JAWBONE CREEK
A021329	14878	10317	Appropriative	Licensed	CROOK REVOCABLE 1992 TRUST	6/10/63	28	Tuolumne	UNST
					CROOK REVOCABLE 1992 TRUST Total		224.4		
A021227	14243	9178	Appropriative	Licensed	DANIEL A SCHULTZ	4/9/63	8	Tuolumne	UNST
					DANIEL A SCHULTZ Total		8		
A020883	13885	8492	Appropriative	Licensed	DAVID C HARDEN	8/1/62	8.4	Tuolumne	UNST
					DAVID C HARDEN Total		8.4		
A019299	12441	7485	Appropriative	Licensed	DAVID ERNEST HERBERT	3/9/60	1.5	Tuolumne	UNST
					DAVID ERNEST HERBERT Total		1.5		
A020381	13434	7885	Appropriative	Licensed	DENNIS S DAOUST	9/6/61	1	Tuolumne	UNST
					DENNIS S DAOUST Total		1		
A027785	19155		Appropriative	Permitted	DONALD F MC CLURE	6/30/83	8.1	Tuolumne	MOSS SPRING
					DONALD F MC CLURE Total		8.1		

A020497	13654	8293	Appropriative	Licensed	EDWARD J FILIBERTI	11/15/61	5.8	Tuolumne	UNST
					EDWARD J FILIBERTI Total		5.8		
A020784	13766	8593	Appropriative	Licensed	Eric J Coffill	5/21/62	17	Tuolumne	UNST
					Eric J Coffill Total		17		
A020575	13569	9158	Appropriative	Licensed	ESTATE OF LAVERNE LITTERAL	1/29/62	5.5	Tuolumne	UNST
A020587	13696	10008	Appropriative	Licensed	ESTATE OF LAVERNE LITTERAL	2/5/62	5.4	Tuolumne	BLUE GULCH
					ESTATE OF LAVERNE LITTERAL Total		10.9		
A022468	15546	10097	Appropriative	Licensed	ESTATES OF ELDON E & ANNA V AMOS	5/11/73	4	Tuolumne	UNSP
					ESTATES OF ELDON E & ANNA V AMOS Total		4		
A029977	20784		Appropriative	Permitted	G SCOTT FAHEY	3/6/02	44.8	Tuolumne	DEADWOOD SPRING, UNSP (AKA SUGAR PINE SPRING)
A031491	21289		Appropriative	Permitted	G SCOTT FAHEY	8/1/11	64.5	Tuolumne	UNSP
					G SCOTT FAHEY Total		109.3		
A018757A03	12099	006636A03	Appropriative	Licensed	GRAY A CLOSSMAN	5/9/90	1	Tuolumne	UNST
					GRAY A CLOSSMAN Total		1		
A019214	12433	7555	Appropriative	Licensed	Gregory C. Henley	2/3/60	30	Tuolumne	UNST
					Gregory C. Henley Total		30		
A018757C	12099	006636C	Appropriative	Licensed	GREGORY L CARR	10/28/88	0.7	Tuolumne	UNST
					GREGORY L CARR Total		0.7		
A019253	12662	7705	Appropriative	Licensed	HELGA ANKER TRUST	2/26/60	8.6	Tuolumne	RATTLESNAKE CREEK
					HELGA ANKER TRUST Total		8.6		
A019192	12410	7502	Appropriative	Licensed	HOLLY HAYDEN-FITZSIMMONS	1/26/60	1.1	Tuolumne	SONORA CREEK
					HOLLY HAYDEN-FITZSIMMONS Total		1.1		
A015987	10073	5215	Appropriative	Licensed	INGALLS FAMILY TRUST	8/9/54	213.2	Tuolumne	DUCKWALL CREEK
					INGALLS FAMILY TRUST Total		213.2		
A013343	7890	5344	Appropriative	Licensed	JACK G MILES	9/8/49	6.8	Tuolumne	UNST
					JACK G MILES Total		6.8		
A016932	10632	5991	Appropriative	Licensed	JACK J GARDELLA JR	3/13/56	24.1	Tuolumne	UNST
A016935	10635	5994	Appropriative	Licensed	JACK J GARDELLA JR	3/13/56	24.6	Tuolumne	UNST
A019043	12594	6946	Appropriative	Licensed	JACK J GARDELLA JR	10/21/59	60	Tuolumne	UNST
A025898	18041	11845	Appropriative	Licensed	JACK J GARDELLA JR	1/5/79	75	Tuolumne	UNST
					JACK J GARDELLA JR Total		183.7		
A020272	13381	8125	Appropriative	Licensed	JAMES CURTONI	6/20/61	30	Tuolumne	UNST
A022472	15391	9206	Appropriative	Licensed	JAMES CURTONI	5/19/66	18	Tuolumne	UNST
					JAMES CURTONI Total		48		
A020943	14166	9170	Appropriative	Licensed	JAY HALE	9/13/62	4	Tuolumne	UNSP
					JAY HALE Total		4		
A020459B	13513	008111B	Appropriative	Licensed	JELITO LIVING TRUST DATED 7/29/89	7/8/85	2.3	Tuolumne	UNST
					JELITO LIVING TRUST DATED 7/29/89 Total		2.3		
A020286	13436	8562	Appropriative	Licensed	JIM LUPO	7/3/61	11	Tuolumne	CURTIS CREEK
A020843	13986	9781	Appropriative	Licensed	JIM LUPO	7/5/62	24	Tuolumne	CURTIS CREEK
					JIM LUPO Total		35		
A020785	13767	8594	Appropriative	Licensed	JOANE SANTOS TRUST	5/21/62	3.6	Tuolumne	UNST
					JOANE SANTOS TRUST Total		3.6		
A018947	12204	6838	Appropriative	Licensed	JOHN B GROHL SR FAMILY RESIDUAL TRUST	8/27/59	49	Modoc, Tuolumne	QUIGLEY CREEK, UNST
A020598	13699	8746	Appropriative	Licensed	JOHN B GROHL SR FAMILY RESIDUAL TRUST	2/7/62	64	Tuolumne	NORTH FORK DRY CREEK, UNST
A021190	14209	9149	Appropriative	Licensed	JOHN B GROHL SR FAMILY RESIDUAL TRUST	2/27/70	26	Tuolumne	UNST
					JOHN B GROHL SR FAMILY RESIDUAL TRUST Total		139		
A018757A01A		006636A01A	Appropriative	Licensed	JOHN C BRUNK	8/17/92	1.4	Tuolumne	UNST
					JOHN C BRUNK Total		1.4		
A025191	17000	11404	Appropriative	Licensed	JOHN ROSS BAKER	10/28/76	24	Tuolumne	UNST
A027519	18792	12548	Appropriative	Licensed	JOHN ROSS BAKER	9/15/82	6	Tuolumne	UNST
A029743	20879		Appropriative	Permitted	JOHN ROSS BAKER	5/14/90	204	Tuolumne	TURNBACK CREEK, UNST
					JOHN ROSS BAKER Total		234		
A025627	17481	11284	Appropriative	Licensed	JOHN WILLMS RANCH INC	12/30/77	6.1	Stanislaus	UNST
					JOHN WILLMS RANCH INC Total		6.1		
A019662	12846	7789	Appropriative	Licensed	JOSEPH M MURRAY JR	8/16/60	19	Stanislaus	UNST
					JOSEPH M MURRAY JR Total		19		
A020407	13406	8086	Appropriative	Licensed	JUSTUS W HOUCK	9/26/61	1.2	Tuolumne	UNST
					JUSTUS W HOUCK Total		1.2		
A018575	11986	6776	Appropriative	Licensed	KAREN REESE	3/9/59	18	Tuolumne	UNST
					KAREN REESE Total		18		
A018602	13128	8018	Appropriative	Licensed	LAKEWOOD PARK ASSOCIATION	3/20/59	7	Tuolumne	SULLIVAN CREEK

					LAKEWOOD PARK ASSOCIATION Total		7		
A018911	12332	7420	Appropriative	Licensed	LEROY L BELT III	8/12/59	0.4	Tuolumne	UNSP (2)
					LEROY L BELT III Total		0.4		
A014262	8759	5372	Appropriative	Licensed	LOUISE ROSASCO CUNNINGHAM	4/20/51	89	Tuolumne	UNSP
					LOUISE ROSASCO CUNNINGHAM Total		89		
A017718	11083	5971	Appropriative	Licensed	LUCILLE MURPHY HATLER	7/15/57	6	Tuolumne	UNST
A017719	11084	5972	Appropriative	Licensed	LUCILLE MURPHY HATLER	7/15/57	40	Tuolumne	UNST
A017720	11085	6098	Appropriative	Licensed	LUCILLE MURPHY HATLER	7/15/57	26	Tuolumne	UNST
A017721	11086	5974	Appropriative	Licensed	LUCILLE MURPHY HATLER	7/15/57	2.3	Stanislaus	UNST
					LUCILLE MURPHY HATLER Total		74.3		
A025569	17507	11687	Appropriative	Licensed	MARILYN K RICE	11/15/77	16	Tuolumne	UNSP
					MARILYN K RICE Total		16		
A020355	13179	9207	Appropriative	Licensed	MARK R VANN	8/16/61	1.1	Tuolumne	ROUGH & READY CREEK
					MARK R VANN Total		1.1		
A021289	14265	9146	Appropriative	Licensed	MARY CURTIN	5/27/63	6.7	Tuolumne	UNST
					MARY CURTIN Total		6.7		
A020488	13752	9943	Appropriative	Licensed	MATTHEW D BEAUCHAMP	11/10/61	51	Tuolumne	CURTIS CREEK
					MATTHEW D BEAUCHAMP Total		51		
A005726	2973	1132	Appropriative	Licensed	MDL TRUST	10/18/27	10.1	Tuolumne	UNSP (2)
					MDL TRUST Total		10.1		
A022326	15125	10764	Appropriative	Licensed	MICHAEL P SARDELLA	10/29/65	9.6	Tuolumne	ROUGH & READY CREEK
					MICHAEL P SARDELLA Total		9.6		
A026084	18024	12790	Appropriative	Licensed	MIKEL C WILLIAMS	9/6/79	0.5	Tuolumne	MORMON CREEK, UNST
					MIKEL C WILLIAMS Total		0.5		
A020590	13722	9244	Appropriative	Licensed	Mountain Springs Community LP	2/5/62	133	Tuolumne	FLORAL CREEK, UNST, Unnamed Stream
					Mountain Springs Community LP Total		133		
A031384			Appropriative	Pending	MOUNTAIN SPRINGS GOLF LLC	1/21/03	99	Tuolumne	SULLIVAN CREEK, UNST, UNST (AKA FLORES CREEK)
					MOUNTAIN SPRINGS GOLF LLC Total		99		
A018554	13137	8109	Appropriative	Licensed	O J SPARROW	2/26/59	10	Tuolumne	SULLIVAN CREEK
					O J SPARROW Total		10		
A016170	10369	6249	Appropriative	Licensed	ODD FELLOWS SIERRA RECREATION ASSN	12/7/54	17.8	Tuolumne	SUGARPINE CREEK
A016172	10370	9772	Appropriative	Licensed	ODD FELLOWS SIERRA RECREATION ASSN	12/7/54	15	Tuolumne	UNSP
					ODD FELLOWS SIERRA RECREATION ASSN Total		32.8		
A018547	13125	8112	Appropriative	Licensed	Pamela Prime and David Kirkpatrick Trust	2/20/59	12	Tuolumne	UNST
					Pamela Prime and David Kirkpatrick Trust Total		12		
A019946	13110	8032	Appropriative	Licensed	PATRICIA B BROOKS	1/31/61	30.2	Tuolumne	UNST
					PATRICIA B BROOKS Total		30.2		
A020885C	14018	9963	Appropriative	Licensed	PINE MOUNTAIN LAKE ASSOCIATION	8/2/62	14	Tuolumne	UNST
A022980	15823	10634	Appropriative	Licensed	PINE MOUNTAIN LAKE ASSOCIATION	2/7/68	7,650.00	Tuolumne	BIG CREEK
					PINE MOUNTAIN LAKE ASSOCIATION Total		7,664.00		
A030367	21220		Appropriative	Permitted	PLGC Partners	8/27/08	36.8	Tuolumne	UNST
A030699	21221		Appropriative	Permitted	PLGC Partners	8/29/08	28	Tuolumne	UNST
					PLGC Partners Total		64.8		
A023262	15978	10774	Appropriative	Licensed	RACHEL M VUYOVICH	4/16/69	21	Tuolumne	UNST
A025092	17006	11369	Appropriative	Licensed	RACHEL M VUYOVICH	7/6/76	10	Tuolumne	UNST
					RACHEL M VUYOVICH Total		31		
A021028	14037	9698	Appropriative	Licensed	RICHARD J NORTON	11/23/62	8.5	Tuolumne	UNST
					RICHARD J NORTON Total		8.5		
A021183	14150	8329	Appropriative	Licensed	Robert E Thomason	3/8/63	30	Tuolumne	KANAKA CREEK
					Robert E Thomason Total		30		
A018614	12019	6496	Appropriative	Licensed	RON GROHL	3/31/59	3	Tuolumne	UNST
					RON GROHL Total		3		
A015254	9645	6368	Appropriative	Licensed	RONALD E CARTER	3/26/53	51.1	Tuolumne	WOODS CREEK
					RONALD E CARTER Total		51.1		
A019388	12687	7837	Appropriative	Licensed	ROYCE WHITNEY	8/4/66	160.6	Tuolumne	UNST
A020328	13410	7838	Appropriative	Licensed	ROYCE WHITNEY	7/26/61	31	Tuolumne	UNST
					ROYCE WHITNEY Total		191.6		
A012858	7618	4990	Appropriative	Licensed	SCOT PATTERSON	3/24/58	5	Tuolumne	UNXX
					SCOT PATTERSON Total		5		
A018738A	12118	008164A	Appropriative	Licensed	SIERRA PACIFIC HOLDING COMPANY	5/25/59	2.5	Tuolumne	UNST
					SIERRA PACIFIC HOLDING COMPANY Total		2.5		

A014947	9197	5270	Appropriative	Licensed	SONORA RIDGE LLC	8/1/52	47.7	Tuolumne	SULLIVAN CREEK
					SONORA RIDGE LLC Total		47.7		
A022146	15250	9454	Appropriative	Licensed	SOREN E JENSEN JR RANCH TRUST	5/10/65	5	Tuolumne	UNST
					SOREN E JENSEN JR RANCH TRUST Total		5		
A019188	12426	7472	Appropriative	Licensed	STEPHEN A FINN	1/21/60	0.4	Tuolumne	UNST
					STEPHEN A FINN Total		0.4		
A020459A	13513	008111A	Appropriative	Licensed	SUSAN A MACDONALD	7/8/85	1.5	Tuolumne	UNST
					SUSAN A MACDONALD Total		1.5		
A020092	13193	9201	Appropriative	Licensed	TUOLUMNE BAND ME-WUK INDIANS	4/19/61	1	Tuolumne	UNST
					TUOLUMNE BAND ME-WUK INDIANS Total		1		
A008758	4830	2252	Appropriative	Licensed	TUOLUMNE PARK AND RECREATION DISTRICT	8/12/36	5	Tuolumne	UNSP
					TUOLUMNE PARK AND RECREATION DISTRICT Total		5		
A016173	10371	10989	Appropriative	Licensed	TUOLUMNE UTILITIES DISTRICT	12/7/54	9.1	Tuolumne	UNSP
A018549	13127	7936	Appropriative	Licensed	TUOLUMNE UTILITIES DISTRICT	2/24/59	2	Tuolumne	UNST
A020565	13606	9740	Appropriative	Licensed	TUOLUMNE UTILITIES DISTRICT	1/19/62	28	Tuolumne	UNST
A023813	16949	11576	Appropriative	Licensed	TUOLUMNE UTILITIES DISTRICT	6/22/71	3.9	Tuolumne	UNSP
					TUOLUMNE UTILITIES DISTRICT Total		43		
A001232	1164	5420	Appropriative	Licensed	TURLOCK I D & MODESTO I D	4/8/19	325,000.00	Tuolumne	TUOLUMNE RIVER
A001233	1165	5417	Appropriative	Licensed	TURLOCK I D & MODESTO I D	4/8/19	325,000.00	Stanislaus, Tuolumne	TUOLUMNE RIVER
A001532	1166	5421	Appropriative	Licensed	TURLOCK I D & MODESTO I D	11/21/19	1,851,934.50	Tuolumne	TUOLUMNE RIVER
A003648	3026	2424	Appropriative	Licensed	TURLOCK I D & MODESTO I D	9/24/23	48,595.80	Stanislaus	TUOLUMNE RIVER
A006711	4271	2425	Appropriative	Licensed	TURLOCK I D & MODESTO I D	6/25/30	480,800.40	Stanislaus	TUOLUMNE RIVER
A009996	5909	5418	Appropriative	Licensed	TURLOCK I D & MODESTO I D	9/6/40	868,773.00	Stanislaus, Tuolumne	TUOLUMNE RIVER
A009997	5910	5419	Appropriative	Licensed	TURLOCK I D & MODESTO I D	9/6/40	721,200.60	Stanislaus, Tuolumne	TUOLUMNE RIVER
A014126	9319	11057	Appropriative	Licensed	TURLOCK I D & MODESTO I D	1/16/51	1,046,800.00	Tuolumne	TUOLUMNE RIVER
A014127	9320	11058	Appropriative	Licensed	TURLOCK I D & MODESTO I D	1/16/51	1,046,800.00	Tuolumne	TUOLUMNE RIVER
					TURLOCK I D & MODESTO I D Total		6,714,904.30		
A003139	1699	2580	Appropriative	Licensed	TURLOCK IRRIGATION DISTRICT	4/2/43	436,558.40	Stanislaus	TUOLUMNE RIVER
					TURLOCK IRRIGATION DISTRICT Total		436,558.40		
A004946	2575	1086	Appropriative	Licensed	TWAIN HARTE LAKE ASSOCIATION	6/29/31	181	Tuolumne	CALDER CREEK
					TWAIN HARTE LAKE ASSOCIATION Total		181		
A007058	3825	2727	Appropriative	Licensed	U S STANISLAUS NATL FOREST	8/24/31	25.5	Tuolumne	NORTH FORK TUOLUMNE RIVER
A009759	5475	2728	Appropriative	Licensed	U S STANISLAUS NATL FOREST	10/31/39	25.5	Tuolumne	SHEERING CREEK
A010355	5937	2962	Appropriative	Licensed	U S STANISLAUS NATL FOREST	1/5/42	1.7	Tuolumne	UNST
A010420	5985	2955	Appropriative	Licensed	U S STANISLAUS NATL FOREST	4/1/42	22.4	Tuolumne	GRANITE SPRING
A010487	6035	3189	Appropriative	Licensed	U S STANISLAUS NATL FOREST	7/3/42	1	Tuolumne	UNSP
A010489	6037	2946	Appropriative	Licensed	U S STANISLAUS NATL FOREST	7/3/42	2.2	Tuolumne	UNCR
A010587	6163	4444	Appropriative	Licensed	U S STANISLAUS NATL FOREST	1/4/43	2.6	Tuolumne	UNSP
A015485	9781	5681	Appropriative	Licensed	U S STANISLAUS NATL FOREST	8/27/53	6.7	Tuolumne	MIDDLE FORK TUOLUMNE RIVER
A015828	10132	6319	Appropriative	Licensed	U S STANISLAUS NATL FOREST	4/9/54	3.3	Tuolumne	MIDDLE FORK TUOLUMNE RIVER
A016052	10113	5923	Appropriative	Licensed	U S STANISLAUS NATL FOREST	9/16/54	3.7	Tuolumne	UNSP (2)
A016979	10759	5510	Appropriative	Licensed	U S STANISLAUS NATL FOREST	3/30/56	13.4	Tuolumne	UNSP
A017259	10962	7582	Appropriative	Licensed	U S STANISLAUS NATL FOREST	8/28/56	46.2	Tuolumne	JORDAN CREEK
A018678	12082	7385	Appropriative	Licensed	U S STANISLAUS NATL FOREST	4/30/59	0.7	Tuolumne	UNSP
A018885	12443	7256	Appropriative	Licensed	U S STANISLAUS NATL FOREST	8/3/59	1.2	Tuolumne	CLAVEY ROAD SPRING
A018886	12444	7548	Appropriative	Licensed	U S STANISLAUS NATL FOREST	8/3/59	1.2	Tuolumne	WALTON SPRING
A018887	12445	7530	Appropriative	Licensed	U S STANISLAUS NATL FOREST	8/3/59	1.2	Tuolumne	FLEMING SPRING
A018888	12446	7257	Appropriative	Licensed	U S STANISLAUS NATL FOREST	8/3/59	1.2	Tuolumne	DODGE RIDGE SPRING
A018889	12447	7258	Appropriative	Licensed	U S STANISLAUS NATL FOREST	8/3/59	1.2	Tuolumne	MT LEWIS SPRING
A018891	12449	7865	Appropriative	Licensed	U S STANISLAUS NATL FOREST	8/3/59	1.2	Tuolumne	BROKENDOWN CABIN SPRING
A018892	12450	7259	Appropriative	Licensed	U S STANISLAUS NATL FOREST	8/3/59	1.2	Tuolumne	MARBLE SPRING
					U S STANISLAUS NATL FOREST Total		163.3		
A016931	10631	5990	Appropriative	Licensed	V A RODDEN INC	3/13/56	12.8	Tuolumne	UNST
A016933	10633	5992	Appropriative	Licensed	V A RODDEN INC	3/13/56	11.9	Stanislaus	UNST
A016937	10637	5996	Appropriative	Licensed	V A RODDEN INC	3/13/56	19.6	Stanislaus	JOHNSON CREEK
A016938	10638	5997	Appropriative	Licensed	V A RODDEN INC	3/13/56	6	Stanislaus	GOODWIN CREEK
					V A RODDEN INC Total		50.3		
A020693	13917	8364	Appropriative	Licensed	VERNAN P HATLER	4/2/62	19.2	Tuolumne	UNCR
					VERNAN P HATLER Total		19.2		

A017054	10961	7338	Appropriative	Licensed	VIRGINIA S SATTLER	4/27/56	4.5	Tuolumne	BIG CREEK
					VIRGINIA S SATTLER Total		4.5		
A020636	13832	9176	Appropriative	Licensed	W D FAHEY TRUST	3/2/62	0.3	Tuolumne	UNSP
					W D FAHEY TRUST Total		0.3		
A018757A01B		006636A01B	Appropriative	Licensed	Wagner Family Trust	8/17/92	1.5	Tuolumne	UNST
A020885A	14018	9961	Appropriative	Licensed	Wagner Family Trust	8/2/62	15	Tuolumne	BIG HUMBUG CREEK
A020885B	14018	9962	Appropriative	Licensed	Wagner Family Trust	8/2/62	12	Tuolumne	BIG HUMBUG CREEK
A031545	21252		Appropriative	Permitted	Wagner Family Trust	4/14/10	47.6	Tuolumne	Big Humbug Creek
					Wagner Family Trust Total		76.1		
A019663	12847	7779	Appropriative	Licensed	WILLIAM C RITTS	8/16/60	51.5	Tuolumne	UNST, WEST FORK BIG CREEK
					WILLIAM C RITTS Total		51.5		
A017965	11426	7771	Appropriative	Licensed	WILLIAM L GOOKIN JR	1/29/58	9	Tuolumne	UNST
					WILLIAM L GOOKIN JR Total		9		
					Grand Total		7162449.4		

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A022506	15290	9699	AMANDA VANCE	6/23/66	8.40	Mariposa	UNSP
			AMANDA VANCE Total		8.40		
A017202	10895	8196	BRIAN T SCHUTT	7/27/56	22.40	Mariposa	DUTCH CREEK
A017822	12142	8197	BRIAN T SCHUTT	9/13/57	12.00	Mariposa	DUTCH CREEK
			BRIAN T SCHUTT Total		34.40		
A015747	9795	5714	CALIF DEPT OF FORESTRY & FIRE PROTECTION	5/1/59	33.30	Mariposa	UNSP
			CALIF DEPT OF FORESTRY & FIRE PROTECTION Total		33.30		
A016484	10389	6889	Carol M Menzel	7/25/55	520.00	Mariposa	MAXWELL CREEK
			Carol M Menzel Total		520.00		
A020033	13202	10081	CEDAR LODGE LLC	3/14/61	4.50	Mariposa	UNSP
			CEDAR LODGE LLC Total		4.50		
A018358	11785	7994	CHRISTINA CRAIG	10/3/58	5.40	Mariposa	UNST
			CHRISTINA CRAIG Total		5.40		
A017147	10855	6585	COASTAL DEVELOPMENT COMPANY LLC, INDIAN FLAT	6/22/56	3.60	Mariposa	MERCED RIVER UNDERFLOW
A028726	19939	13089	COASTAL DEVELOPMENT COMPANY LLC, INDIAN FLAT	1/14/86	0.50	Mariposa	UNSP
			COASTAL DEVELOPMENT COMPANY LLC, INDIAN FLAT Total		4.10		
A020935	14124	10181	CRANBERRY GULCH WATER SUPPLY LTD	9/11/62	3.00	Mariposa	CRANBERRY SPRING
			CRANBERRY GULCH WATER SUPPLY LTD Total		3.00		
A017008	10768	6549	DALE HURLEY	4/16/56	10.50	Mariposa	UNST
A018267	11688	9205	DALE HURLEY	8/14/58	14.50	Mariposa	UNST
			DALE HURLEY Total		25.00		
A028991	20429	13735	DAVID RICHARD WILKEY	8/23/07	1.80	Mariposa	UNST
			DAVID RICHARD WILKEY Total		1.80		
A026054	18134	12034	DREAM RANCH WEST LLC	7/25/79	23.00	Mariposa	UNST
A028861	20148	13046	DREAM RANCH WEST LLC	6/19/86	10.00	Mariposa	UNST
			DREAM RANCH WEST LLC Total		33.00		
A010696	6196	6528	Estate of Herbert F. Frey	4/16/62	4.30	Mariposa	BEAN CREEK
			Estate of Herbert F. Frey Total		4.30		
A006762	3650	1847	FISKE TRUST	8/8/30	4.80	Mariposa	UNSP
			FISKE TRUST Total		4.80		
A018695	12514	8655	FRANK R DOMINGUES III	5/7/59	1.50	Mariposa	CRANBERRY SPRING
			FRANK R DOMINGUES III Total		1.50		
A027985	19338		GERALD P HARRISON	3/2/84	21.00	Mariposa	SMITH CREEK
			GERALD P HARRISON Total		21.00		
A014982	9338	6134	GLEN PICKREN	8/20/52	35.00	Mariposa	PLUMBAR CREEK
			GLEN PICKREN Total		35.00		
A017647	11272	6825	HORACE MEYER ESTATE	6/11/57	1.00	Mariposa	UNXX
A017648	11457	6826	HORACE MEYER ESTATE	6/11/57	16.00	Mariposa	UNXX
			HORACE MEYER ESTATE Total		17.00		
A021014	14083	8491	JAMES DICKEY	11/13/62	16.00	Mariposa	DUTCH CREEK
			JAMES DICKEY Total		16.00		
A016639	10434	5721	JAMES D LAW	9/29/55	4.50	Mariposa	UNSP
			JAMES D LAW Total		4.50		
A022268	15006	10524	JAMES E EWERT	8/20/65	18.00	Mariposa	UNST
			JAMES E EWERT Total		18.00		
A027761	19391	12814	JERRY INMAN	5/26/83	1.20	Mariposa	UNST
			JERRY INMAN Total		1.20		
A019463	12765	8917	JOHN REYNOLDS	5/31/60	2.70	Mariposa	CRANBERRY SPRING
			JOHN REYNOLDS Total		2.70		

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A023205	15972	10272	John C. Fox Revocable Trust	1/7/69	4.30	Mariposa	UNST
			John C. Fox Revocable Trust Total		4.30		
A017496	11036	7522	JOHN H WELCH	3/5/57	25.70	Mariposa	UNSP, UNST
			JOHN H WELCH Total		25.70		
A022076	14930	9082	JOSEPH C LODGE	3/18/65	19.00	Mariposa	LONG CANYON CREEK
			JOSEPH C LODGE Total		19.00		
A017011	10888	7626	KAO CHAO	4/17/56	1.60	Mariposa	UNST
			KAO CHAO Total		1.60		
A011814	7943	3955	Kelsey Ranch LP	4/4/47	1,002.80	Mariposa, Merced	SOUTH FORK DRY CREEK, UNST
			Kelsey Ranch LP Total		1,002.80		
A016348	10503	7813	KENNETH J PULVINO	4/27/55	50.00	Mariposa	BEAN CREEK
			KENNETH J PULVINO Total		50.00		
A016969	10678	5509	LAUREL L ANDERSON	3/26/56	2.70	Mariposa	CRANBERRY SPRING
			LAUREL L ANDERSON Total		2.70		
A013954	8963	4323	LAUREL MUNSON BOYERS	9/20/50	0.20	Mariposa	CRANE CREEK
			LAUREL MUNSON BOYERS Total		0.20		
A018444	12134	7529	LEONARD SYNKOWICZ	12/24/58	1.20	Mariposa	UNST
			LEONARD SYNKOWICZ Total		1.20		
A021760	14875	9687	LLOYD MYERS	5/1/64	16.00	Mariposa	SAXON CREEK
			LLOYD MYERS Total		16.00		
A016736	11046	9275	LYLE TURPIN	11/16/55	55.60	Mariposa	UNST, WILLOW CREEK
			LYLE TURPIN Total		55.60		
A023731	16551	10498	MARGERY M DE LA MARE	3/22/71	1.00	Mariposa	UNSP
			MARGERY M DE LA MARE Total		1.00		
A020422	13988	8553	MARK HAYNES	3/18/68	16.70	Mariposa	EAST FORK PINEY CREEK
			MARK HAYNES Total		16.70		
A024212	16807	11733	MELBA WRIGHT	10/18/72	22.00	Mariposa	UNST
A027198	19304	12739	MELBA WRIGHT	2/2/82	8.20	Mariposa	UNST
			MELBA WRIGHT Total		30.20		
A020524	13735	8385	MERCED COMMUNITY COLLEGE DISTRICT	12/13/61	3.40	Mariposa	UNSP
			MERCED COMMUNITY COLLEGE DISTRICT Total		3.40		
A001221	912	990	MERCED IRRIGATION DISTRICT	3/26/19	868,773.00	Mariposa	MERCED RIVER
A001222	913	2684	MERCED IRRIGATION DISTRICT	3/26/19	491,080.20	Mariposa	MERCED RIVER
A001224	914	2685	MERCED IRRIGATION DISTRICT	6/20/03	345,440.00	Mariposa, Merced	MERCED RIVER
A016186	12825	11395	MERCED IRRIGATION DISTRICT	6/20/03	605,000.00	Mariposa	MERCED RIVER
A016187	12826	11396	MERCED IRRIGATION DISTRICT	12/23/54	1,861,824.90	Mariposa	MERCED RIVER
			MERCED IRRIGATION DISTRICT Total		4,172,118.10		
A019859	13044	8192	MIGUEL FLORES JR	11/28/60	2.50	Mariposa	UNXX
			MIGUEL FLORES JR Total		2.50		
A017204	10846	5919	MJ OAKS LLC	7/31/56	0.80	Mariposa	UNST
			MJ OAKS LLC Total		0.80		
A016463	10443	7282	OLIVER HAYCRAFT	7/13/55	18.00	Mariposa	UNST
			OLIVER HAYCRAFT Total		18.00		
A025842	17639	11876	P ORD HATTON	10/5/78	34.00	Mariposa	UNST
			P ORD HATTON Total		34.00		
A009056	5056	2555	PacificUS Real Estate Group	7/29/37	47.10	Mariposa	UNSP
A016646	10487	10522	PacificUS Real Estate Group	10/4/55	21.00	Mariposa	UNSP
			PacificUS Real Estate Group Total		68.10		

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A016994	10556	6534	PHILIP M HOULIHAN	4/9/56	48.00	Mariposa	DUTCH CREEK
A017786	11217	6535	PHILIP M HOULIHAN	8/19/57	27.00	Mariposa	DUTCH CREEK
			PHILIP M HOULIHAN Total		75.00		
A016559	10845	7366	RICHARD FERRY	8/30/55	72.40	Mariposa	PORATH GULCH
			RICHARD FERRY Total		72.40		
A020476	13787	8658	ROBERT W KINGMAN	11/6/61	16.00	Mariposa	DUTCH CREEK
			ROBERT W KINGMAN Total		16.00		
A016431	10264	6363	ROBERTA G FLANAGAN	6/21/55	2.50	Mariposa	UNXX
			ROBERTA G FLANAGAN Total		2.50		
A012986	7809	3778	ROD KENNEC	3/17/49	17.90	Mariposa	LITTLE BEAR CREEK
			ROD KENNEC Total		17.90		
A016653	10486	6321	RODNEY A BAKER	10/10/55	17.10	Mariposa	SMITH CREEK
			RODNEY A BAKER Total		17.10		
A028536	19785	13775	RONALD B LUFFY	9/5/08	4.30	Mariposa	UNST
			RONALD B LUFFY Total		4.30		
A020969	14119	8707	ROSEMARY M GAMBLIN	10/5/62	31.50	Mariposa	DUTCH CREEK, UNST
			ROSEMARY M GAMBLIN Total		31.50		
A017012	10889	7627	RUSSELL BOCKHOP	4/17/56	8.00	Mariposa	UNST
			RUSSELL BOCKHOP Total		8.00		
A017523	11236	7138	THE BARRIER	3/22/57	9.30	Mariposa	UNST
			THE BARRIER Total		9.30		
A020765	13763	8358	The Estate of William Rottenkolber	5/3/62	10.00	Mariposa	UNST
			The Estate of William Rottenkolber Total		10.00		
A019306	12551	6891	THERAN L BALMAIN	3/14/60	0.60	Mariposa	UNXX
			THERAN L BALMAIN Total		0.60		
A018430	11877	9147	Tidall Virginia	12/9/58	46.00	Mariposa	BEAN CREEK
			Tidall Virginia Total		46.00		
A014979	9336	6392	TRAIAN MICU	8/19/52	180.00	Mariposa	SMITH CREEK
A031125	21122		TRAIAN MICU	1/10/01	60.00	Mariposa	SMITH CREEK
			TRAIAN MICU Total		240.00		
A018097	11726	7117	Transition Mountain Properties	4/21/58	4.20	Mariposa	MILLER GULCH
			Transition Mountain Properties Total		4.20		
A029559	20689	13768	U S BUREAU OF LAND MANAGEMENT	6/19/08	2.40	Mariposa	UNSP
			U S BUREAU OF LAND MANAGEMENT Total		2.40		
A006729	3549	6112	U S NATIONAL PARK SERVICE	7/11/30	170.60	Madera	UNSP (2)
A010488	6036	2973	U S NATIONAL PARK SERVICE	7/3/42	7.30	Mariposa	CRANE CREEK
A019116	12387	11233	U S NATIONAL PARK SERVICE	12/2/59	76.50	Mariposa	MOSS CREEK
			U S NATIONAL PARK SERVICE Total		254.40		
A019671	12991	8390	U S SIERRA NATL FOREST	8/18/60	0.30	Madera	UNSP
A027715	19740	13206	U S SIERRA NATL FOREST	4/12/83	0.10	Mariposa	UNST
A027717	19741	13207	U S SIERRA NATL FOREST	4/12/83	0.10	Mariposa	UNST
A027718	19742	13155	U S SIERRA NATL FOREST	4/12/83	0.10	Mariposa	UNST
			U S SIERRA NATL FOREST Total		0.60		
A011772	6842	3408	U S STANISLAUS NATL FOREST	3/12/47	0.90	Mariposa	UNSP
A017904	11347	6441	U S STANISLAUS NATL FOREST	12/4/57	1.00	Mariposa	PROUTY SPRING
A022229	15102	10349	U S STANISLAUS NATL FOREST	7/19/65	3.30	Mariposa	JORDAN CREEK
			U S STANISLAUS NATL FOREST Total		5.20		
A028321	19652	13486	US BUREAU OF LAND MANAGEMENT	11/9/84	0.40	Mariposa	UNST
A028322	19653		US BUREAU OF LAND MANAGEMENT	11/9/84	0.10	Mariposa	UNSP
			US BUREAU OF LAND MANAGEMENT Total		0.50		

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A023074	15746	10295	VERE GEARY	6/26/68	22.00	Mariposa	UNST
			VERE GEARY Total		22.00		
A014721	9768	6166	W B STURTEVANT	3/20/52	80.00	Mariposa	EAST FORK PINEY CREEK
			W B STURTEVANT Total		80.00		
A029615	20574		WALTER K BUNT & DOROTHY L BUNT TRUST ETAL	11/15/89	8.00	Mariposa	UNST
			WALTER K BUNT & DOROTHY L BUNT TRUST ETAL Total		8.00		
A029012	20543	13561	Wendy L Garrish	9/10/03	0.70	Mariposa	PINEY CREEK
			Wendy L Garrish Total		0.70		
A018244	11854	7131	YOSEMITE-MARIPOSA KOA	7/30/58	4.50	Mariposa	UNST
			YOSEMITE-MARIPOSA KOA Total		4.50		
			Grand Total		4,175,203.90		

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A015789	9819	5684	ALLISON S FAHEY	3/22/54	597	Stanislaus	DRY CREEK
			ALLISON S FAHEY Total		597		
A028622	20118	13057	ANITA SERRANO	11/19/85	200	Merced	DUTCHMAN CREEK
			ANITA SERRANO Total		200		
A017775	11410	7344	ANTHONY VALLELUNGA	8/16/57	44	Merced	DEADMAN CREEK
			ANTHONY VALLELUNGA Total		44		
A013018	7777	6132	ANTHONY J DUTRA	4/5/49	361.1	Stanislaus	STANISLAUS RIVER
			ANTHONY J DUTRA Total		361.1		
A028539	19943	13034	ARMELIM DE SOUSA	8/19/85	293	Stanislaus	UNST (AKA VIVIAN SLOUGH)
			ARMELIM DE SOUSA Total		293		
A013679	8224	4313	ARTHUR BRIGHT	4/7/50	1,592.80	Merced	DEADMAN CREEK
			ARTHUR BRIGHT Total		1,592.80		
A023257	16003	10359	AUGUST KNITTEL	4/10/69	4.00	Fresno	UNST
A023258	16002	10358	AUGUST KNITTEL	4/10/69	18.10	Fresno	UNST
A023313	16004	10360	AUGUST KNITTEL	7/15/69	1.70	Fresno	UNST
			AUGUST KNITTEL Total		23.80		
A024900	17060	13099	BASS LAKE SCHOOL DISTRICT	10/14/75	2.70	Madera	UNSP
			BASS LAKE SCHOOL DISTRICT Total		2.70		
A003736	1887	3927	BASS LAKE WATER COMPANY	5/20/54	217.20	Madera	North Fork Willow Creek
A011270	6514	3928	BASS LAKE WATER COMPANY	1/30/46	36.20	Madera	North Fork Willow Creek
A015566	11072	9993	BASS LAKE WATER COMPANY	10/5/53	355.00	Madera	North Fork Willow Creek
			BASS LAKE WATER COMPANY Total		608.40		
A020649	13814	8403	BIG CREEK COMMUNITY SERVICE DISTRICT	3/9/62	57.90	Fresno	BIG CREEK
			BIG CREEK COMMUNITY SERVICE DISTRICT Total		57.90		
A009573	5463	2847	BILL J LYONS JR	5/1/39	4,781.80	Stanislaus	TUOLUMNE RIVER
			BILL J LYONS JR Total		4,781.80		
A012634	8701	5875	BILLY D GRISSOM	8/6/48	1,467.80	Merced	DUCK SLOUGH
			BILLY D GRISSOM Total		1,467.80		
A001730	863	1661	BORBA FAMILY HOME & STEVINSON RANCH LP	3/22/20	955.1	Merced	MERCED RIVER
			BORBA FAMILY HOME & STEVINSON RANCH LP Total		955.1		
A015835	9925	7298	BRENDA KNUTSON	4/14/54	11.8	Stanislaus	DRY CREEK
			BRENDA KNUTSON Total		11.8		
A013697	8179	4470	BRICHETTO TRUST	4/19/50	1,463.80	Stanislaus	UNCR
			BRICHETTO TRUST Total		1,463.80		
A021823	14922	9360	BRIGHT'S NURSERY INCORPORATED	5/8/70	685	Merced	DEADMAN CREEK
			BRIGHT'S NURSERY INCORPORATED Total		685		
A006963	3885	5495	BROCCHINI FARMS INC	5/19/31	4,096.90	Stanislaus	STANISLAUS RIVER
			BROCCHINI FARMS INC Total		4,096.90		
A018526	14677	8400	BRUCE AVERY	2/10/59	333.8	San Joaquin	STANISLAUS RIVER
			BRUCE AVERY Total		333.8		
A011741	6924	4420	CALIF DEPARTMENT OF TRANSPORTATION	2/21/47	204.7	Stanislaus	STANISLAUS RIVER
			CALIF DEPARTMENT OF TRANSPORTATION Total		204.7		
A001935	848	349	Camp Sierra Improvement Association	3/31/24	29.40	Fresno	ALDER CREEK
			Camp Sierra Improvement Association Total		29.40		
A011047	7583	8706	CHOWCHILLA WATER DISTRICT	5/9/45	6,195.70	Madera	ASH CREEK, BERENDA SLOUGH
A013175	9136	8577	CHOWCHILLA WATER DISTRICT	6/27/49	77,312.80	Madera	CHOWCHILLA RIVER
			CHOWCHILLA WATER DISTRICT Total		83,508.50		
A018718	12939	8257	CHRISTOPHER H GALFO	11/30/67	47.00	Fresno	LITTLE SANDY CREEK
A019193	12940	7818	CHRISTOPHER H GALFO	1/26/60	28.00	Fresno	UNST
			CHRISTOPHER H GALFO Total		75.00		

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A004102	1816	2883	City of Modesto WQC Primary	10/22/47	1,219.90	Stanislaus	SAN JOAQUIN RIVER
			City of Modesto WQC Primary Total		1,219.90		
A013541	9076	4689	COSTA VIEW FARMS #2, A CA GEN PARTNERSHIP	9/20/57	21,689.60	Madera	FRESNO RIVER
A013541	9076	4689	COSTA VIEW FARMS #2, A CA GEN PARTNERSHIP	9/20/57	21,689.60	Madera	FRESNO RIVER
			COSTA VIEW FARMS #2, A CA GEN PARTNERSHIP Total		43,379.20		
A023231	16200	10592	COTTONWOOD CREEK VINEYARDS PARTNERSHIP	2/6/69	920	Madera	COTTONWOOD CREEK
			COTTONWOOD CREEK VINEYARDS PARTNERSHIP Total		920		
A012674	7675	7556	Couchman Brothers	9/2/48	1,622.70	Stanislaus	TUOLUMNE RIVER
			Couchman Brothers Total		1,622.70		
A024298	16638	11097	COUNTY OF MERCED	2/2/73	5	Merced	UNST
			COUNTY OF MERCED Total		5		
A027544	18910	12372	Cynthia A. Downing	9/30/82	0.30	Fresno	UNSP
			Cynthia A. Downing Total		0.30		
A028192	19732	12955	D & D LAND & WATER INC	7/16/84	907	Merced	SAN JOAQUIN RIVER
			D & D LAND & WATER INC Total		907		
A029966	20860		D.M. BRYANT FARMS INC	6/17/91	21.50	Madera	UNST
			D.M. BRYANT FARMS INC Total		21.50		
A023214	15869	10375	DAMAN PITTS	1/28/69	33.00	Fresno	UNST
			DAMAN PITTS Total		33.00		
A014104	8683	4081	DEER CREEK WATER ASSOCIATION	12/14/50	2.80	Fresno	DEER CREEK
			DEER CREEK WATER ASSOCIATION Total		2.80		
A026121	19395		DIRK J VLOT	10/22/79	2,534.00	Madera	EASTSIDE BYPASS
			DIRK J VLOT Total		2,534.00		
A027241	19140	12867	DM BRYANT FARMS INC	3/9/82	30.00	Madera	UNST
A027242	19141	12868	DM BRYANT FARMS INC	3/9/82	30.00	Madera	UNST
A027243	19142	12869	DM BRYANT FARMS INC	3/9/82	6.00	Madera	UNST
A027244	19143	12870	DM BRYANT FARMS INC	3/9/82	13.00	Madera	UNST
A027245	19144	12871	DM BRYANT FARMS INC	3/9/82	4.00	Madera	LITTLE FINE GOLD CREEK
			DM BRYANT FARMS INC Total		83.00		
A016465	10407	5578	DONALD HARCKSEN	7/14/55	19.6	Merced	MERCED RIVER
			DONALD HARCKSEN Total		19.6		
A014455	9568	4428	DONALD L SMITH	8/30/51	171.10	Madera	UNST
			DONALD L SMITH Total		171.10		
A013071	8703	4456	Donald L. Smith, Trustee	5/3/49	301.5	Merced	DUCK SLOUGH
			Donald L. Smith, Trustee Total		301.5		
A006467	3448	1295	DONALD M HEINY	10/26/29	190.2	Stanislaus	SAN JOAQUIN RIVER
			DONALD M HEINY Total		190.2		
A024520	19878	12836	DOROTHY R AYERS FAMILY TRUST	1/7/74	19.50	Madera	ARNOLD CREEK
			DOROTHY R AYERS FAMILY TRUST Total		19.50		
A025872	17656	11870	Double A Ranches	11/16/78	20	Stanislaus	UNST
			Double A Ranches Total		20		
A012396	7348	4949	EAST STANISLAUS RESOURCES CONSERVATION DISTRICT	3/11/48	487.9	Stanislaus	TUOLUMNE RIVER
			EAST STANISLAUS RESOURCES CONSERVATION DISTRICT Total		487.9		
A019738	12923	7494	EDWIN DANIELS	9/14/60	1.30	Madera	UNSP
			EDWIN DANIELS Total		1.30		
A017633	11484	6138	EL CAJON RETIREMENT RESIDENCE LP	5/31/57	77.4	Merced	UNST
A017812	11485	6139	EL CAJON RETIREMENT RESIDENCE LP	9/4/57	8.7	Merced	CANAL CREEK, UNST
A017813	11486	6140	EL CAJON RETIREMENT RESIDENCE LP	9/4/57	33.1	Merced	UNST

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A018329	11781	6141	EL CAJON RETIREMENT RESIDENCE LP	9/23/58	1.3	Merced	UNST
A018330	11782	6142	EL CAJON RETIREMENT RESIDENCE LP	9/23/58	2.2	Merced	UNST
A024071	16613	10681	EL CAJON RETIREMENT RESIDENCE LP	5/22/72	7	Merced	UNST
			EL CAJON RETIREMENT RESIDENCE LP Total		129.7		
A018993	12472	9790	ELSIE KING	9/18/59	590	Stanislaus	VIVIAN SLOUGH
			ELSIE KING Total		590		
A020244	13495	7998	EST OF D E JACKSON & DIXIE R JACKSON	6/2/61	4.50	Madera	UNSP
			EST OF D E JACKSON & DIXIE R JACKSON Total		4.50		
A016317	10209	7574	FORD RANCH INC	4/19/55	50.00	Fresno	UNST
A019577	12771	7631	FORD RANCH INC	7/26/60	26.00	Fresno	UNST
A019578	12772	7632	FORD RANCH INC	7/26/60	19.50	Fresno	UNST
A019581	12773	7635	FORD RANCH INC	7/26/60	13.10	Fresno	UNST
			FORD RANCH INC Total		108.60		
A011555	6742	3459	FRANK J GOMES DAIRY	9/17/46	941.2	Merced	MERCED RIVER
			FRANK J GOMES DAIRY Total		941.2		
A016329	11460	10393	GALLO CATTLE COMPANY, A PARTNERSHIP	4/21/55	9,020.00	Merced	LIVINGSTON DRAIN
A016604	11121	7220	GALLO CATTLE COMPANY, A PARTNERSHIP	9/15/55	7,239.80	Merced	UNSL
			GALLO CATTLE COMPANY, A PARTNERSHIP Total		16,259.80		
A012715	8354	4948	GALLO VINEYARDS, INC. (LIVINGSTON RANCH)	9/27/48	493.7	Merced	MERCED RIVER
			GALLO VINEYARDS, INC. (LIVINGSTON RANCH) Total		493.7		
A012987	7734	10045	GARY M BARTON	3/18/49	1,506.00	San Joaquin	STANISLAUS RIVER, UNSL
A013099	7768	9123	GARY M BARTON	5/17/49	83	San Joaquin, Stanislaus	STANISLAUS RIVER
A013100	7769	6130	GARY M BARTON	5/17/49	170.6	Stanislaus	STANISLAUS RIVER
A018715	12116	9960	GARY M BARTON	5/18/59	66	Stanislaus	STANISLAUS RIVER
			GARY M BARTON Total		1825.6		
A010255	5965	6445	GEORGE C JONES III	8/21/41	1,423.40	Merced	DRY CREEK
			GEORGE C JONES III Total		1,423.40		
A015680	9749	5653	GERTRUDE PELUCCA	1/11/54	273.7	Stanislaus	STANISLAUS RIVER
			GERTRUDE PELUCCA Total		273.7		
A020975	14129	9545	GIN FLATS LLC	10/9/62	2.20	Fresno	UNSP
			GIN FLATS LLC Total		2.20		
A010466	6064	3429	GIRARDI FARMS	5/25/42	1,279.40	San Joaquin	STANISLAUS RIVER
A014716	9011	4539	GIRARDI FARMS	3/17/52	474.5	San Joaquin	STANISLAUS RIVER
			GIRARDI FARMS Total		1753.9		
A023031	16060		GRAVELLY FORD WATER DISTRICT	4/18/68	5,000.00	Madera	COTTONWOOD CREEK
			GRAVELLY FORD WATER DISTRICT Total		5,000.00		
A003664	2360	1307	GRAVELSTONE RANCH LP	10/5/23	365	Merced	MERCED RIVER
A006603	3581	2429	GRAVELSTONE RANCH LP	3/17/30	660.6	Merced	MERCED RIVER
			GRAVELSTONE RANCH LP Total		1025.6		
A012262	7309	6985	Gregory B. Reed	1/26/48	2,171.90	Stanislaus	TUOLUMNE RIVER
			Gregory B. Reed Total		2,171.90		
A017208	12313	10673	HARRY H BAKER JR	8/3/56	580	Madera	FRESNO RIVER
			HARRY H BAKER JR Total		580		
A016662	10345	9816	HARRY H BAKER JR TRUST	10/10/55	230	Stanislaus	SAN JOAQUIN RIVER
			HARRY H BAKER JR TRUST Total		230		
A005702	3001	1880	HOOGENDAM FAMILY LIMITED PARTNERSHIP	9/29/27	426.5	Merced	NORTH SLOUGH MARIPOSA CREEK

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A005703	3002	1881	HOOGENDAM FAMILY LIMITED PARTNERSHIP	9/29/27	1,279.40	Merced	NORTH SLOUGH MARIPOSA CREEK
			HOOGENDAM FAMILY LIMITED PARTNERSHIP Total		1,705.90		
A016934	10634	5993	JACK J GARDELLA JR	3/13/56	15	Tuolumne	UNST
A019042	12593	6945	JACK J GARDELLA JR	10/21/59	55	Tuolumne	UNST
A020976	14123	8248	JACK J GARDELLA JR	10/9/62	19	Tuolumne	UNST
			JACK J GARDELLA JR Total		89		
A020271	13380	8124	JAMES CURTONI	6/20/61	9	Stanislaus	UNST
			JAMES CURTONI Total		9		
A020364B	13428	008351B	JAMES R CHANCE	3/18/88	8	Merced	UNST
A022977B	15637	009776A	JAMES R CHANCE	3/18/88	50.5	Merced	UNST
			JAMES R CHANCE Total		58.5		
A009301	5192	4576	JAMES R DEMARTINI	5/20/38	1,066.10	Stanislaus	TUOLUMNE RIVER
			JAMES R DEMARTINI Total		1,066.10		
A001195	588	4934	JAMES S CODDINGTON	2/26/19	15,897.80	Stanislaus	SAN JOAQUIN RIVER
			JAMES S CODDINGTON Total		15,897.80		
A027546	19615		JEFF A LION	8/5/96	15,700.00	Madera	EASTSIDE BYPASS (AKA CHOWCHILLA CANAL)
			JEFF A LION Total		15,700.00		
A026829	18359	12028	Jerry Hollingshead	5/21/81	0.20	Fresno	UNSP
			Jerry Hollingshead Total		0.20		
A028679	20259	13270	JIMMY W LIPE	12/23/85	2.40	Fresno	UNST
A028908	20258	13271	JIMMY W LIPE	9/25/86	3.60	Fresno	UNST
			JIMMY W LIPE Total		6.00		
A020364C	13428	008351C	JOHN SMALLEY	3/18/88	1	Merced	UNST
A022977C	15637	009776A	JOHN SMALLEY	3/18/88	11.3	Merced	UNST
			JOHN SMALLEY Total		12.3		
A006748	3880	2549	JOHN VANDERSCHAAF JR	7/24/30	729.9	San Joaquin	LONE TREE CREEK
			JOHN VANDERSCHAAF JR Total		729.9		
A011003A	007582A	9073	JOHN HANCOCK LIFE INS. CO.	3/9/45	5,727.40	Madera	FRESNO RIVER
			JOHN HANCOCK LIFE INS. CO. Total		5,727.40		
A001442F	940	000388F	JOHN J SHAW	9/10/19	40.6	Merced	MERCED RIVER
			JOHN J SHAW Total		40.6		
A025373	17078	11286	JOHN M LASGOITY	5/31/77	24	Madera	UNST
			JOHN M LASGOITY Total		24		
A006539	3403	2044	JOSE DA SILVA	1/20/30	27.1	San Joaquin	UNDR
			JOSE DA SILVA Total		27.1		
A001322	890	311	JOSEPH E GALLO	6/11/19	182.5	Merced	MERCED RIVER
			JOSEPH E GALLO Total		182.5		
A016895	10696	6421	JOSEPH J CARDOZA	2/15/56	45.8	Merced	MERCED RIVER
			JOSEPH J CARDOZA Total		45.8		
A013414	7929	5274	Karlene H Bert	10/24/49	799.3	Stanislaus	STANISLAUS RIVER
			Karlene H Bert Total		799.3		
A011814	7943	3955	Kelsey Ranch LP	4/4/47	1,002.80	Mariposa, Merced	SOUTH FORK DRY CREEK, UNST
A018344	11787	6738	Kelsey Ranch LP	9/29/58	8.8	Merced	UNCR
A018345	11788	6480	Kelsey Ranch LP	9/29/58	5.6	Merced	UNCR
A018346	11789	6481	Kelsey Ranch LP	9/29/58	4.2	Merced	UNCR
A018347	11790	6482	Kelsey Ranch LP	9/29/58	8.1	Merced	UNCR
A018348	11791	6739	Kelsey Ranch LP	9/29/58	9	Merced	UNCR
			Kelsey Ranch LP Total		1038.5		
A022294	15550	10429	L EUGENE MONDO	9/24/65	26	Stanislaus	STANISLAUS RIVER

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			L EUGENE MONDO Total		26		
A026088	18077	12047	LEWIS MATHIS	9/13/79	188	Merced	UNST
			LEWIS MATHIS Total		188		
A027759	19031	12557	LINDA OUIMETTE	5/26/83	0.10	Madera	UNSP
			LINDA OUIMETTE Total		0.10		
A019746	12982	8031	LIVE OAK TRUST	9/20/60	17.00	Fresno	UNST
			LIVE OAK TRUST Total		17.00		
A018540	12215	8522	LURINE S TOPHAM	2/19/59	37.50	Fresno	UNST
A019005	12999	8523	LURINE S TOPHAM	9/28/59	45.00	Fresno	UNST
A020869	13897	8524	LURINE S TOPHAM	7/25/62	20.00	Fresno	UNST
A021951	15093	8525	LURINE S TOPHAM	11/4/64	10.00	Fresno	UNST
A022269	15094	9153	LURINE S TOPHAM	8/20/65	20.00	Fresno	UNST
A027159	19743	13028	LURINE S TOPHAM	12/23/81	3.10	Fresno	UNST
A027160	19744	13029	LURINE S TOPHAM	12/23/81	3.20	Fresno	UNST
			LURINE S TOPHAM Total		138.80		
A010710	6241	5077	M & R ZOLEZZI A PARTNERSHIP	9/11/43	273.7	San Joaquin	STANISLAUS RIVER
			M & R ZOLEZZI A PARTNERSHIP Total		273.7		
A017311	11172	9229	MADERA IRRIGATION DISTRICT	10/4/56	4,700.00	Madera	FRESNO RIVER
			MADERA IRRIGATION DISTRICT Total		4,700.00		
A013344	8355	6418	MAGNESON REVOCABLE TRUST	9/8/49	1,122.30	Merced	MERCED RIVER
			MAGNESON REVOCABLE TRUST Total		1,122.30		
A005316	2937	4912	MCMULLIN RECL DISTRICT #2075	12/24/26	35,293.90	San Joaquin	STANISLAUS RIVER
A017966	14674	10403	MCMULLIN RECL DISTRICT #2075	1/29/58	490	San Joaquin	STANISLAUS RIVER
			MCMULLIN RECL DISTRICT #2075 Total		35783.9		
A016136	10115	7561	MENEFEE RIVER RANCH COMPANY	11/15/54	856.9	Merced	FRESNO RIVER
A026875	19669	13106	MENEFEE RIVER RANCH COMPANY	6/16/81	4,470.00	Merced	SAN JOAQUIN RIVER
			MENEFEE RIVER RANCH COMPANY Total		5,326.90		
A028626	20066	13378	MERCED COUNTY FIRE DEPARTMENT	11/25/85	0.4	Merced	MERCED RIVER
			MERCED COUNTY FIRE DEPARTMENT Total		0.4		
A001224	914	2685	MERCED IRRIGATION DISTRICT	6/20/03	345,440.00	Mariposa, Merced	MERCED RIVER
A006807	5732	5227	MERCED IRRIGATION DISTRICT	9/27/30	1,251.20	Merced	DEADMAN CREEK
A008238	4893	6032	MERCED IRRIGATION DISTRICT	2/11/35	5,066.00	Merced	DUCK SLOUGH
A010572	6808	6047	MERCED IRRIGATION DISTRICT	6/20/03	63,719.90	Merced	MERCED RIVER
A018774	13088	9429	MERCED IRRIGATION DISTRICT	6/8/59	5,000.00	Merced	DUCK SLOUGH
			MERCED IRRIGATION DISTRICT Total		420,477.10		
A005269	2727	1173	MICHAEL PASSALAQUA	11/15/26	635.4	Stanislaus	TUOLUMNE RIVER
			MICHAEL PASSALAQUA Total		635.4		
A004233	2261	1616	MICHAEL J KNAPP	2/28/36	255.5	Madera	CHOWCHILLA RIVER
A004233	2261	1616	MICHAEL J KNAPP	2/28/36	255.5		
			MICHAEL J KNAPP Total		511		
A025113	17303	11417	MICHELLE MIDBOE	7/27/76	0.30	Fresno	UNSP
			MICHELLE MIDBOE Total		0.30		
A006393	3386	3044	MOONSHINE DAIRY	8/3/29	868.8	Stanislaus	SAN JOAQUIN RIVER
			MOONSHINE DAIRY Total		868.8		
A017729	11214	6782	MUIR TRAIL RANCH, INC	7/19/57	271.70	Fresno	SENGER CREEK
			MUIR TRAIL RANCH, INC Total		271.70		
A013218	8130	5170	Myers Ranch, LLC	7/8/49	1,630.40	Merced	SNAKE SLOUGH
			Myers Ranch, LLC Total		1,630.40		
A011048	7584	5753	N & W Land Co. LLC	6/30/59	3,979.70	Madera	FRESNO RIVER
			N & W Land Co. LLC Total		3,979.70		

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
A020148	13372	7960	NANCY GASSETT	5/25/61	5.90	Fresno	UNST
			NANCY GASSETT Total		5.90		
A010957	6373	3036	NORTH FORK COMMUNITY DEVELOPMENT COUNCIL	1/15/45	44.20	Madera	SOUTH FORK WILLOW CREEK
			NORTH FORK COMMUNITY DEVELOPMENT COUNCIL Total		44.20		
A008892	4924	2634	OAKDALE IRRIGATION DISTRICT	2/3/37	1,665.90	Stanislaus	STANISLAUS RIVER
A009666	5421	2706	OAKDALE IRRIGATION DISTRICT	7/17/39	616.5	Stanislaus	STANISLAUS RIVER
			OAKDALE IRRIGATION DISTRICT Total		2282.4		
A025688	17834	11824	PATRICIA J MANNING	3/3/78	1,471.00	Madera	SAN JOAQUIN RIVER
			PATRICIA J MANNING Total		1,471.00		
A011324	6615	3051	PATRICK DAVID MARTIN	3/25/46	4.50	Fresno	UNSP
			PATRICK DAVID MARTIN Total		4.50		
A027777	19139		PHIL MUELLER	6/23/83	85	Merced	DUTCHMAN CREEK
A027880	19591		PHIL MUELLER	9/16/83	85	Merced	DUTCHMAN CREEK
			PHIL MUELLER Total		170		
A001633	784	2072	PHILIP DICKERSON	1/20/20	1,518.30	Stanislaus	TUOLUMNE RIVER
A004607	2357	2071	PHILIP DICKERSON	5/26/25	356.6	Stanislaus	TUOLUMNE RIVER
			PHILIP DICKERSON Total		1874.9		
A023561	16184	10646	PREMIERE AGRICULTURAL PROPERTIES LLC	7/20/70	720	Madera	COTTONWOOD CREEK
			PREMIERE AGRICULTURAL PROPERTIES LLC Total		720		
A014484	9229	5249	RANCHERIA WATER & IMPROVEMENT ASSN	9/14/51	3.90	Fresno	POTTER CREEK
			RANCHERIA WATER & IMPROVEMENT ASSN Total		3.90		
A015919	10316	8498	RAY GENE VELDHUIS	6/18/54	815.2	Merced	JONES DRAIN
			RAY GENE VELDHUIS Total		815.2		
A004945	2593	1336	RECLAMATION DISTRICT #2039	3/5/26	56,904.60	San Joaquin	MIDDLE RIVER, TRAPPER SLOUGH
			RECLAMATION DISTRICT #2039 Total		56,904.60		
A010365	5942	3035	REDEVELOPMENT AGENCY OF THE COUNTY OF MADERA	1/19/42	36.20	Fresno	SOUTH FORK WILLOW CREEK
			REDEVELOPMENT AGENCY OF THE COUNTY OF MADERA Total		36.20		
A001442C	940	000388C	RICCI THORESON	9/10/19	123.7	Merced	MERCED RIVER
			RICCI THORESON Total		123.7		
A026674	18416	12251	RICHARD LIAL	12/23/80	10.3	Stanislaus	UNST
A029133	20326	13324	RICHARD LIAL	11/9/87	6	Stanislaus	UNST
			RICHARD LIAL Total		16.3		
A011390	6631	7451	RICHARD MARCHY	5/4/46	818.2	Stanislaus	TUOLUMNE RIVER
			RICHARD MARCHY Total		818.2		
A004460	2277	8697	RIVER JUNCTION RECL DIST NO 2064	2/14/25	30,828.30	San Joaquin	SAN JOAQUIN RIVER, STANISLAUS RIVER
			RIVER JUNCTION RECL DIST NO 2064 Total		30,828.30		
A009834	5533	2827	Robert Albert Brocchini Trust	2/21/40	2,129.60	San Joaquin	STANISLAUS RIVER
A013628	8140	4918	Robert Albert Brocchini Trust	3/10/50	366	Stanislaus	STANISLAUS RIVER
			Robert Albert Brocchini Trust Total		2495.6		
A025168	17424	11416	ROBERT B FITZGERALD	10/5/76	0.40	Fresno	UNSP
			ROBERT B FITZGERALD Total		0.40		
A020364A	13428	008351A	ROBINSON CATTLE COMPANY	3/18/88	16	Merced	UNST
A022976	15636	9777	ROBINSON CATTLE COMPANY	1/31/68	37	Merced	UNST
A022977A	15637	009776A	ROBINSON CATTLE COMPANY	3/18/88	1.9	Merced	UNST
			ROBINSON CATTLE COMPANY Total		54.9		
A001628	692	289	Roger K Beeman	1/15/20	251.8	Stanislaus	STANISLAUS RIVER
A003516	1620	2009	Roger K Beeman	4/1/40	901.5	Stanislaus	STANISLAUS RIVER
			Roger K Beeman Total		1153.3		
A020135	13652	8479	ROY H RICHARDS	5/17/61	48.9	Merced	UNST

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
			ROY H RICHARDS Total		48.9		
A017362	10979	6834	ROY N TALLMAN	11/19/56	10.00	Fresno	UNXX
A017363	10980	6835	ROY N TALLMAN	11/19/56	48.00	Fresno	UNXX
A017364	10981	6836	ROY N TALLMAN	11/19/56	8.00	Fresno	UNXX
			ROY N TALLMAN Total		66.00		
A004061	1901	937	Sharon D. Naraghi	3/9/42	182	Stanislaus	DRY CREEK
A009225	5127	2374	Sharon D. Naraghi	1/12/38	477.6	Stanislaus	DRY CREEK
			Sharon D. Naraghi Total		659.6		
A004709	2381	2131	SHEILA KLIEWER	7/21/25	0.70	Madera	UNSP
			SHEILA KLIEWER Total		0.70		
A015924	10002	5636	SHIRLEY M WELDON	6/21/54	48.00	Fresno	LITTLE DRY CREEK, UNST
A015925	10003	5637	SHIRLEY M WELDON	6/21/54	48.00	Fresno	LITTLE DRY CREEK, UNST
			SHIRLEY M WELDON Total		96.00		
A020138	13359	9235	SIERRA LINDA MUTUAL WATER COMPANY INC	5/19/61	16.80	Madera	UNSP
			SIERRA LINDA MUTUAL WATER COMPANY INC Total		16.80		
A005271	2761	741	SIERRA PINES YOUTH CAMP, INC	11/16/26	14.50	Madera	UNSP (2)
			SIERRA PINES YOUTH CAMP, INC Total		14.50		
A017751	11504	6280	SPRING CREEK IMPROVEMENT ASSN	8/1/57	2.80	Fresno	SPRING CREEK
			SPRING CREEK IMPROVEMENT ASSN Total		2.80		
A018950			STATE WATER RESOURCES CONTROL BOARD	8/28/59	0	Madera	FRESNO RIVER
			STATE WATER RESOURCES CONTROL BOARD Total		0		
A028166	19456	12734	STEVE FIELDS	6/21/84	10	Stanislaus	UNST
			STEVE FIELDS Total		10		
A001885	893	5397	STEVINSON WATER DISTRICT	1/14/59	16,716.90	Merced	MERCED RIVER
A005724	5726	5940	STEVINSON WATER DISTRICT	10/17/27	79,534.40	Merced	BEAR CREEK, OWENS CREEK
A006111	5729	5941	STEVINSON WATER DISTRICT	11/5/28	58,552.90	Merced	ARENA SPILLWAY, BEAR CREEK, MCCOY SPILLWAY, OWENS CREEK
A007012	5733	6222	STEVINSON WATER DISTRICT	7/20/31	35,619.70	Merced	ARENA SPILLWAY, BEAR CREEK
			STEVINSON WATER DISTRICT Total		190,423.90		
A027326B		12759	SUSIE MOODY	4/26/91	0.70	Fresno	UNST
A027469	19303	12763	SUSIE MOODY	8/10/82	29.00	Fresno	UNST
			SUSIE MOODY Total		29.70		
A020049	13203	8939	TAMAR V ARMSTRONG	3/24/61	10.60	Madera	UNSP
			TAMAR V ARMSTRONG Total		10.60		
A001925	838	366	The Irrevocable Flying M Ranch Trust	7/15/24	424.5	Merced	BURNS CREEK
			The Irrevocable Flying M Ranch Trust Total		424.5		
A029279	20627		THE PROTESTANT EPISCOPAL BISHOP OF S J	6/24/88	11	Madera	LEWIS FORK FRESNO RIVER, UNST
			THE PROTESTANT EPISCOPAL BISHOP OF S J Total		11		
A010797	6505	5402	THE VANDER WOUDE FAMILY REVOCABLE TRUST OF NOV 25 2003	4/11/44	223.1	Merced	NORTH SLOUGH MARIPOSA CREEK
A024973	17419	11605	THE VANDER WOUDE FAMILY REVOCABLE TRUST OF NOV 25 2003	1/13/76	394	Merced	NORTH SLOUGH MARIPOSA CREEK
			THE VANDER WOUDE FAMILY REVOCABLE TRUST OF NOV 25 2003 Total		617.1		
A015628	11092	12268	U S FISH & WILDLIFE SERVICE	12/2/53	6,868.00	Merced	BRAVEL SLOUGH, DEEP SLOUGH
A020246	14323	10139	U S FISH & WILDLIFE SERVICE	8/5/61	360	Merced	DUCK SLOUGH
A027586	19473		U S FISH & WILDLIFE SERVICE	11/17/82	3,000.00	Merced	DEADMAN CREEK
			U S FISH & WILDLIFE SERVICE Total		10,228.00		
A012416	7363	5342	U S SIERRA NATL FOREST	3/18/48	2.40	Fresno	BEAR CREEK, MONO CREEK
A013904	8656	4608	U S SIERRA NATL FOREST	8/18/50	96.00	Madera	MCCLURE LAKE CREEK
A013907	8659	4609	U S SIERRA NATL FOREST	8/18/50	155.00	Madera	LILLIAN LAKE CREEK
A014150	8681	4064	U S SIERRA NATL FOREST	2/6/51	0.30	Fresno	RANCHERIA CREEK

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
A016424	10496	8203	U S SIERRA NATL FOREST	6/20/55	9.20	Madera	UNSP
A016426	10270	6263	U S SIERRA NATL FOREST	6/20/55	5.20	Fresno	COON CREEK
A017209	10992	6266	U S SIERRA NATL FOREST	8/3/56	100.00	Madera	RUTHERFORD LAKE CREEK
A017439	11009	7270	U S SIERRA NATL FOREST	1/28/57	29.00	Madera	UNST
A017594	11166	7587	U S SIERRA NATL FOREST	5/10/57	0.50	Madera	UNSP
A017595	11167	7588	U S SIERRA NATL FOREST	5/10/57	0.20	Madera	UNSP
A018245	12266	7274	U S SIERRA NATL FOREST	7/30/58	8.00	Fresno	BEAR CREEK
A018318	12267	8388	U S SIERRA NATL FOREST	9/15/58	16.10	Fresno	BIG CREEK
A019420	12420	7325	U S SIERRA NATL FOREST	5/6/60	103.00	Madera	MCCLURE LAKE
A019634	12729	7589	U S SIERRA NATL FOREST	8/1/60	0.10	Fresno	UNSP
A019635	12730	7590	U S SIERRA NATL FOREST	8/1/60	0.10	Fresno	UNSP
A019636	12731	6696	U S SIERRA NATL FOREST	8/1/60	0.40	Fresno	UNSP
A019637	12732	6697	U S SIERRA NATL FOREST	8/1/60	0.40	Fresno	UNSP
A019638	12733	6698	U S SIERRA NATL FOREST	8/1/60	0.10	Fresno	UNSP
A019639	12734	6699	U S SIERRA NATL FOREST	8/1/60	0.10	Fresno	UNSP
A019640	12735	6700	U S SIERRA NATL FOREST	8/1/60	0.40	Fresno	UNSP
A019641	12736	6914	U S SIERRA NATL FOREST	8/1/60	0.10	Fresno	UNSP
A019676	12738	7781	U S SIERRA NATL FOREST	8/18/60	0.40	Madera	UNSP
A019839	13175	8145	U S SIERRA NATL FOREST	11/3/60	8.80	Fresno	LINE CREEK
A019930	13146	9121	U S SIERRA NATL FOREST	1/24/61	11.20	Madera	UNSP
A021107	14247	9089	U S SIERRA NATL FOREST	1/2/63	0.70	Madera	MOUSE TRAP SPRING
A023979	16611	10878	U S SIERRA NATL FOREST	2/10/72	0.20	Fresno	UNSP
A027719	19882	13043	U S SIERRA NATL FOREST	4/12/83	0.20	Fresno	UNST
			U S SIERRA NATL FOREST Total		548.10		
A000023	273	1986	U.S. BUREAU OF RECLAMATION	3/27/15	44,340.00	Madera	SAN JOAQUIN RIVER
A000234	11885		U.S. BUREAU OF RECLAMATION	6/29/59	2,124,486.50	Madera	SAN JOAQUIN RIVER
A001465	11886		U.S. BUREAU OF RECLAMATION	6/29/59	2,124,486.50	Madera	SAN JOAQUIN RIVER
A005638	11887		U.S. BUREAU OF RECLAMATION	6/29/59	3,917,477.50	Madera	SAN JOAQUIN RIVER
A014858B	20245		U.S. BUREAU OF RECLAMATION	7/18/88	1,000,000.00	Calaveras, San Joaquin	STANISLAUS RIVER
A018714	16301		U.S. BUREAU OF RECLAMATION	5/15/59	143,000.00	Madera	CHOWCHILLA RIVER
A018733	16584	13836	U.S. BUREAU OF RECLAMATION	8/25/11	71,600.00	Madera	FRESNO RIVER
			U.S. BUREAU OF RECLAMATION Total		9,425,390.50		
A013345	8356	6419	UHRHAMMER PROPERTIES	9/8/49	405	Merced	MERCED RIVER
			UHRHAMMER PROPERTIES Total		405		
A011438	6672	3314	V A RODDEN INC	6/17/46	1,273.40	Stanislaus	UNION SLOUGH
A030613	21156		V A RODDEN INC	7/10/03	3,769.50	Stanislaus	UNION SLOUGH
			V A RODDEN INC Total		5,042.90		
A006160	5731	4638	VANDER WOUDE FARMS	1/14/29	138.7	Merced	NORTH SLOUGH MARIPOSA CREEK
			VANDER WOUDE FARMS Total		138.7		
A005386	2847	1518	VANDER-WOUDE DAIRY	3/21/27	14,479.60	Merced	DUCK SLOUGH
			VANDER-WOUDE DAIRY Total		14,479.60		
A013496	8037	4747	VERNA M MURRAY	12/2/49	83.9	Stanislaus	TUOLUMNE RIVER
			VERNA M MURRAY Total		83.9		
A006479	3582	1443	VISTA LIVESTOCK COMPANY	11/6/29	36.6	Merced	DRY CREEK
			VISTA LIVESTOCK COMPANY Total		36.6		
A006114	5730	2911	W P RODUNER CATTLE & FARMING COMPANY	11/9/28	2,945.50	Merced	DUCK CREEK
A011653	7585	4910	W P RODUNER CATTLE & FARMING COMPANY	12/10/46	14,519.20	Madera	ASH CREEK
A012635	8702	4909	W P RODUNER CATTLE & FARMING COMPANY	8/6/48	12,810.20	Merced	OWENS CREEK
			W P RODUNER CATTLE & FARMING COMPANY Total		30,274.90		

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
A020268	13377	7963	WALTER D HARRIS TRUSTEE OF THE WALTER D HARRIS TRUST DATED SEPTEMBER 29 2005	6/20/61	23.80	Fresno	UNST
A020269	13378	7964	WALTER D HARRIS TRUSTEE OF THE WALTER D HARRIS TRUST DATED SEPTEMBER 29 2005	6/20/61	28.00	Fresno	UNST
A020270	13379	7965	WALTER D HARRIS TRUSTEE OF THE WALTER D HARRIS TRUST DATED SEPTEMBER 29 2005	6/20/61	45.00	Fresno	UNST
			WALTER D HARRIS TRUSTEE OF THE WALTER D HARRIS TRUST DATED SEPTEMBER 29 2005 Total		96.80		
A016936	10636	5995	WILLIAM J FOGARTY	3/13/56	22.7	Stanislaus	UNST
A019044	12595	6947	WILLIAM J FOGARTY	10/21/59	30	Stanislaus	UNST
A020928	14122	8247	WILLIAM J FOGARTY	9/5/62	20	Stanislaus	UNST
			WILLIAM J FOGARTY Total		72.7		
A015371	9578	5478	WILLIAM J HALL	6/8/53	91.2	Stanislaus	TUOLUMNE RIVER
			WILLIAM J HALL Total		91.2		
A023861	16610	10928	WILLIAM J JAWIEN	9/3/71	0.70	Fresno	UNSP
			WILLIAM J JAWIEN Total		0.70		
A019227	12707	7805	William O Jamison	2/9/60	61.50	Madera	UNST
A022724	15563	9796	William O Jamison	5/26/71	20.3	Madera	UNST
A022727	15566	9848	William O Jamison	3/13/67	11.60	Madera	UNST
			William O Jamison Total		93.40		
A001442B	940	000388B	WILMA R THOMPSON	9/10/19	119.1	Merced	MERCED RIVER
			WILMA R THOMPSON Total		119.1		
A026152	18151	12012	WILSHIRE ALEC	12/26/79	0.40	Fresno	UNSP
			WILSHIRE ALEC Total		0.40		
			Grand Total		10,484,617.10		

Appendix D

Section D.7
Priority Rankings for Sacramento River Water Rights Claimants

Sacramento + Trinity + East and West Creeks Above Feather River Confluence by Priority - Post-1914 Appropriative Water Rights

Post-1914 Water Right Holder Name	Priority Date	Face Amount
Reclamation District 1004	4/2/1915	56.0
Reclamation District 108	1/25/1917	97.5
River Garden Farms Company	1/25/1917	29.3
Sutter Mutual Water Company	2/1/1917	21.9
Tisdale Irrigation & Drainage Co	7/26/1917	12.5
Reclamation District 108	8/27/1917	270.7
Oji Brothers	1/3/1918	1.9
Sutter Mutual Water Company	1/3/1918	265.7
Provident Irrigation District	1/18/1918	40.1
Stanford Vina Ranch Irrigation Co	8/5/1918	4.6
Natomas Central Mutual Water Co	8/22/1918	16.2
Lomo Cold Storage	9/10/1918	2.0
Meridian Farms Water Company	9/10/1918	67.3
Sutter Mutual Water Company	1/24/1919	19.7
Conaway Preservation Group LLC	3/1/1919	43.6
Natomas Central Mutual Water Co	3/5/1919	58.4
Natomas Central Mutual Water Co	8/27/1919	36.7
Provident Irrigation District	9/2/1919	3.4
Glenn-Colusa Irrigation District	12/3/1919	28.1
Glenn-Colusa Irrigation District	1/14/1920	10.8
Rancho Esquon, Inc	2/5/1920	3.7
Sycamore Mutual Water Company	2/9/1920	42.5
Reclamation District 999	2/11/1920	58.4
Sutter Mutual Water Company	4/9/1920	1.5
US Bureau of Reclamation	2/17/1921	50.2
Butte Valley Irrigation District	2/28/1921	17.2
Rancho Esquon, Inc	10/9/1921	1.8
Rancho Esquon, Inc	3/4/1922	3.8
Gorrill Land Company	3/6/1922	4.6
Rancho Esquon, Inc	6/27/1922	3.0
Hot Springs Valley Irrigation District	4/12/1923	48.4
Sacramento River Ranch II	5/17/1923	2.6
Reclamation District 999	7/18/1924	3.9
Gorrill Land Company	6/30/1925	4.5
Rancho Esquon, Inc	6/30/1925	4.6
Sutter Mutual Water Company	6/22/1926	3.3
M & T Incorporated	7/17/1926	5.1
Parrott Investment Company	7/17/1926	5.1
Sacramento River Ranch II	2/17/1927	1.8
Subtotal Before Initial State Filings in 1927		1,352.4
US Bureau of Reclamation	7/30/1927	11,153.8
US Bureau of Reclamation	7/30/1927	3,349.9
Sutter Mutual Water Company	1/31/1928	0.1
Lomo Cold Storage	11/14/1929	20.3
Conaway Preservation Group LLC	4/18/1930	5.4
Natomas Central Mutual Water Co	5/28/1931	15.4
County of Sacramento	6/6/1931	2.7
Lomo Cold Storage	3/21/1932	0.7
South Fork Irrigation District	3/5/1934	17.0
Reclamation District 883	5/1/1934	2.2
M & T Incorporated	12/1/1934	5.1
Parrott Investment Company	12/1/1934	5.1
M & T Incorporated	2/27/1936	3.1
Parrott Investment Company	2/27/1936	3.1
Maxwell Irrigation District	4/8/1936	29.0
Glenn-Colusa Irrigation District	5/28/1936	0.7
Subtotal Before Second State Filings in 1938		14,613.5
US Bureau of Reclamation	8/2/1938	7,818.8

Post-1914 Water Right Holder Name	Priority Date	Face Amount
Calif Dept of Fish & Game	6/19/1939	5.5
M & T Incorporated	9/22/1939	13.6
Parrott Investment Company	9/22/1939	13.6
Sutter Mutual Water Company	11/3/1939	0.6
Gorrill Land Company	3/13/1942	3.9
Sutter Mutual Water Company	6/16/1943	3.7
Oji Brothers	1/11/1945	2.9
Oji Brothers	3/6/1946	0.6
Reclamation District 108	5/26/1947	27.4
River Garden Farms Company	5/29/1947	6.3
Sutter Mutual Water Company	6/23/1947	2.7
Conaway Preservation Group LLC	9/8/1947	70.1
Glenn-Colusa Irrigation District	10/8/1947	3.4
Sycamore Mutual Water Company	3/17/1948	2.2
Pelger Mutual Water Company	4/13/1948	22.8
Sutter Mutual Water Company	4/13/1948	15.3
Sycamore Mutual Water Company	3/25/1949	2.3
US Fish & Wildlife Service	1/12/1950	44.2
Oji Brothers	2/20/1950	1.0
Reclamation District 108	2/24/1950	78.0
Maxwell Irrigation District	8/25/1950	4.9
Maxwell Irrigation District	6/28/1951	1.6
Subtotal Before Feather River Project Rights Filed in 1951		8,145.4
CA DWR	8/25/1951	1,575.2
Natomas Central Mutual Water Co	10/8/1953	11.8
M & T Incorporated	5/10/1954	0.5
Parrott Investment Company	5/10/1954	0.5
Lomo Cold Storage	11/28/1955	0.2
Tisdale Irrigation & Drainage Co	4/3/1956	1.4
Princeton-Codora-Glenn Irrig Dist	5/2/1956	15.1
US Bureau of Reclamation	11/28/1956	1,335.4
US Bureau of Reclamation	11/28/1956	1,230.8
CA DWR	3/15/1957	1,100.0
Maxwell Irrigation District	6/24/1957	34.6
Calif Dept of Fish & Game	10/24/1957	5.3
US Fish & Wildlife Service	10/25/1957	8.0
US Bureau of Reclamation	4/30/1958	160.0
US Bureau of Reclamation	9/16/1959	3,030.8
South Fork Irrigation District	3/14/1960	2.2
US Bureau of Reclamation	7/28/1960	1,335.4
US Bureau of Reclamation	4/12/1961	9,032.0
US Fish & Wildlife Service	7/3/1961	21.7
Subtotal of Most Feather River and CVP Filings 1951-1961		18,901.0
Rancho Esquon, Inc	2/5/1965	5.5
US Fish & Wildlife Service	7/19/1965	14.5
Gorrill Land Company	10/25/1965	2.5
Hot Springs Valley Irrigation District	3/17/1966	20.0
Reclamation District 999	4/1/1966	35.6
Sutter Mutual Water Company	9/7/1967	2.0
Butte Valley Irrigation District	4/10/1968	10.0
Calif Dept of Fish & Game	7/24/1968	5.2
Reclamation District 1004	12/26/1968	21.0
Pelger Mutual Water Company	3/13/1972	1.7
Calif Dept of Fish & Game	12/21/1972	5.5
Sycamore Mutual Water Company	12/22/1972	1.0
Sacramento River Ranch II	3/1/1973	12.7
Calif Dept of Fish & Game	4/10/1974	7.4
Gorrill Land Company	4/12/1978	4.4

Sacramento + Trinity + East and West Creeks Above Feather River Confluence by Priority - Post-1914 Appropriative Water Rights

Post-1914 Water Right Holder Name	Priority Date	Face Amount
Reclamation District 1004	12/1/1978	36.0
County of Sacramento	8/19/1982	0.5
Pelger Mutual Water Company	9/16/1994	5.0
Maxwell Irrigation District	2/17/1995	13.6
Princeton-Codora-Glenn Irrig Dist	11/19/1998	24.4
Provident Irrigation District	11/19/1998	26.7
Glenn-Colusa Irrigation District	2/18/1999	182.9
City of Sacramento	10/30/2000	81.8
Provident Irrigation District	2/27/2001	124.5
Princeton-Codora-Glenn Irrig Dist	12/17/2001	71.8
US Bureau of Reclamation	7/29/2002	2,203.1
Glenn-Colusa Irrigation District	5/3/2006	53.7
Sacramento County Water Agency	2/15/2008	71.0
Reclamation District 108	10/18/2010	36.0
Woodland-Davis Clean Water Agency	4/14/2011	45.0
Subtotal Since 1963		3,125.0
Total		46,137.3

Source: State Water Resources Control Board; California Water Impact Network.

Appendix E
Water Availability Analysis Model Assumptions and Methodology

Analysis of water supply availability must account for water rights claims in addition to the variability contained within watershed hydrology. C-WIN's method of water supply availability has three components: watershed hydrology, known water rights claims, and yield estimation from the interaction of hydrology and water claims. All analytic methods contain assumptions.

Hydrology and Instream Flow Assumptions:

- The State Water Resources Control Board adopts a Delta inflow criterion for the major tributaries of the San Joaquin River Basin of 60 percent of unimpaired flow. This implies a diversion cap not to exceed 40 percent of unimpaired flow in the San Joaquin River Basin.

- The State Water Resources Control Board adopts a Delta inflow criterion for the major tributaries of the Sacramento River Basin of 75 percent of unimpaired flow. This implies a diversion cap not to exceed 25 percent of unimpaired flow in the San Joaquin River Basin. As with the San Joaquin, C-WIN is well aware that this is an assumption, not a foregone conclusion.

- C-WIN's water supply availability analysis relies on the 82-year unimpaired flow hydrology prepared for water years 1922 through 2003 by the California Department of Water Resources (2007). These data are arrayed by major watershed of the Central Valley and Delta. C-WIN calculated monthly decile, quartile and median flows by month and year, and then calculated the subtotals for key regulation periods: November through June for the Sacramento River Basin, and February through June for the San Joaquin River Basin. The percent of regulated period to total flows in the unimpaired hydrology was also calculated for each year, from which deciles, quartiles, medians, averages, and minima and maxima were calculated.

- The annual total and regulated period subtotals were then employed in the water rights yield analysis component. Remaining flows in the non-regulation season (July to October in the Sacramento Basin, July to January in the San Joaquin Basin) are estimated by simply subtracting regulation season flows from annual totals.

- All non-regulated flows are assumed to be fully available for diversion by water right holders; no instream flow requirements are assumed for the unregulated flow period. This assumptions inflates the amount of water that junior water right holders would be allocated during this period of the year, and may ignore temperature restrictions for fish protection.

- No monthly breakdown of flows and diversion allocations is attempted.

- Use of an 82-year unimpaired flow hydrology accounts for inter-annual flow variations in assessing the potential for paper water.

Water Rights Claims Assumptions:

- C-WIN sought to gather water rights information from a variety of sources. Using the Public Records Act, C-WIN requested from nearly 100 different public water districts and agencies information concerning any and all pre-1914 water rights they may have. Many had no pre-1914 water rights. Others provided copies of pre-1914 notices, copies of adjudication decrees, operation agreements, diagrams, statements of diversion and use, and other information that described their early water rights claims. C-WIN wishes to express our gratitude for their helpful responses, which are too numerous to mention here.

- C-WIN also gathered from the State Water Resources Control Board's web site copies of adjudication decrees from the Pit River watershed, the Stanislaus River, Butte Creek, and the Indian Creek and Middle Fork Feather River watersheds.

- State law requires that pre-1914 and riparian water right holders file Statements of diversion and use with the State Water Resources Control Board annually. The Board has made most, but not yet all SDUs available online. The Board's eWRIMS database search engine itemizes each SDU but does not provide usage quantities when query answers are returned in the vast majority of cases. Consequently, C-WIN staff downloaded as many as possible to study and record the highest usage claims, as well as year of first usage. C-WIN includes only SDUs with cumulative usage claims by the same claimant that exceed 1,000 acre-feet. This kept the research scope manageable, while also capturing statistically significant cumulations of water usage.

- C-WIN's reliance on SDUs assumes that each usage report they contain is accurately measured. The highest amount claimed is employed to represent the maximum claim that might be exerted by the water right holder on behalf the right under which the reported diversion was made. This is assumed to be the case regardless of whether the type or right claimed is riparian or pre-1914.

- Many SDUs do not provide adequate usage information, however, and were ignored. Therefore, it is quite possible that C-WIN's use of SDU data in this analysis understates the magnitude and location of riparian and pre-1914 water rights claims throughout the Sacramento and San Joaquin river basins.

Yield Analysis Assumptions:

- The water rights priority system would operate subordinate to the application of water quality instream flow objectives.

- The obverse of the Board's instream flow objectives is referred to in our method as a "diversion cap." a 75 percent of unimpaired flow criterion thus is converted to a 25 percent of unimpaired flow diversion cap for Sacramento River Basin rivers in this analysis. In other words, if 75 percent of unimpaired flow is available for fish and aquatic beneficial uses, the 25 percent of unimpaired flow is available for diversion to consumptive uses. For the San Joaquin River Basin, a 60 percent of unimpaired flow objective is reflected in the analysis as a 40 percent of unimpaired flow diversion cap.

- Under the diversion cap, paramount riparian water rights are given first diversion rights, followed by senior pre-1914 water right holders, based on highest usage claimed, the cumulative face amount of water rights claim notices, adjudications, or other water rights claim source. For some river models, riparian and pre-1914 water rights claims are bundled together to simply the analysis when the pre-1914 rights are senior to all other succeeding rights. Only after major pre-1914 water rights claims are any post-1914 appropriative water rights granted by the State of California provided with any remaining flows. Post-1914 water rights that are not shown in a specific river model's results are left off because no flows are left for these rights to divert given the model's operation.

- SDU highest use claims, adjudication allocations, and pre-1914 water right notice claims by the same entities are summed. While this appears to be double-counting, we believe it is important to cumulate them on the assumption that when the Board or a court undertakes to adjust water rights, the Board or court must be aware of all claims (both in notices as well as in uses) made in order to remove clouds from their titles.

- As noted above, the unimpaired flow hydrology data is analyzed to determine an average percent of regulated period to total flow for each river. This average indicates that share of the hydrograph's overall flows that occur during the regulated period. We assume that water right claimants claim their supplies under the diversion in a manner that is directly proportional to the regulated period's share of the overall total flow for that river. (This is a water diverter's way of "mimicking the natural hydrograph.") For all riparian and many pre-1914 water right holders, this seemed a reasonable assumption; for post-1914 water right holders whose rights may have limited seasons of diversion or contributions to storage, this assumption may break down. However, but this assumption might only come into play during the wettest portions of each river's overall unimpaired flow hydrology, if at all. The factors used for each river system is shown in Table E-1:

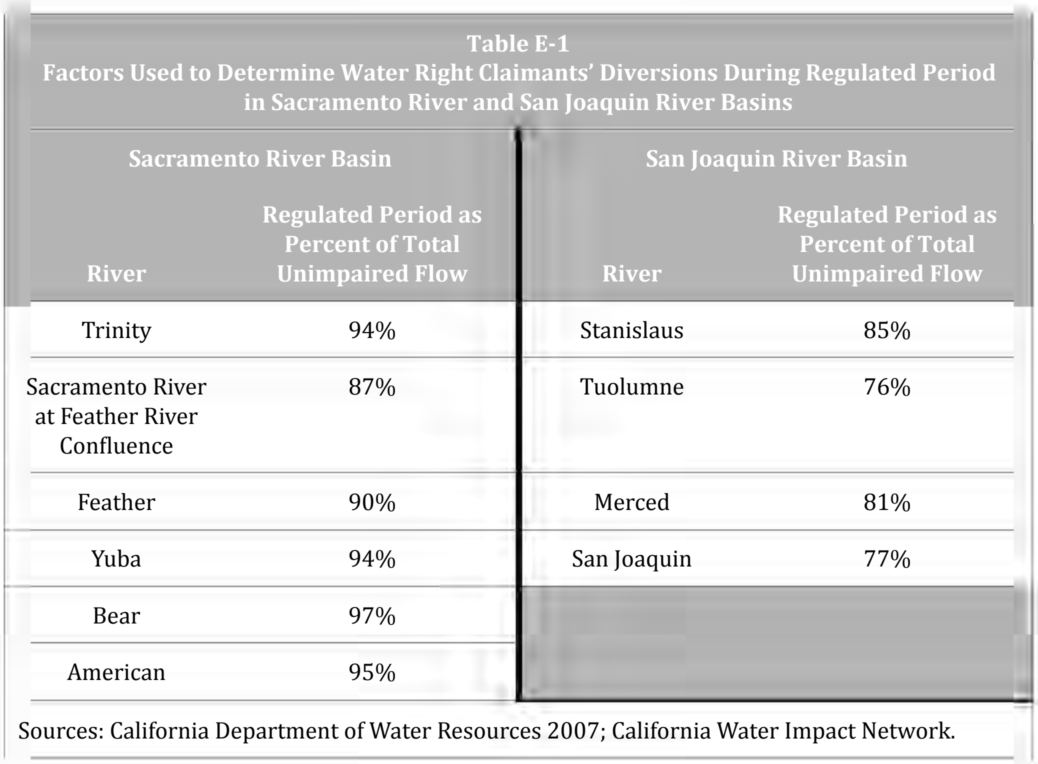

Table E-1
Factors Used to Determine Water Right Claimants' Diversions During Regulated Period in Sacramento River and San Joaquin River Basins

Sacramento River Basin		San Joaquin River Basin	
River	**Regulated Period as Percent of Total Unimpaired Flow**	**River**	**Regulated Period as Percent of Total Unimpaired Flow**
Trinity	94%	Stanislaus	85%
Sacramento River at Feather River Confluence	87%	Tuolumne	76%
Feather	90%	Merced	81%
Yuba	94%	San Joaquin	77%
Bear	97%		
American	95%		

Sources: California Department of Water Resources 2007; California Water Impact Network.

- Default calculation method for pre-1914 water rights notices are often expressed in cubic feet per second (cfs) without seasonal limitation are to multiply the cfs by 3600 (seconds per hour), then by 24 (hours in a day), then by 365.25 days per year. The result is then divided by 43,560 square feet to the acre to obtain the face amount expressed in acre-feet.

- Default calculation method for pre-1914 water rights notices expressed in miners inches is to divide the miners inches by 50 to convert the claim to cubic feet per second, then follow the calculation for converting cfs claims to acre-feet of face amount. We see this as a conservative conversion assumption. Some pre-1914 water right holders may have legal documents that suggest that the conversion should be 40 miners inches to 1 cubic feet per second. This would increase the face value of such pre-1914 water rights by 20 percent.

- Default calculation method for water rights claims (particularly in SDUs) expressed in gallons per day was to divide the gallons by 325,851 gallons per acre-foot, then multiply by the number of days in the usage season disclosed in the SDU.

- These calculation methods are employed for estimating the quantity of rights administered under adjudication decrees as well. Diversion seasons mandated under the decrees were used as well.

Appendix F
California Water Code Article 1.3
Declaration of Fully Appropriated Streams

1205. (a) Following notice and hearing, the board may adopt a declaration that a stream system is fully appropriated. As used in this article, "stream system" includes stream, lake, or other body of **water**, and tributaries and contributory sources, but does not include an underground **water** supply other than a subterranean stream following through known and definite channels.

(b) A declaration that a stream system is fully appropriated shall contain a finding that the supply of **water** in the stream system is being fully applied to beneficial uses where the board finds that previous **water** rights decisions have determined that no **water** remains available for appropriation.

(c) Upon its own motion or upon petition of any interested person, and following notice and hearing, the board may revoke or revise a declaration that a stream system is fully appropriated.

1206. (a) From and after the date of adoption of a declaration that a stream system is fully appropriated, and subject to subdivision (b), the board shall not accept for filing any application for a permit to appropriate **water** from the stream system described in that declaration, and the board may cancel any application pending on that date.

(b) Notwithstanding subdivision (a), the board may provide, in any declaration that a stream system is fully appropriated, for acceptance for filing of applications to appropriate **water** under specified conditions. Any provision to that effect shall specify the conditions and may contain application limitations, including, but not limited to, limitations on the purpose of use, on the instantaneous rate of diversion, on the season of diversion, and on the amount of **water** which may be diverted annually. The board may make those limitations applicable to individual applications to appropriate **water**, or to the aggregate of the applications, or to both.

(c) Subdivision (a) shall not apply to applications for temporary permits made pursuant to Chapter 6.5 (commencing with Section 1425) or to any provision of this **code** respecting change in point of diversion, place of use, or purpose of use.

1207. Notice of hearing pursuant to this article shall be given as follows:

(a) The notice shall be published at least once a week for four consecutive weeks in one or more newspapers of general circulation published in each county in which any part of the stream system is situated, and publication shall be complete at least 60 days prior to the date of hearing.

(b) At least 60 days prior to the date of the hearing, the notice shall be mailed to all persons known to the board who own land that appears to be riparian to the stream system, who divert **water** from the stream system, or who have made written request to the board for special notice of hearing pursuant to this article.

Appendix G
Selected Fully-Appropriated Rivers and Creeks of the Bay-Delta Estuary's Central Valley Watershed

River	Fully-Appropriated Season	Critical Reach
Trinity	1/1 to 12/31	North Fork from Salmon-Trinity Primitive Area to Helena at river mouth (W&S)
	1/1 to 12/31	South Fork Trinity from State Route 36 to river mouth at Salver (W&S)
	1/1 to 12/31	Main stem from 100 yards below Lewiston Dam to river mouth at Weitchpec (W&S)
Pit River	4/1 to 11/30	North and South Forks, Franklin Creek, and Pit River in Big Valley adjudications
	3/15 to 10/31	Ash Creek from confluence with Pit River upstream (adjudication)
McCloud	1/1 to 12/31	Mainstem from Algoma to Lake McCloud, mainstem from McCloud Dam to Shasta Lake (W&S)
Squaw Creek	1/1 to 12/31	Squaw Valley Creek from Section 14, T38N, R3W to confluence with McCloud River
Feather	1/1 to 12/31	Middle Fork from confluence of its tributary streams 1 KM south of Beckwourth, CA. (W&S)
	5/15 to 9/30	Middle Fork at Beckwourth, CA upstream (D-831)
	4/1 to 11/30	Indian Creek from North Fork Feather upstream (adjudication)
	3/1 to 10/31	South Fork Feather from confluence of Oroville Dam and Middle and South Forks of Feather River upstream (D-25)
	7/1 to 9/30	From confluence of Feather with Sacramento River upstream (D-1275)
	4/15 to 9/30	Sierra Valley channels from the confluence of Middle Fork Feather River at Beckwourth upstream (D-1391)
	7/1 to 11/30	West Branch of Feather River from upper Miocene Canal Head Dam located in Section 30, T23N R4E, upstream (D-844)
Yuba	8/1 to 10/31	From Englebright Dam upstream (D-934)
	4/1 to 11/30	From Shady Creek within Section 17, T17N R7E and upstream of South Fork Yuba River (adjudication)
Bear	5/1 to 11/30	From Camp Far West Reservoir upstream (D-1091)
	4/15 to 11/30	From Wolf Creek upstream (above Bear River, D-1059, D-1091)
American	1/1 to 12/31	North Fork of American River from source to Iowa Hill Bridge (W&S)
	1/1 to 12/31	North Fork of American River from point 0.3 miles above Heath Springs to 1,000 feet upstream of Colfax-Iowa Hill Bridge, including Gold Run Addition area. (W&S)
	7/1 to 10/31	From the Sacramento River upstream (D-1108)

Appendix G
Selected Fully-Appropriated Rivers and Creeks of the Bay-Delta Estuary's Central Valley Watershed

River	Fully-Appropriated Season	Critical Reach
	5/1 to 10/31	White Rock Creek from the confluence with South Fork American upstream (D-1522, D-1211)
	7/1 to 12/31	Silver Creek from confluence with South Fork American upstream (D-163, D-1211)
	6/15 to 10/31	Sugar Loaf Creek from confluence with South Fork American upstream (D-776)
Butte Creek	4/1 to 11/30	Butte Creek from confluence with Butte Sink in T17N R1E (adjudication)
	6/1 to 9/30	Butte Creek from confluence of Butte Slough upstream (D-1329)
Stony Creek	4/1 to 11/30	Stony Creek from confluence with Sacramento River upstream (adjudication)
Cache Creek	4/15 to 10/31	Cache Creek from confluence with Yolo Bypass upstream (D-1506)
Putah Creek	1/1 to 12/31	Putah Creek from Monticello Dam upstream (D-869, WR Order 96-002)
Stanislaus River	4/1 to 11/30	From confluence with San Joaquin River upstream (adjudication)
	7/1 to 10/31	From confluence with San Joaquin River upstream (D-1422)
Tuolumne	1/1 to 12/31	From source on Mount Lyell and Mount Dana to Don Pedro Reservoir (W&S)
	7/1 to 12/31	From Don Pedro Reservoir upstream (D-995)
Merced	1/1 to 12/31	From south side of Mount Lyell in Yosemite National Park to 300 feet upstream of confluence with Bear Creek (W&S)
	1/1 to 12/31	South Fork Merced River from Triple Divide Peak to confluence with mainstem of Merced River (W&S)
Chowchilla	1/1 to 12/31	From confluence of Chowchilla River with San Joaquin River upstream (D-1365)
Fresno River	5/1 to 11/30	From Hidden Dam and Fresno River upstream (D-1407)
San Joaquin	1/1 to 12/31	From confluence with Mendota Pool upstream (D-935)
Fresno Slough	1/1 to 12/31	From confluence with San Joaquin River upstream to Kings River and including upstream watershed of Kings River (D-1290)
Sacramento-San Joaquin Delta	6/15 to 8/31	From the Delta upstream - allowing no diversions from the Delta less than 1 cubic foot per second or less than 100 acre-feet in storage. (D-1594)
Source: State Water Resources Control Board, 1998. Key: W&S = Wild & Scenic Designation; adjudication = decree issued adjudicating water rights in that critical reach; D-"[Some number]" refers to a Board Water Rights Decision.		

Letter 7 California Water Impact Network/California Sportfishing Protection Alliance/AquAlliance/ Planning and Conservation League

california water impact network

CSPA

AQUALLIANCE
DEFENDING NORTHERN CALIFORNIA WATERS

PLANNING AND CONSERVATION LEAGUE

October 15, 2016

Ted Alvarez
State Water Department Analysis Office
Department of Water Resources
PO Box 942836
Sacramento, CA 94236-0001
emailed to: watercontractextension@water.ca.gov

Subject: Comments on DEIR for Water Supply Extension Contract Project

Dear Mr. Alvarez;

We appreciate the opportunity to comment on the proposed SWP contract extension project that includes amending certain provisions of the State Water Resources Development System (SWRDS) Water Supply Contracts (SWP Contracts) to among other things, extend the term of the contracts.

1. CEQA and the Definition of the Project: We believe the entire SWP contract must be included in CEQA analysis.

The Project as defined by DWR is to extend the full SWP contracts for 50 years while conducting an environmental review on only the financial sections of the contract. This is a blatant violation of CEQA as it leaves the bulk of the contract intact but without analysis of the potential consequences to the environment of extending the existing contractual obligations. Thus the proposed Project is not properly defined. This piece-meal approach is a direct violation of CEQA. *The potential consequences can only be evaluated in the context of some proposed project. The urgency for extending the contracts now is not well justified in the DEIR. The only project that would require the extensions at this early date is the Twin Tunnels (BDCP_DHCCP_CWF). That is because the construction is estimated to begin in 2020 and the period of construction is estimated to take at least 15 years; hence, the extended contracts must be in place by 2020 well before the 2035 expiration of the existing contracts. No other project on the horizon requires such early action.*

While implying that the only contract change of consequence is financial, DWR proceeds to propose one significant change to the content of the contract. That is the elimination of Article 1, (hh). This is the section of the original contracts that names the projects authorized for construction. There is no mention of Tunnels in this list. The Contract Extension Project proposes to delete the one clause that limits the extent of Delta Transfer Facilities that could be pursued after 1987. We believe Article 1 (hh) was deleted to allow the Tunnels, and anything else DWR might want to build.

The original contracts were signed beginning in 1965 before the California Environmental

Quality Act became law in 1972. A lot has changed since then. The original contracts begin to expire in 2035. The proposed extension will push the date for the contract's expiration to 2085. *The existing contracts include a take-or-pay requirement that presumably would remain if they were simply extended now. "Take-or-Pay" means that the contractor must pay all the fixed costs whether any water is delivered or not. Without the take-or-pay provision large capital investments in the SWP would be difficult to finance in the bond market. It seems that the necessity of extending the contracts now is to keep intact the take-or-pay provisions.* Examining only the financial sections of the existing contracts cannot possibly responsibly determine what the environmental consequences might be*, especially without any idea of proposed projects*. This runs afoul of CEQA's requirements that the project should encompass the whole of the action.

Change of Circumstance--Changes the Definition of the Project:
The SWP as envision some 54 years ago has changed. Any environmental review of the contracts for this project must recognize these changes. For example, there is no justification for including the original contract amounts for the full Table A. The water for these allocations can never be delivered because they simply do not exist. Climate changes, legal changes including the protection of the North Coast Rivers, under both Federal and State law, and the voters' rejection of the Peripheral Canal all have redefined the SWP and the alleged contract amounts. The Contract Table A Allocations must be refigured to reflect this.

For a major contract extension such as is being proposed, a full analysis of actual water supply available to the SWP must be completed. Prudence requires that the amounts of water assigned reflect what is really available if the SWP were operated on a "safe yield" basis. (Please refer to The Santa Barbara Report Appendix B included as Attachment 1)

This must entail a thorough analysis of how much water is actually in the Delta watershed and is legally available to the SWP taking into consideration both the Public Trust Doctrine and Senior Water Rights law. (See Attached C-WIN Quantification Analysis included as Attachment 2) The SWP was originally premised on promises to protect Areas of Origin and Senior Water Rights holders and to take only "surplus" water that would not affect the rights of those from where the water originated.

Water allocated under existing contracts has already had significant environmental repercussions as we have seen with the Pelagic Organism Decline (POD), the continued decline of the three runs of salmon and the Delta smelt as well as other listed species. Extending the contracts and continuing the full Table A Allocations without any environmental review for 50 years beyond 2035 will have considerable impacts. This is a clear violation of CEQA and the Endangered Species Act.

On its face, this attempt to extend only the financial obligations of the SWP contracts to 2085 appears to be solely for the purpose of being able to finance the proposed Twin Tunnel Project that is now winding its way, with much controversy, through the various permit processes. Ratepayers ought to be allowed to vote on such a major change in their land based charges, property taxes and water rates and to have transparency regarding what projects are included in this 50 year extension and obligation of payments. Full disclosure demands a complete listing of all the projects proposed to be financed by this extension.

2. Extension of the Contracts allows for any large project, including the Twin Tunnels that DWR

wishes to pursue.

Although the DEIR claims that the WaterFix is “separate and independent” from the proposed project, it is clear that the WaterFix could not move forward without the completion of this contract extension. *It is doubtful that the Twin Tunnels with its extremely large capital cost and with little quantified benefit would pass muster in the bond market without the take-or-pay provision.* There is no language in the DEIR that promises a vote to opt out for/by each Contractor on large projects like the Twin Tunnels or to allow each Contractor to decide on the merits of each project as proposed in the future.

The DEIR discusses the Monterey Amendments and at 6.1.2, the Cumulative Impacts Analysis, says, “The proposed project would not affect the provisions of the Monterey Amendments specific to water allocations and water management measures or amendments that may be added to allocate costs for the California WaterFix should it be approved.” What does this mean exactly? On its face, it seems to mean that if the proposed Contract Extension Project was approved, there would be no way for any existing Contractor to get out of paying

The current SWP Contracts are not uniform as both Plumas County FC&WCD and the Empire West Side ID did not sign the Monterey Amendments and DWR honored the original contracts that they signed without a problem.

3. DWR claims that contractors would forfeit their Table A allocation if they refuse to acquiesce to the contract extensions: On what basis is this threat made? SWP Contractors and ratepayers originally anticipated their financial obligations would be met by 2035. Now DWR is suggesting these contractors must encumber their ratepayers and property taxpayers for another 50 years for some "hidden" non disclosed list of projects? How can decision makers possibly know if this is the least environmentally damaging alternative without full disclosure of what they are buying with this 50 year financial obligation?

The Executive Summary and DEIR Alternative 7 looks at what would happen if not all the Contractors sign the Project Extension and goes on to suggest veiled threats that if a Contractor chooses not to sign, they may have their water deliveries cut off at the expiration of their current contract. There is no mention in the Executive Summary or DEIR Alternative 7 about Article 4 of the current contracts, very germane to this issue. So long as a Contractor submits an Article 4 letter 6 months before his contract is to expire, DWR **must honor** the request to extend the Contract. Why is DWR threatening to cut off a Contractor’s water service? The DEIR analysis in Alternative 7 is dishonest and threatening.

Article 4 of the existing contracts states that by written notice to DWR at least 6 months prior to the expiration date of the Contract, **the Contractor can elect to receive continued service after the expiration of the term under the following conditions unless otherwise agreed to:**

(1) service of water in annual amounts up to and including the Contractor’s maximum annual Table A amount;
(2) service of water at no greater cost to the Contractor than would have been the case had the Contract continued in effect;
(3) service of water under the same physical conditions of service, including time, place, amount and rate of delivery;

(4) retention of the same chemical quality objective provision;
(5) retention of the same options to use the SWP transportation facilities as provided in Articles 18© and 55, as applicable.

The Monterey Amendments to the SWP contracts set an important precedent for non-conformity in the Contracts. According to the DEIR, Plumas County FC&WCD and the Empire West Side ID did not sign the Monterey Amendments yet these two SWP Contractors "continue to receive, without threat, SWP water from DWR in accordance with the Contracts in effect before the Monterey Amendments.

4. The financial consequences and environmental impacts to local agencies from the Contract Extension Project have not been disclosed:

Language in the existing Contracts gives DWR the authority to build new facilities or modify existing facilities as stipulated without a financial constraint imposed by the current 2035 term of the contract. *Without the contract extensions any proposed project would face the constraint of the viability of floating a revenue bond without a take-or-pay provision.* According to the DEIR, Article 51 of the current contracts stipulates that, "DWR may submit supplemental bills to the Contractors if necessary to meet unanticipated costs for revenue bond debt service and coverage, which are chargeable to the Contractors." This has already impacted individual contractors, especially the 27 smaller ones. These 27 contractors hold only 25% of the total voting power of the SWP, with the Metropolitan Water District having a 50% share and Kern County Water Agency, 25%. Since the SWP contractors are obligated to pay even if they receive little or no water under Table A, the possibility of financial peril for all smaller contractors is very evident if the Twin Tunnels' price tag, $20 billion to $38 billion is financed. (See the Exhibit 1, the SB Report Appendix A attached). With a large percentage of local budgets earmarked to pay SWP costs, the smaller contractors already have deferred needed maintenance, and abandoned some conservation efforts such wastewater recycling for lack of funds.

Without the Contract Extension proposed here, it is unlikely that the tunnels would be able to obtain the financing needed to move forward. So to extend the existing contracts for 50 years beyond their current term opens up considerably more potential debt risk that could be thrust on the contractors even if they didn't want or need the project being proposed.

Sincerely,

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THE UNAFFORDABLE AND UNSUSTAINABLE TWIN TUNNELS:

WHY THE SANTA BARBARA EXPERIENCE MATTERS

Photo credit: Kenji Photography

Report by:

California Water Impact Network (C-WIN)
http://www.c-win.org

JULY 2016

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In Memoriam:

Dorothy Green, co-founding Secretary

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The California Water Impact Network's Mission Statement:

The California Water Impact Network is a non-profit, tax exempt California Corporation that advocates for the just and environmentally sustainable use of California's water, including in-stream flows and groundwater reserves, through research, planning, public education, media outreach, and litigation.

PURPOSE OF THIS REPORT

1. Examine the deficiencies and cost impacts of Governor Brown's Twin Tunnels/CA WaterFix, illustrating the untenable financial burden these proposals place on local water agencies and ratepayers;

2. Highlight that the Tunnels/CA WaterFix will not provide more water when needed, i.e., during drought;

3. Explain the unintended consequences of participation in the State Water Project (SWP) utilizing the experience of Santa Barbara County as an example of the statewide problem;

4. Highlight the exorbitant cost and unreliability of importing water from the State Water Project (SWP) to the communities of Santa Barbara's South Coast.

This report was prepared by Carolee Krieger and Arve Sjovold with the assistance of Joan Wells, Beno Budgor and Georgia Strickland. The California Water Impact Network (C-WIN) obtained data on cost, usage, and fiscal indicators to evaluate the performance of the SWP. C-WIN has used public information obtained from the Central Coast Water Authority (the county's manager of SWP water) and its constituent water agencies for its information. Some data was obtained through requests under the California Public Records Act. Much of the data is available through CCWA and its member agency websites.

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EXECUTIVE SUMMARY

I. WHAT IS THE TWIN TUNNELS/CAWATERFIX PROJECT?

Twin Tunnels/CA WaterFix Proposal: Governor Brown has proposed twin trans-Delta tunnels, each 40 feet in diameter, 35 miles long and buried 150 feet deep, running from the lower Sacramento River to Modesto. Bypassing the San Francisco Bay/Delta, they are intended to move water south "more efficiently" to corporate agricultural water districts in the western San Joaquin Valley and urban southern California water agencies who are beneficiaries of and contractors to the State Water Project (SWP) and the Central Valley Project (CVP). This includes the largest SWP contractor, the Metropolitan Water District of Southern California. There is no clear plan for financing the Tunnels. The administration and its supporters intend to build them without a vote of the people who must pay for them, the ratepayers of the State Water Project (SWP) and the Central Valley Project (CVP).

As of the date of this report, DWR has acknowledged that engineering for the project is only 10% complete and that an additional 3 years and $1.2 billion is needed just to complete the planning. On top of what is needed to complete the planning, construction costs are estimated at $20 billion to $38 billion, according to analysis by ECONorthwest (see Appendix A). The annual cost burden to the contractors will reflect the amortization of the construction costs plus annual operations and maintenance, presumably under the terms of the SWP contracts. The project has not defined quantitatively any of the purported benefits in terms of expected additional water deliveries. In fact, if there is to be additional water from the project it is not certain where it is to be delivered.

The water purveyors in Santa Barbara County are concerned about these two aspects of the proposed project: additional costs to SWP contractors and no clear statement as to how they are to be benefited. The microcosm of the Santa Barbara experience serves as a red flag warning for all Southern California SWP contractors and their customers.

Concerning the affordability of the project, the introduction to the section of the Bay Delta Conservation Plan/ CA WaterFix, *Economic Benefits and Financing Strategies, (March 2012)* [for the CA WaterFix Tunnels], it states:

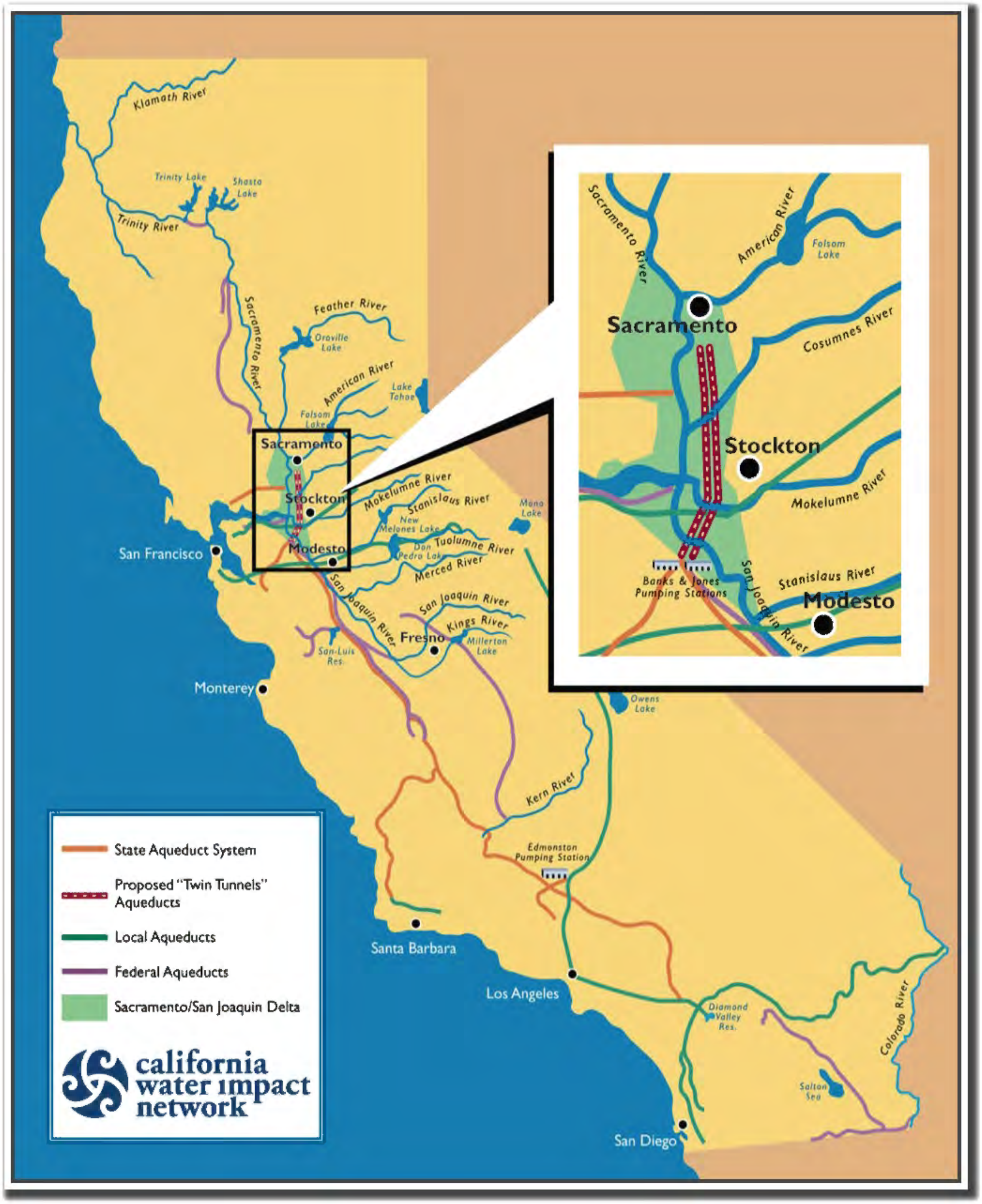
> *"California's investment need is relatively modest compared to the size of the economy. California is the 8th largest economy in the world with an annual Gross Domestic Product of $1.9 trillion. Investments for Ecosystem Restoration and Water Supply Reliability are also relatively small compared to current annual expenditures. Approximately $20 to $30 billion is spent annually for water services and water related programs. Water rates are lower than other household utility costs. Average monthly household water and wastewater rates are less than average costs for other utilities such as electricity, cable/satellite, cell phone... California's investment need is substantial, but well within the capacity of California."*

The situation in Santa Barbara County in general, and the South Coast of Santa Barbara County in particular, do not fit this rosy picture of affordability. In this report we analyze the current problems with affordability of SWP and what the difficulties would be with the addition of the Twin Tunnels project. We have also analyzed the Sacramento River hydrology to assess the likelihood of more reliable deliveries from the SWP due to this project. These are our conclusions.

- **The Twin Tunnels project promises more debt and no additional water to the South Coast districts.**
- **The South Coast districts are already at their limits for absorbing new debt and cannot afford more.**
- **Current South Coast debt burdens are now crowding out budget expenditures for needed infrastructure and maintenance.**
- **SWP water deliveries have never been reliable for the South Coast, especially in droughts and the Twin Tunnels project promises no relief from that circumstance.**

Each of these conclusions follows from the detailed, quantitative analyses in the body of the report. We start with the economic challenges that the water districts presently face with the current SWP debt burdens. We have examined each of the South Coast districts budget details and how they are meeting their financial obligations. We also examined the difficulties of providing water deliveries to their customers with a strong focus on the current drought and the failure of the SWP. The difficulties of the SWP in providing reliable deliveries is revealed in a thorough examination of the Sacramento River hydrology (Appendix B) where it is shown that the droughts are the determining factor in why the SWP demonstrates such poor reliability, while the Bay Delta Conservation Plan/CA WaterFix deals almost entirely with the capability of the Twin Tunnels to capture more water during wet periods. Then we examine the likely cost impacts of the proposed Twin Tunnels project, based on the meager information available on its estimated construction costs, and how those costs when allocated to SWP contractors will affect water district budgets.

We conclude by finding that for Santa Barbara's South Coast purveyors the cost/benefit analysis cannot justify the Tunnels construction. By analysis, the construction of the Tunnels could result in vast economic hardship and financial turmoil for agencies and ratepayers, financial resources that can be applied to construction and delivery of more reliable sources of water such as treated wastewater and desalination.



Map 1: Proposed Twin Tunnels route

THE SANTA BARBARA EXPERIENCE

I. OVERVIEW

History of SWP and South Coast Santa Barbara County

The costs of bringing SWP water to Santa Barbara County were not accurately disclosed in 1991 when voters approved the project. The reliability and delivered amounts of SWP water have been much less than originally promised in 1991. Prior to that election, the state's estimate of the total cost to ratepayers for construction of the Coastal Aqueduct was **$270 million.** SWP contractors located south of the terminus of the Coastal Aqueduct in Santa Maria additionally, must pay for a local aqueduct connection. Based on information provided by the Central Coast Water Authority (CCWA), the total costs of construction for the coastal branch and the local branch was **$670 million**, which is to be contrasted with the $270 million as the estimate given to the voters. Santa Barbara ratepayers will have paid **$1.76 billion** including amortization with interest and operations and maintenance (O & M) for bringing state water to Santa Barbara. The large cost is best illustrated by Montecito, which has only 4,200 meters, but must pay over $5 million a year for SWP related debt whether any water is delivered or not. As will be shown, the much higher than expected construction costs has materially affected the affordability of the SWP for the South Coast districts.

Santa Barbara County has paid and will continue to pay extremely high costs for minimal amounts of the SWP water, largely due to the low reliability of the SWP. **Actual delivery of SWP water between 1998 and 2015 for the four South Coast water agencies (Montecito, the City of Santa Barbara, Goleta and Carpinteria) was only 28% of full contract amounts,** despite the fact that Santa Barbara County voters were told in 1991 ballot information that intimated the State Water Project would deliver 97% of contract amounts to urban water users.

Current Cost/Benefit Analysis

The SWP has failed in delivering water to Santa Barbara's South Coast water districts and cities in a cost-effective and reliable manner. But to fully understand these impacts, they must be viewed from an historical perspective.

Prior to the 1987-1992 drought South Coast water purveyors had relatively small budgets. Water supply costs represented less than 10% of the budgets and local sources provided all the water. The drought changed everything. At the peak of the drought, all South Coast water purveyors, convinced of the reliability of state water delivery system, voted to import state water at enormous construction costs. The South Coast is now living with the consequences of that decision; some very important lessons have been learned.

A. Costs:

Due primarily to the region's connection to the SWP, South Coast water district budgets have increased substantially. By way of example, the budget for the Montecito Water District went from $1 million in the early 90's before deliveries of state water to $14 million today. For the upcoming year, the budget is $21 million, an extraordinary increase of $7 million, as Montecito tries to catch up on needed repairs to old infrastructure. As the 1987-1992 drought unfolded, mandatory conservation and severe use restrictions decreased water demands dramatically. These measures also had the adverse effect of decreasing water sales to the point that water rates had to be raised substantially in order to balance budgets. Upon emerging from the 1987-92 drought, the water districts were immediately faced with increasing cost burdens from the construction of the Coastal Aqueduct and the local aqueduct necessary for the importation of state water. Rates had to be maintained at high levels, and raised in many cases. When the drought ended and mandatory conservation and restrictions were lifted, demand remained depressed due to the high water rates that were still in effect. Before the drought, water use was not necessarily sensitive to water costs, but the higher costs have caused demand to decrease. Increased rates are met with commensurate decreases in demand such that the districts have resorted to large increases in the fixed charges for water service.

B. Benefits:

Because of its inherent unreliability, there have been few benefits redounding from the importation of state water, especially during droughts. Because severe droughts are often statewide phenomena, state water deliveries typically are curtailed at the very time they are needed most on the South Coast. The current drought demonstrates this exceedingly well.

There has been one benefit of the Coastal Branch, the South Coast's tie-in to the SWP: water demand has decreased due to the cost impacts of the project on water agencies and ratepayers. Before the 1987-1992 drought, normal water demand in the City of Santa Barbara was about 16,500 acre-feet per year. The post-drought, new normal, is now 13,500 acre-feet, which is 3,000 acre-feet less than the pre-drought level. This drop in demand can be attributed directly to higher water prices.

The additional cost to agencies and ratepayers from the construction of the Twin Tunnels will have a negative effect on water supply and demand given the unreliability of delivery, lack of new water sources, and higher rates required to cover costs plus more stringent conservation measures.

Twin Tunnels and Additional Debt from the State Water Project

The CCWA's local contractors are paying large amounts of money for the planning and engineering of the tunnels. The State Water Project (SWP) and the Central Valley Project (CVP) contractors have spent **$250 million** on planning to date and estimate it will cost an additional **$1.2 billion** to get the project “shovel ready”. These costs are paid proportionately by South Coast Contractors.

C-WIN has documented the estimated cost of construction of the Twin Tunnels. The annual payment with interest and principle on these construction costs, which will be allocated to Santa Barbara County under its contract with the SWP, will range from **$7.7 million/yr.** to **$46.4 million/yr.** The South Coast districts’ share will range from **$2 million/yr.** to almost **$15 million/yr.** These estimates are based on a 55/45 division in costs between the State Water Project (SWP) and the Central Valley Project (CVP); **if the CVP doesn't participate, these estimates will roughly double.**

If Santa Barbara County is forced to participate in the construction of the Twin Tunnels, its SWP expenditures will increase significantly at a minimum. The resultant increases in retail water costs will burden Santa Barbara County customers without any assurance that additional water supplies will be forthcoming. This increased cost burden will depress demand even further.

Why would Santa Barbara County want to pay more money for unreliable water it may not need or use?

2) TERMINOLOGY

Water issue terminology may be unfamiliar to some readers. The following are some key terms that will be used throughout the report:

Acre-foot: One acre-foot is equal to an acre of land (or 43,560 square feet) covered to a depth of one foot. An acre-foot is thus 43,560 cubic feet of water or about 325,829 gallons. It is equivalent to the annual consumption of water by two average California families.

Table A Allocations: "Table A Allocations" are the total contractual amount of water that may be delivered under the terms of a State Water Project water service contract. The actual amount of water delivered, depends on how much water is available from nature; this varies widely from year to year. The cost of Table A Allocations is based on the SWP contractors' percentage share of the total Table A Allocations. This cost reflects the percentage of both the original SWP contract and Santa Barbara's share of the Coastal Branch aqueduct constructed after the 1991 SWP election. All costs incurred by each SWP contractor must be paid every year regardless of whether any water is delivered at all.

Table A Deliveries: This amount represents what a water contractor actually receives in deliveries from the State Water Project under the contract in a given year. For Santa Barbara County water districts, Table A deliveries have always been less than the full amounts for a given year because the water is either not available from the State, or is not needed, and is therefore not requested.

Article 21, and other "surplus water": The SWP contracts deal with three types of non-scheduled water deliveries. They are Article 21 or "Surplus Water"; "Turn-back Pool"; and "Carryover Water".

Article 21 or surplus water is non-Table A water that may be declared available in the first three months of the contract year after all current Table A demands are met, reservoir refill requirements are satisfied, and there is fresh water in the Delta.

Turn-back Pool water is Table A water that was requested but not fully delivered in the previous contract year. The contractor who has unused Table A water receives a specified rebate for relinquishing his unused amount; any other contractor may offer to buy water from Turn-back Pool sources at a specified price.

Carryover Water is Table A water for a specific contractor that was available but not fully delivered in the previous contract year and can be claimed during the first three months of a new contract year if there is a demand for it or a place to store it.

The determining factors for exploiting these accounts are adequate capacity in the aqueduct facilities that deliver the water, satisfaction of all demands by the SWP contractors for Table A water, and water availability. The test of water availability is not necessarily constrained by Delta health considerations. Availability can be met simply by certifying that there is fresh water in the Delta as if it were a lake. This has not been healthy for the Delta.

Cachuma Project: The Cachuma Project consists of the Bradbury Dam and Lake Cachuma reservoir. The project stores floodwater runoff from the Santa Ynez River in Santa Barbara County. Completed in 1958, it is managed by the Bureau of Reclamation and provides water for South Coast urban and agricultural use by a series of tunnels that traverse the Santa Ynez mountain range.

Central Coast Water Authority (CCWA): Is a Joint Powers Authority (JPA) that manages Santa Barbara County's water from the SWP. It was created in 1991 when the County Board of Supervisors ceded management of the State Water Project. CCWA's voting membership is comprised of representatives of the eight county water agencies that contract for state water: the City of Santa Barbara, Montecito, Carpinteria, Goleta, Santa Ynez WCID #1, Santa Maria, Buellton, and Guadalupe. However, the legal responsibility for state water obligation payments is with the County of Santa Barbara Board of Supervisors, sitting as the Santa Barbara County Flood Control and Water Conservation District (SBCFCWCD). Thus, Santa Barbara County taxpayers ultimately have the fiscal responsibility for SWP payments. CCWA is acting as the agent for SBCFCWCD, which is the technical entity that holds the contract with the SWP.

Hundred Cubic Feet (HCF): A common measure of water consumption used by retail water agencies to describe how much water their local customers consume in a billing period. 1 HCF equals 748 gallons; 1 acre-foot equals 435.6 HCF.

Safe Yield: The level of water a project can deliver every year, given some small probability of short fall. "Safe Yield" is an operational concept whereby a reservoir is operated on the basis of a steady, firm annual yield calculated at a high probability to extend through the worst drought of record; the droughts extension is determined as the interval between spills or fills.

Twin Tunnels: The Twin Tunnels are a Gov. Brown administration plan to divert water from the Sacramento River under the San Joaquin-Sacramento River Delta to the federal and state pumps in the South Delta. The two proposed tunnels would each be 40 feet in diameter, buried more than 150 feet below the Delta and run for about 35 miles. The project would include three new intakes, each with a flow capacity of 3,000 cubic feet per second. The "Bay-Delta Conservation Plan" (BDCP) is a plan initiated by the State Dept. of Water Resources (DWR) to facilitate approval and construction of the Twin Tunnels. The BDCP has since been subsumed by the CA WaterFix.

Unit Cost: The cost of a given measurement for water. For example, units of measuring water may include cubic feet, gallons, or acre-feet. The *unit cost* of water is the cost per increment of each such designation (i.e., the "cost per acre-foot" or "cost per hundred cubic feet", etc.) consumed or supplied.

Effective Unit Cost: This is the cost of supply divided by the actual water delivered over a given time period, usually a year. It is a measure of the cost-effectiveness of a given source of supply.

Urban Preference: In state water law, urban preference means giving domestic and industrial water rights holders priority in receiving water during droughts, prior to the claims of agricultural water users. The theory in state law is that water for people is a higher social priority than water for farming.

Water Supply Reliability is the likelihood that the requested demand for delivery in a given year by a contractor can be met. It is usually stated as a probability. The prudent level of probability for each contractor depends on the availability to that contractor of other sources of water. For example, a contractor that is totally dependent on SWP water requires a very high level for SWP deliveries because shortfalls for that contractor are not easily tolerated. On the other hand, a contractor that has a year-to-year or longer term storage carryover capability can tolerate lower levels of probability of delivery. The reliability of delivery is also limited by the availability of water to the project and the ability of the project to carry over water year-to-year in storage reservoirs. The probability of availability can be calculated by investigating the probability distributions of runoff from the hydrologic record convolved with the prescribed operations. This differs from CALSIM II modeling done by the State, which utilizes "frequency of return" calculated by CALSIM II as a measure of reliability.

Water Year: October 1 - September 31 of a given year, as opposed to **Calendar Year** which runs from January 1 - December 31 or **fiscal year** which typically runs from July 1- June 30.

Lake Cachuma during current drought

3) GEOGRAPHIC AREA COVERED BY THE REPORT

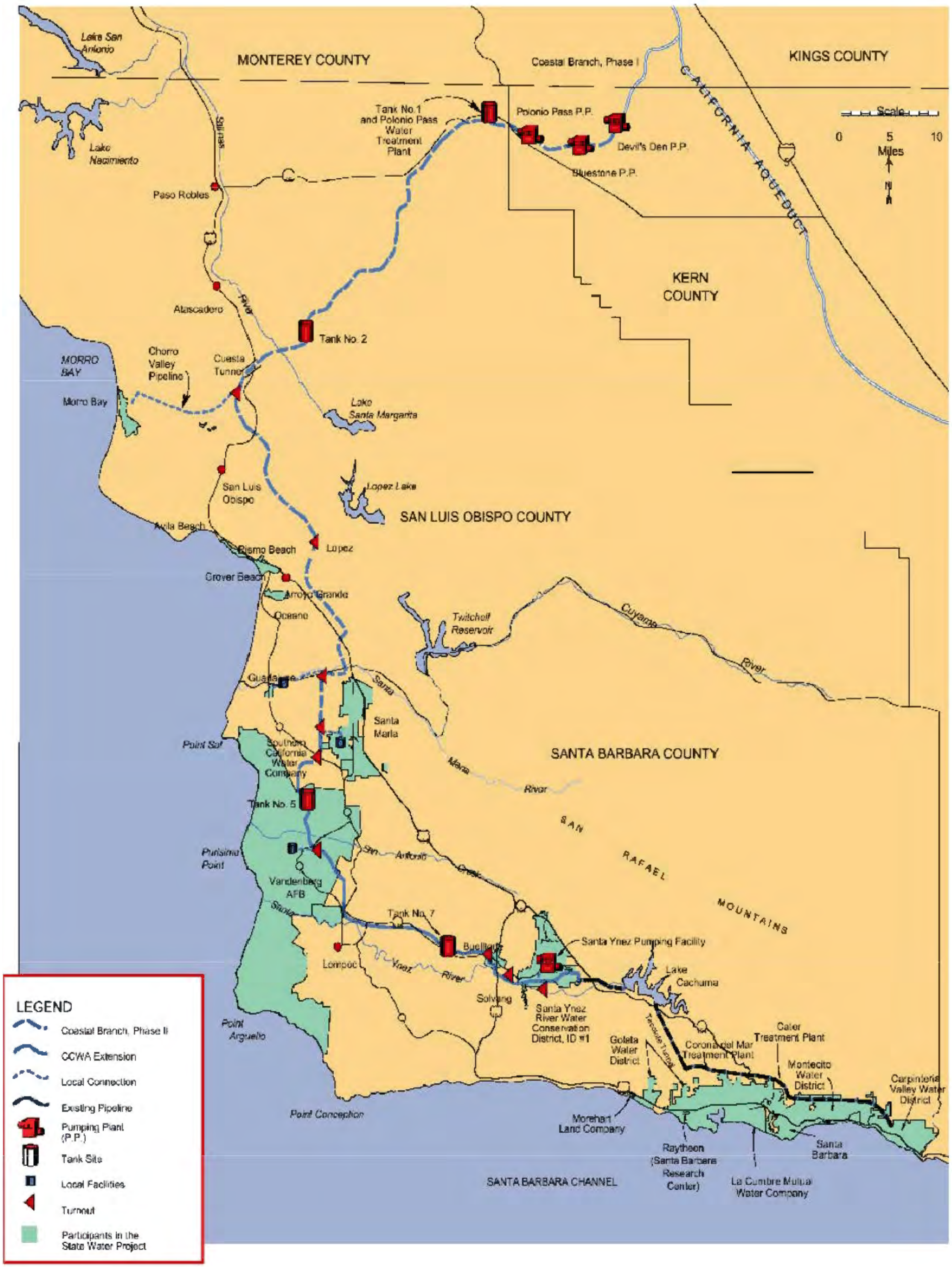
This report clarifies the cost of State Water Project water to four urban and suburban water districts and their customer service areas along the foothills and coastal plain of Santa Barbara County. These water districts include:

- City of Santa Barbara
- Montecito Water District
- Carpinteria Valley Water District
- Goleta Water District

They are located on the littoral plain of the south coast of Santa Barbara County along Highway 101. They are about 330 miles south of Tracy, where State Water Project water is pumped from the Bay-Delta Estuary.

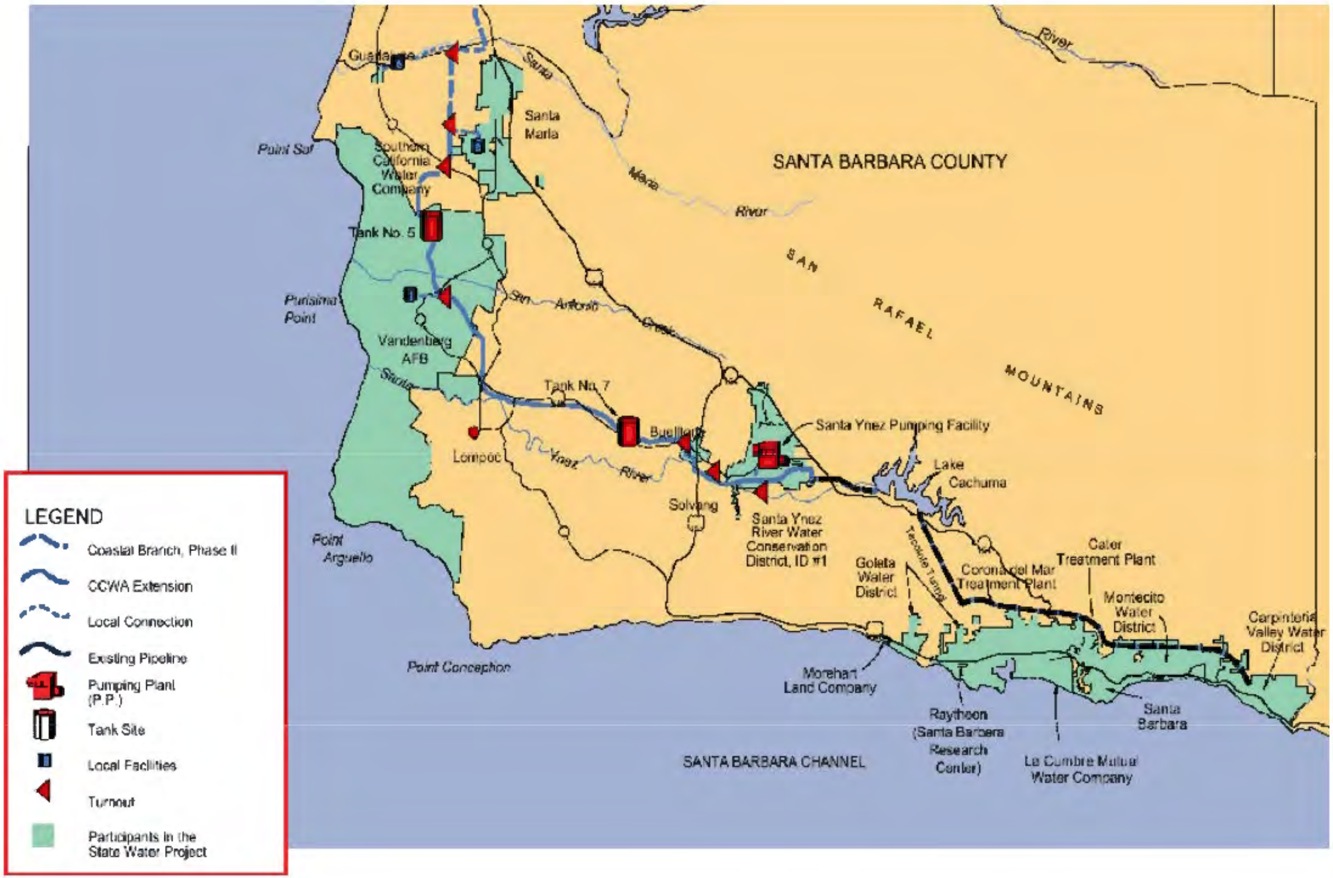
After studying the impacts to date of the SWP, C-WIN then analyzed the costs of the Twin Tunnels project and its likely impacts.

The four water districts and cities are among the major customers in Santa Barbara County for water delivered by the State Water Project's California Aqueduct. SWP water originates at Lake Oroville and travels down the Feather River to the Delta. When water is pumped from the Bay-Delta estuary, it must travel 330 miles south through the California Aqueduct traversing the western San Joaquin Valley to the state-owned Coastal Branch Aqueduct. The Coastal Branch aqueduct terminates at the Santa Maria River. (See Map 2 on following page.)



Map 2: Water Agencies of the Central Coast Water Authority; Coastal Branch Aqueduct, and the Local Aqueduct in Santa Barbara County. Map courtesy of CCWA

From the Santa Maria River, the water enters the Central Coast Water Authority's local pipeline to Lake Cachuma in Santa Barbara County. (Map 3 portrays the route of the local aqueduct, and the location of the districts that receive SWP water.)



Map 3 Central Coast Water Authority pipeline. Map courtesy of CCWA

The transport of state water in Santa Barbara County occurs under the jurisdiction of the Central Coast Water Authority (CCWA).

This report excludes some Santa Barbara County contractors from detailed analysis for several reasons:

- The City of Santa Maria is located close to the terminus of the Coastal Branch Aqueduct and faces none of the costs of financing, construction, operation, and maintenance for delivery of water to Lake Cachuma. Consequently, Santa Maria's water importation burdens are not equivalent to those borne by the South Coast districts. The difference is due to the significant costs of the local aqueduct, which is intended to serve districts downstream from Santa Maria. *However, due to Santa Maria's large allocation of Table A water, it represents a special case when it comes to the assessment of impacts due to the Twin Tunnels. These impacts will be addressed later in this report.*

- Vandenberg Air Force Base is excluded from this analysis because it is a **federal military** installation and is not a voting CCWA member. It will be able to pay the costs of any water supply that is provided in Santa Barbara County.

- Other voting members of the Central Coast Water Authority were excluded from the analysis in this report because they had small Table A Allocations. C-WIN chose a threshold of 1,000 acre-feet of Table A Allocation for determining a voting member exclusion from this report. Voting members excluded under this criterion included the City of Buellton, the City of Guadalupe, Solvang, and the Santa Ynez Water Conservation Improvement District #1.

- Because information from private corporations is not available under the Public Records Act, non-voting members such as Raytheon, Morehart Land Company, Southern California Water Company, and La Cumbre Mutual Water Company are not included here.

The primary reason for focusing on the water agencies analyzed in this report is their location at the terminus of the Coastal Aqueduct and the CCWA local pipeline. The cost burdens faced by the South Coast water districts for their shares of the local aqueduct are nearly equal to the cost of their shares in the SWP Coastal Aqueduct.

Table 1 presents a summary profile of the cities and water agencies that are included in the scope of this report. Readers may wish to refer back to this table from time to time.

Table 1
Summary Profile of Four Santa Barbara County Water Districts

	Goleta Water District	City of Santa Barbara	Montecito Water District	Carpinteria Valley Water District
Population(2010 census)	86,946	91,416	14,000	15,141
Single Family Accounts	13,342	16,920	4,204	3,078
MF Res Accounts	1,578	6,126	74	314
Total Water Budget Fiscal Year 2011	$24,646,996	$34,600,000	$13,545,136	$11,147,539
Residential Deliveries 2010 (AF)	6,115	8,755	3,794	1,354
Table A Allocations (AF)	4,500	3,000	3,000	2,000
2010 SWP Deliveries (AF)	813	541	541	363

As can be seen in Table 1, SWP deliveries are small fractions of Table A Allocations and small fractions of deliveries.

4) COSTS TO SANTA BARBARA COUNTY OF SWP WATER

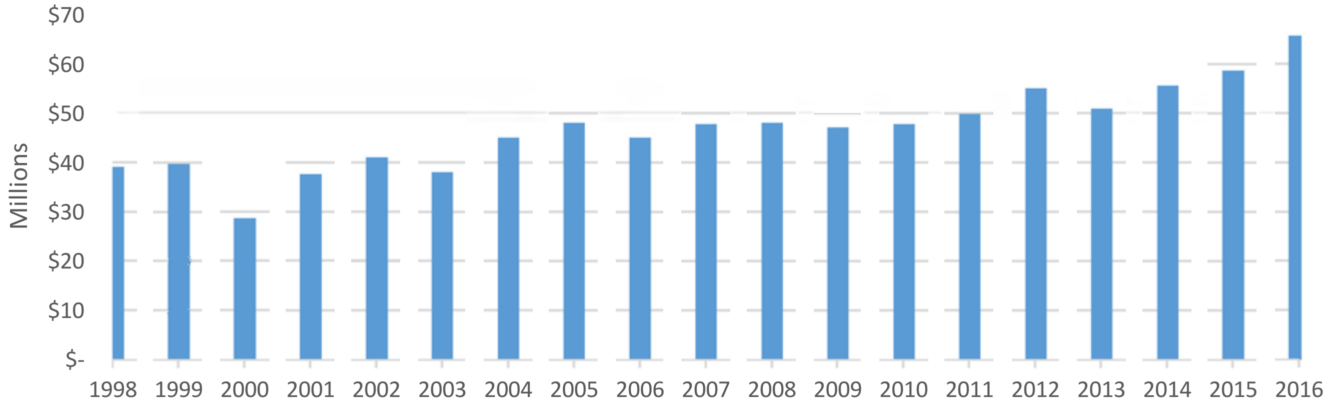
In 1991, the voters of Santa Barbara County approved a ballot measure to construct 144 miles of the Coastal Branch Aqueduct in order to connect Santa Barbara County water districts to the State Water Project. The vote was 66% for and 34% against. Earlier, in 1979, when voters were told the truth about high cost and low reliability in droughts, county voters defeated a similar measure by a vote of 72% to 28%. Before the 1991 election, Santa Barbara County voters were told that the costs for a Santa Barbara hook-up to the SWP would be **$270 million**; the construction costs alone for the Coastal Branch Aqueduct were just under **$500 million**. The addition of the local aqueduct construction costs brought the **total to $670 million.** The local aqueduct construction had to be financed at a much higher interest rate than the Coastal Branch construction. Because the South Coast Districts are at the end of the local pipeline they have much higher shares of the proportionate costs. The consequences of this higher cost, together with the higher interest rate, causes the South Coast water districts payments for the local aqueduct to be nearly equal to that of their Coastal aqueduct costs.

Water agencies face two key challenges as they continue providing SWP water to the suburban and urban communities along the Santa Barbara Coastal Plain: 1) rising State Water Project water costs, and 2) poor reliability for what they pay.

Santa Barbara County water districts cumulatively paid more than $893 million for all project costs (capital, financing, power, operations and maintenance) between July 1, 1997 and June 30, 2016; further, costs continue to escalate annually. Figure 1 shows the trend of total annual costs to all the CCWA water districts receiving state water, (including local aqueduct charges), from completion of construction to the present. This figure shows increasing costs, even though Santa Barbara County water districts have not added any new projects. These recent increases most likely reflect the resources that DWR has dedicated to the ongoing planning for the BDCP/CA WaterFix and the Twin Tunnels. These costs are buried in the invoices for the SWP that are sent to the SWP contractors.

Figure 1

Annual SWP Payment by Santa Barbara County Water Agencies



Source: CCWA Budgets

Based on district budgets and financial information supplied by CCWA, C-WIN has calculated the proportion of CCWA's annual budget for repayment of SWP capital and operating charges, as well as operations and maintenance charges for delivery of SWP water. Figures 2 through 5 present these costs in pie charts showing the percentage of SWP costs of water district budgets for each of the four South Coast districts (City of Santa Barbara, Carpinteria Valley Water District, Montecito Water District and Goleta Water District). These figures represent the averages from 2012 to 2015.

Figure 2
City of Santa Barbara Water Budget

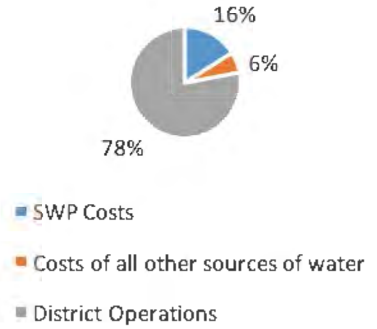


Figure 3
Carpinteria Valley Water District Budget

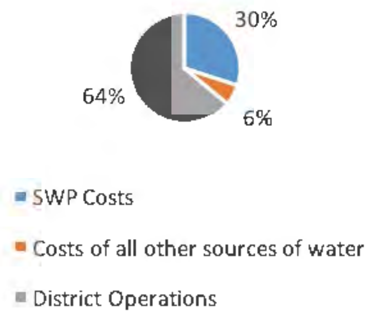


Figure 4
Montecito Water District Water Budget

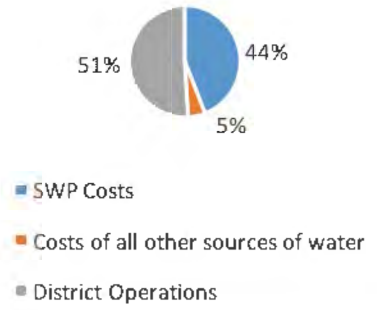
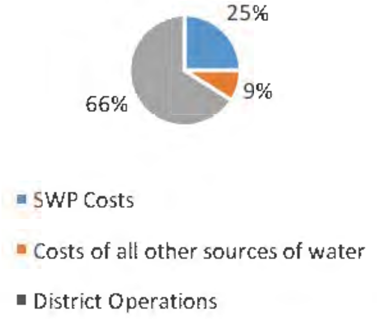


Figure 5
Goleta Water District Water Budget



Impact on Local Water Districts: The high costs imposed by the SWP on the South Coast districts may also cause distortions in district priorities. For example, a report by the Santa Barbara County 2006-07 Grand Jury noted that the Carpinteria Valley Water District is paying half of its $10 million/year budget for non-operational expenses, i.e., those primarily related to purchase and delivery of SWP water (this includes some other non-SWP costs as well).

The opening paragraph of this Grand Jury Report states as follows:

> *"The Carpinteria Valley Water District (CVWD) has delivered an essential product but has experienced the need for an exceptional amount of facility maintenance and upgrades. This*

> *has resulted in outstanding loans of $33.8 million against a total operating budget of less than $5 million per year. Coupled with the expense of a State Water option,* ***which it does not need and uses little,*** *the district is strapped with nonoperational yearly expenses, which exceed $5 million. Total annual expenses therefore exceed $10 million, giving rise to high water rates."*

Montecito's 2012-13 Adopted Budget states that 45% ($4,995,100) of its operating budget and 39% of its total budget is required to pay for its SWP costs. **In 2014 all SWP contractors received only 5% of their Table A allocations of State Water**, but had to pay the full costs of the construction debt.

Many other Santa Barbara County water districts are also suffering from the high cost of SWP water. Repayment of SWP debt, along with SWP ongoing operation and maintenance costs, comprise the dominant costs for each water agency. Yet the volume of water these districts draw from the SWP in normal and wetter years is minimal compared to other available local sources such as the Cachuma Project. The high cost for the SWP debt, combined with reduced water sales strains district budgets, compromises district ability to maintain adequate reserves, perform system upgrades, and needed repairs. As a result, maintenance and upgrades are backlogged or must be paid out of dwindling reserve funds. C-WIN believes districts defaults on SWP payments are a real threat for many of these districts.

Debt Requirements Looming: In some cases, water districts are struggling to maintain the lenders' required bond coverage covenant of 125%. For instance, for fiscal year 2012-2013, Montecito had a bond coverage ratio of only 115%. During fiscal year 2009-2010, Goleta had a bond coverage ratio of only 120%.

Santa Barbara County during current drought

5) SWP RELIABILITY AND EFFECTIVE UNIT COSTS

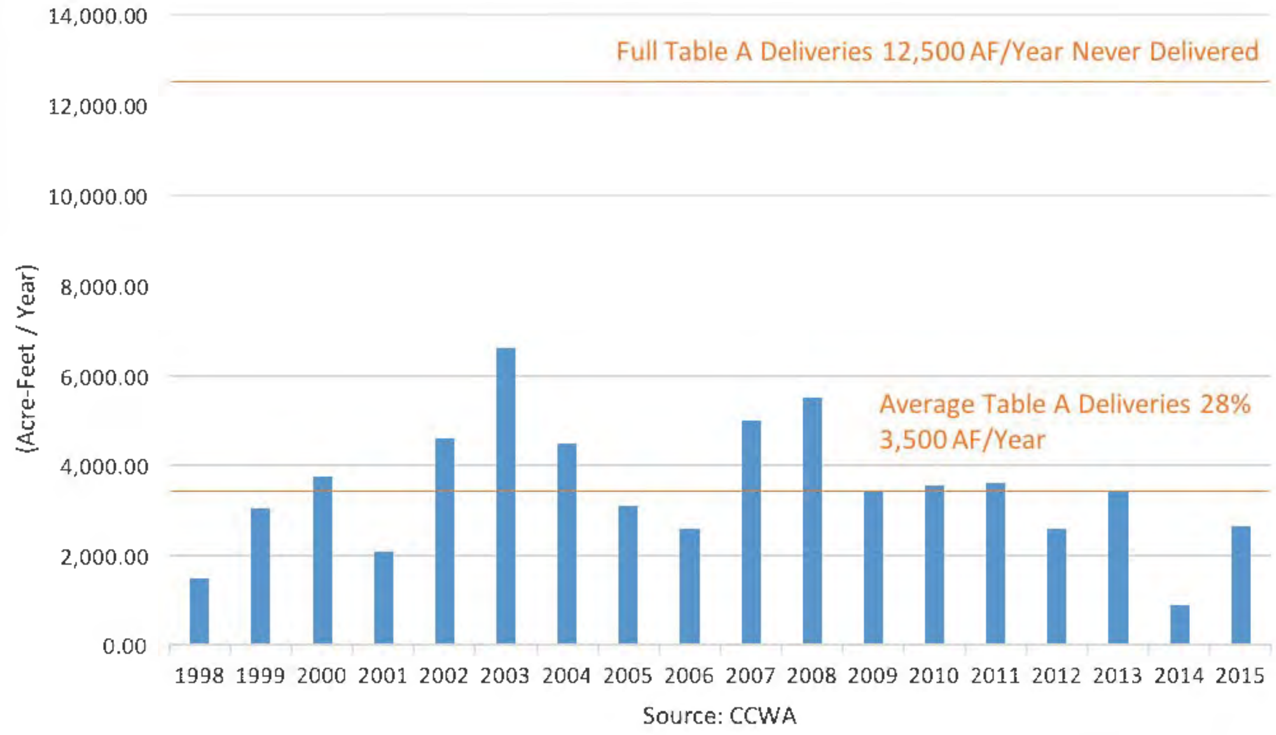
Reliability

Before the 1991 election, voters were promised that the SWP contracts would be "97% reliable", meaning 97% of Table A water could be delivered. This promise has never been fulfilled.

However, it was made clear by all the supporting districts that SWP water was sought as a supplemental source to existing local sources, a supply that would be utilized during extreme droughts when local sources proved to be insufficient. This established a requirement for reliability quite different than that characterized as average delivery capability over a long period of time. The assurance of state water in time of need constitutes the best measure of reliability. This assurance is probably best met by operating the SWP on the basis of **safe yield**, which is that level the project can deliver every year given some small probability of shortfall. The SWP is not operated on this basis, and can therefore never meet the requirements for a reliable supplemental water source as intended by Santa Barbara County's water districts.

Figure 6 shows that over the past 18 years, the four South Coast districts received approximately 28% of their Table A allocation. **2014 was a very dry year for the entire state. The official SWP allocation of 5% is a clear demonstration the SWP coming up very short in the years it is needed most.**

Figure 6
Santa Barbara South Coast Districts Table A Deliveries
(Full Table A Deliveries are 12,500 AF)



Source: CCWA

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The availability of state water under present operational rules is limited year-to-year by the amount of runoff experienced in each year. C-WIN has examined the 98-year hydrologic record of the Sacramento River and found that **it is very likely that present operations can only provide a small fraction of Table A amounts during droughts.** DWR has never performed a proper analysis to determine a truly reliable level of delivery. Without such analysis, it is fruitless to propose structural solutions to the Delta's problems, given that *precipitation is the main limiting factor*. (See Appendix B for details on mischaracterizations of Sacramento River hydrology by DWR.)

The SWP's difficulties in delivering full Table A allocations can be traced to the origin of the project, which dates to the late 1950's. The full statewide Table A amounts were developed in the 1950's and 1960's, and were based on potential new sources anticipated from further damming of California's North Coast rivers. Federal and State Wild and Scenic River designations for most North Coast rivers closed the door on these projections. The State Water Project also planned to build a Peripheral Canal to move water through the Delta. The bond measure to fund the Peripheral Canal was voted down by California voters in 1982, in large part due to the potential environmental devastation to the Bay/Delta. Without the availability of these sources, there is no likelihood of meeting Table A amounts.

Effective Unit Costs

The effective unit (acre-foot) costs of SWP water are highly variable and have led to costs considerably higher than those estimated for the 1991 ballot measure. This is because the water agencies must pay the fixed costs for the amount of water contracted, regardless of the amount delivered annually. Even if no SWP water is delivered these fixed costs must be paid.

C-WIN has determined that CCWA's estimated unit costs for SWP water on a per acre-foot basis are often greatly understated because CCWA bases cost estimates on full delivery of Table A Allocation amounts what has been shown to be a fictitious delivery amount. As shown in Figure 6 on the previous page, full Table A Allocations have **never** been delivered by the SWP and are unlikely to ever be delivered because of limited availability in times of drought and lack of need during wet years when the water is available.

Figure 7, on the following page, shows the **effective unit water cost** per acre foot for SWP water; *the cost of supply divided by the actual water delivered.* This is based on information from the four water agencies. Figure 7 compares the effective unit costs of state water against the effective unit cost of local sources for each of the four South Coast districts. In this figure, average costs over the last 5 years for SWP and local sources are presented. This is another way of showing the impact of a costly and unreliable project. Figure 7 shows that SWP costs significantly outweigh the costs of local water sources.

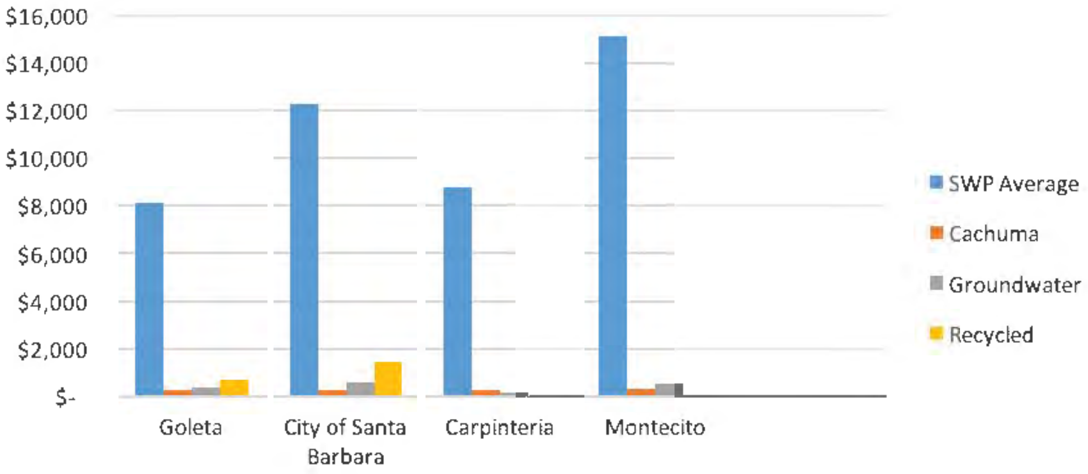


Figure 7
SB County Effective Unit Water Cost per Acre-Foot

Sources: CCWA, GWD, SB City, CWD, MWD

	SWP Average	Worst year, 2014 SWP Drought	Avg. Cachuma	Avg. Groundwater	Avg. Recycled
Goleta	$8,150AF	$21,500AF	$240AF	$376AF	$707AF
City of Santa Barbara	$12,299AF	$28,200AF	$240AF	$610AF	$1,450AF
Carpinteria	$8,800AF	$19,800AF	$240AF	$144AF	
Montecito	$15,132AF	$30,600AF	$310AF	$516AF	

Table 2 demonstrates the singular effects of SWP costs and deliveries by calculating the *effective unit costs of SWP deliveries* focusing only on those costs that are the fundamental allocations of Table A made by DWR at the beginning of each new contract year. Accordingly, no deliveries associated with the Article 21 surplus water, Turn-back Pool water, or Carryover water are included in delivered Table A allocations. Similarly, all the costs that are included in the CCWA invoices for such deliveries have been deducted from the invoiced costs. Also excluded are deliveries of and costs for supplemental purchased water.

On this basis Table 2 confirms the very high effective unit costs and exposes the extraordinary high costs during droughts when deliveries are curtailed. It is important to note that the costs and deliveries shown in Table 2 are more representative of SWP contract scenarios as they stood in 1991, when votes were taken. Since 1991, the SWP contract has been significantly amended to provide a far more liberal interpretation of non-Table A types of water and the established requirements for buying and selling water among SWP and non-SWP contractors. Further the amended SWP contract eliminated the **urban preference** for Table A deliveries, a primary factor causing lower deliveries during drought years and consequent high unit costs. The urban preference required water for people before agriculture in times of drought. This safe guard was eliminated by the Monterey Amendments to the SWP contracts in 1995. C-WIN is currently contesting these Amendments in court.

Table 2

SWP Effective Unit Cost

		City of SB	
	Delivery	Total Cost	Eff Unit Cost
	(Acre-ft/yr)	$M	$/AF
2010	541	4.31	$7,970
2011	773	4.71	$6,090
2012	703	4.77	$6,735
2013	339	4.24	$12,500
2014	165	4.81	$28,200
2015	0	4.66	(NWD)

		Montecito	
	Delivery	Total Cost	Eff Unit Cost
	(Acre-ft/yr)	$M	$/AF
2010	500	4.91	$9,800
2011	218	4.86	$22,300
2012	0	4.45	(NWD)
2013	1155	5.27	$4,560
2014	165	5.06	$30,600
2015	660	5.56	$8,400

		Goleta	
	Delivery	Total Cost	Eff Unit Cost
	(Acre-ft/yr)	$M	$/AF
2010	1103	3.75	$3,400
2011	1126	6.63	$5,900
2012	972	7.24	$7,400
2013	1433	6.5	$4,500
2014	373	8.03	$21,500
2015	1592	9.83	$6,200

		Carpinteria	
	Delivery	Total Cost	Eff Unit Cost
	(Acre-ft/yr)	$M	$/AF
2010	492	3.22	$6,500
2011	501	3.23	$6,400
2012	433	3.03	$7,000
2013	500	3.66	$6,600
2014	110	3.08	$19,800
2015	450	3.01	$6,500

In the years of no SWP water deliveries, each district is still required to pay millions of dollars for their share of the revenue bonds.

Impact on Ratepayers

Retail water agencies are responsible for delivering water directly to homes and business customers. As nonprofit governmental institutions, they must by law recover their costs through their revenue-generating operations. They typically have two means of doing this: charging customers for the water they directly consume ("water rates") and charging customers for the meters that provide access to water and measures their consumption at the street. The latter is commonly referred to as the "fixed service charge."

Montecito is an example of the severity of the budget shortfalls experienced when water sales drastically decrease. Montecito has not been able to generate enough revenue from water sales or fixed service charges, and in 2014 instituted rationing. Severe penalties were imposed for going over allocation. When even this measure was not enough, Montecito levied an additional drought surcharge. Montecito's revenue from fines, levies and fixed charges is greater than revenue from water sales. This is not a sustainable way to run a water district.

Single Family Residential Rate Structures

C-WIN investigated retail water costs for an average single-family residential customer by obtaining data from updated Urban Water Management Plans (UWMP) and current district fee schedules for the four water agencies of the Santa Barbara coastal plain.

All four water districts have responded similarly in their efforts to increase revenues following high SWP costs. Prior to the 1987-1992 drought, unit rates and service charges were substantially lower as were the consequent water bills of the customers. These rates, however, are not as high as would be indicated by the effective unit costs of SWP deliveries. That is due to the fact that the bulk of delivered retail water is supplied by much lower- cost sources such as Lake Cachuma. Nonetheless, customer bills are several times higher than before the drought. For example, in 1991 (before South Coast districts incurred state water debt), Montecito's Water District's annual budget was $1 million. Today, with SWP debt, it is $14 million. The current drought promises further rate increases due to the need to procure supplemental purchased water because SWP water isn't there. These additional sources must be purchased on the spot market at prevailing prices, which are much higher than the variable costs of SWP water.

Balancing of Water Rates for Large and Small Users

The Santa Barbara County Grand Jury Report on the Carpinteria Valley Water District noted "…a serious imbalance in the monthly service charges between small and large meters … resulting in small water user costs that … are 2 ½ times the going rate in the general area." The subtext here: it is particularly difficult for Carpinteria to increase rates to provide sufficient revenues. Carpinteria has a substantial agricultural sector that constitutes a significant fraction of its retail water deliveries. If rates for agriculture are raised too high many of the farmers will activate private wells that can be operated at lesser cost. This results in lost revenue to the district leaving the residential sector to bear a disproportionately higher load.

In Montecito the district has instituted a parcel fee that is applied to developed and undeveloped parcels alike. This has helped raise needed revenues. Santa Maria has folded its waste water operation into the water department to constitute a single enterprise fund to help meet its obligations. *The need for increased revenues has brought about many creative cost management solutions to balance revenues with obligations, of which the single most important factor is SWP charges.*

6) IMPACTS OF THE PROPOSED TWIN TUNNELS

- Construction of the Twin Tunnels will place a significant burden on ratepayers, especially urban ratepayers, without delivery of any additional water when needed most in drought.
- Public water agencies may find it difficult to maintain fiscal solvency with this added burden.
- Planning costs of the Twin Tunnels already have increased the financial burden for ratepayers. The State already has spent $250 million, and is moving forward in the permitting process with only 10% of the proposed project engineered. The State has announced its need for an additional $1.2 billion to finalize the plans and complete the engineering for the Twin Tunnels.

Estimated Costs and Allocations to SB County Water Districts

In 2012, BDCP/CA WaterFix cost estimates for the Tunnels were $17.2 billion for construction. This is a gross underestimate because cost estimates have not been updated to reflect the construction timeline and do not include the potential for cost overruns. Such overruns are all too common for large construction projects, and can occur for a variety of reasons. The Coastal Branch Phase II Aqueduct, the most recent project built by DWR, which serves Santa Barbara and San Luis Obispo counties, is a classic example of an engineering project with significant cost overruns.

The construction costs for the tunnels range from an estimate of **$20.6 billion** (DWR) to **$38 billion** (ECONorthwest). The $20.6 billion number represents DWR's $17.2 billion estimate escalated to the expected period of construction, while the $38 billion is based on an independent analysis obtained by the consulting firm ECONorthwest, also escalated to the expected period of construction. (See Appendix A).

In order to calculate the annual costs that would accrue from selling bonds to finance these construction costs, several assumptions have been made. First, an interest rate of 6.1% was used as the bond financing rate. How the annual bond financing costs would be paid is still uncertain.

The proposed project would be built under the authority of the SWP contracts. Under those contracts, the Twin Tunnels financing costs likely would be part of Delta water cost. On this basis, each contractor's proportionate share would be equivalent to its proportionate share of Table A allocations.

The tunnel project was conceived to provide for both CVP and SWP deliveries across the Delta, with the CVP responsible for half the costs. Almost all CVP deliveries south of the Delta are for agriculture and about one-fourth of SWP deliveries are for agriculture. Agribusiness contractors are unsure they can sustain such a financial burden. They would prefer that the urban contractors assume a larger share. There is no obvious objective basis within the SWP to make such a shift between agriculture and urban beneficiaries but we have assumed an allocation based on each contractor's proportionate share of SWP construction costs to date. Since urban SWP contractors typically lie at the ends of the various branches of the SWP, they assume proportionately larger shares of construction costs than proportions based on Table A allocations.

Santa Barbara County Water District contractual cost share of Table A Delta water is approximately 1.1 % of the financed total. If the allocation is based on proportionate shares of SWP construction costs, the Santa Barbara County share of financing costs is approximately 3.4 %. These two values were used in estimating the impacts on Santa Barbara County SWP contractors. The costs are further allocated within Santa Barbara to CCWA members (the water districts) on the basis of their proportionate shares of Table A water.

The impact analysis also addresses the possibility that the CVP would decline to participate in the tunnels project which provides a high value limit. In Tables 4 and 5, the designation "55/45" represents shares of the total costs allocated to the SWP and CVP; "100/0" indicates the total burden allocated to the SWP.

Table 4 shows the estimated share that would be allocated to the Santa Barbara County Flood Control and Water Conservation District (SBCFCWCD), the entity that holds Santa Barbara's SWP contract. Table 5 shows the shares further allocated to CCWA participants. Invoices to the SBCFCWCD show only a single additional charge for each share of the Twin Tunnels financing costs. These will be passed on to the CCWA participants based on proportionate shares of Table A amounts.

Table 4
Annual Costs Allocated to SBCFCWCD (CCWA)
$Million/yr.

SB Co. %	SWP/CVP Share			
Allocation	Low (55/45)	Low (100/0)	High (55/45)	High (100/0)
1.1%	7.7	14	15	27.3
3.4%	23.4	43.3	46.4	84.3

In Table 5, "no participation" by the CVP, (100/0), was excluded because the costs are untenable for Santa Barbara County. (See Table 4).

Table 5
Annual Costs to CCWA Participants (Participant Budget Impacts)
$Million/yr.

	SWP/CVP Share			
SB Co. % Allocation	Low (55/45)	High (55/45)	Low (55/45)	High (55/45)
	at 3.4%	*at 3.4%*	*at 1.1%*	*at 1.1%*
Montecito	1.71	3.4	.56	1.1
SB City	1.71	3.4	.56	1.1
Carpinteria	1.14	2.27	.38	.74
Goleta	2.57	5.10	.84	1.65
Santa Maria	9.36	18.5	3.04	6.00

As a state water contractor, Santa Barbara County will be required to make all payments necessary to recover its portion of the state's bond costs for constructing and operating the Twin Tunnels project. Tables 4 and 5 demonstrate these impacts will significantly inpact Santa Barbara County and CCWA participants. Participation will likely result in even greater water rate increases to cover the costs of a project that will not provide additional water supplies.

Steadily increasing water rates already have spurred fierce resistance from local ratepayers. The additional financial burden of the Twin Tunnels may result in ratepayer revolts through local elections or remedies provided by Proposition 218 to challenge fee increases. The statement from the 2006-07 Santa Barbara County Grand Jury Report on the Carpinteria Valley Water District is thus relevant to all County water agencies:

"Coupled with the expense of State Water option, which it does not need and uses little, the district is strapped with non-operational yearly expenses which exceed $5 million... giving rise to high water rates."

Budgetary Impacts

The cost allocations presented in Table 5 are examined from the perspective of water district budgets. This represents the impacts of the proposed Twin Tunnels. The following pie charts, one set for each district plus a set for Santa Maria, show the proportions of budgets that would be allocated to the SWP and the Twin Tunnels for each district under the assumptions of high and low construction costs. The pie charts in figures 8A-12B use the year 2014 as a baseline for all the costs not accounted by the SWP and the Twin Tunnels. These impacts reflect the degree of exposure for each district based on SWP Table A allocation relative to non-SWP sources of supply.

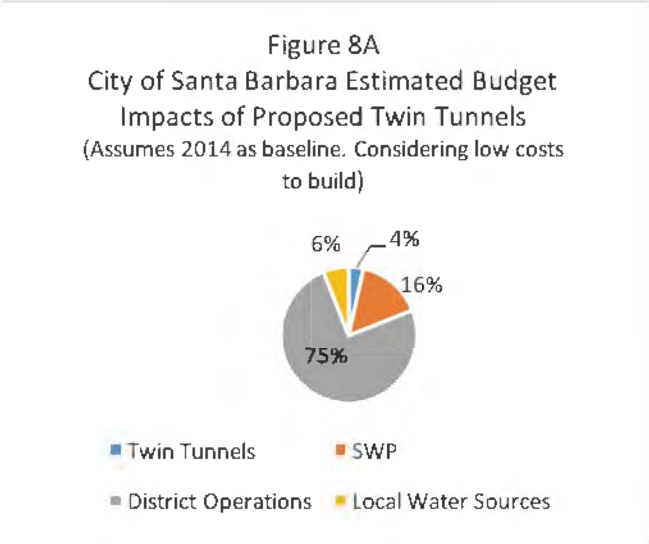


Figure 8A
City of Santa Barbara Estimated Budget Impacts of Proposed Twin Tunnels
(Assumes 2014 as baseline. Considering low costs to build)

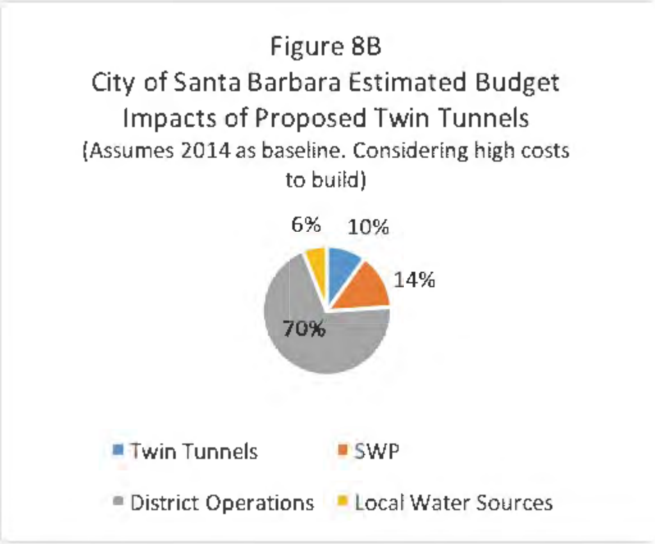


Figure 8B
City of Santa Barbara Estimated Budget Impacts of Proposed Twin Tunnels
(Assumes 2014 as baseline. Considering high costs to build)

Figure 9A
Carpinteria Estimated Budget Impacts of Proposed Twin Tunnels
(Assumes 2014 as baseline. Considering low costs to build)

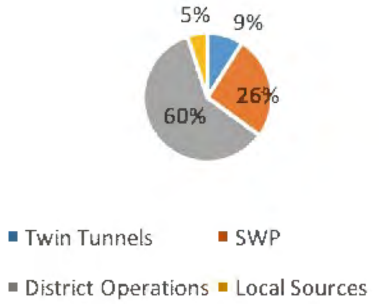


Figure 9B
Carpinteria Estimated Budget Impacts of Proposed Twin Tunnels
(Assumes 2014 as baseline. Considering high costs to build)

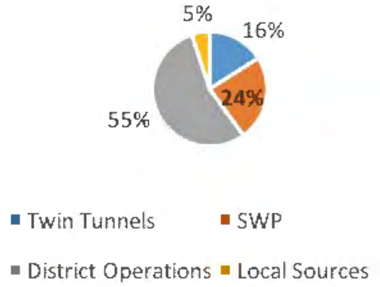


Figure 10A
Montecito Estimated Budget Impacts of Proposed Twin Tunnels
(Assumes 2014 as baseline. Considering low costs to build)

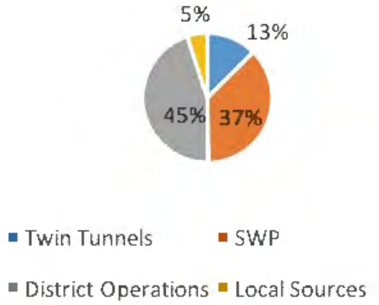


Figure 10B
Montecito Estimated Budget Impacts of Proposed Twin Tunnels
(Assumes 2014 as baseline. Considering high costs to build)

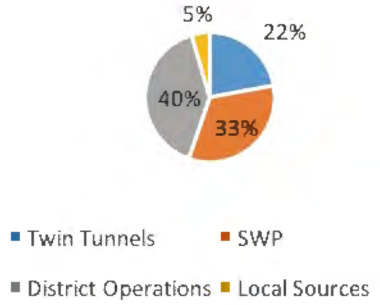


Figure 11A
Goleta Estimated Budget Impacts of Proposed Twin Tunnels
(Assumes 2014 as baseline. Considering low costs to build)

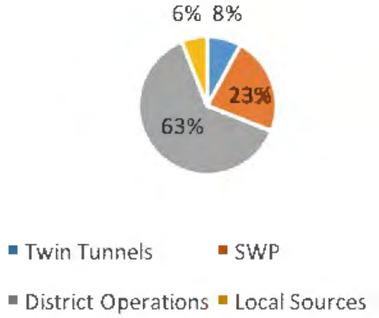
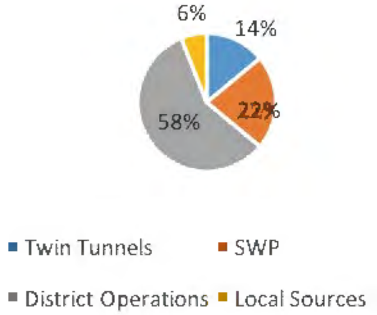


Figure 11B
Goleta Estimated Budget Impacts of Proposed Twin Tunnels
(Assumes 2014 as baseline. Considering high costs to build)



Santa Maria has a large Table A allocation and is thus likely to have a very large allocation of and more significant exposure to Twin Tunnels costs:

Figure 12A
Santa Maria Estimated Budget Impacts of Proposed Twin Tunnels
(Assumes 2014 as baseline. Considering low costs to build)

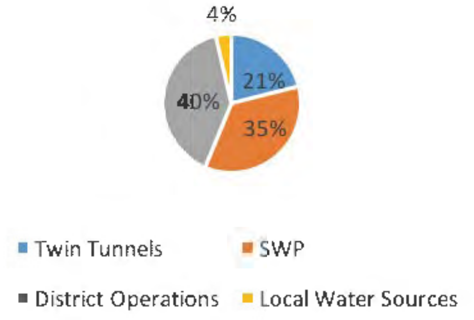
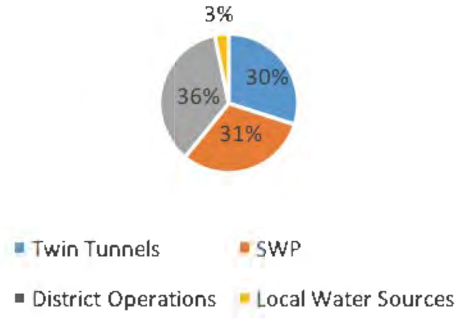


Figure 12B
Santa Maria Estimated Budget Impacts of Proposed Twin Tunnels
(Assumes 2014 as baseline. Considering high costs to build)



Cost Estimating Risk

The estimates provided above are based on the analyses of ECONorthwest as presented in Appendix A. Those analyses in turn are based on the best available information from project proponents: Bay Delta Conservation Plan (BDCP), DWR studies, and input from SWP contractors. That information is meager at best. Detailed investigations of tunneling to support competent engineering designs, which is a first order cost driver for the project, have not yet been completed. Without such designs it in unlikely that initial cost estimates are very accurate. The financing plan originally articulated in the March 12, 2012, BDCP, "Economic Benefits and Financing Strategies" has been used by ECONorthwest to develop the cost impacts of the project (Appendix A).

The BDCP estimated a 10 to 12 year construction period; that means 10 to 12 years of construction costs are accumulated before any tangible water delivery benefits are produced. The financing strategy proposes to capitalize only two years of the bond interest accumulated over the construction period; project participants are expected to cover the major fraction of the bond financing during the construction period. These costs are considerable. According to the spreadsheets prepared by ECONorthwest, these uncapitalized interest costs, when allocated to the SBCFCWCD accumulate to $45 M and $135 M for the low case at 1.1% and 3.4% respectively. Correspondingly, the amounts for the high case are $99 M and $308 M. These amounts equate to 20% to 24% of the estimated project costs without capitalized interest. Accordingly, all the values presented in Tables 4 and 5 would be increased by these percentages if it is determined that construction interest should be fully capitalized. This determination should be made by the project participants, the SWP contractors. It should also be a concern for the bond issuers and the bond buyers.

Twin Tunnels Benefits

The benefits of the Twin Tunnels project must be measured by its likelihood of improving the delivery of SWP and CVP water.

According to the analysis in Appendix B, at least half of the years in the 100-year record of the Sacramento River watershed will be dry. Of those years, half are too dry to confidently allow much, if any, export. In the other half of the dry years, if we account for senior water rights in the Delta and Sacramento Valley and provide for sufficient outflow to maintain Delta health, it is very unlikely that the dry group exports can exceed 2 million acre-feet. During droughts, 4-5 dry years can occur in sequences; therefore the project must be operated to provide a reliable yield under these circumstances; in effect a **safe yield** operation**. Because the Twin Tunnels proposes only to capture excess flows during wet years, it can make no claim to improve reliability.**

Project proponents claim the Twin Tunnels will improve the State's ability to capture and store the excess run-off that occurs in wet years. Wet years comprise 44% of the 100-year run-off record as shown in Appendix B; however, **the Twin Tunnels project involves no new storage.** Project supporters claim ground water basins in the San Joaquin Valley can be used to store significant amounts of water. But these basins are neither SWP nor CVP facilities. **Storing water there would amount to a privatization of project waters. Santa Barbara water districts have just witnessed the monopolistic windfall profits water privateers reap by selling to distressed water districts during drought periods.** These circumstances are at a complete variance with what voters were told in 1991.

The SWP did acquire a large ground water basin in Kern County for the specific purpose of improving SWP deliveries as part of their contractual obligations. But this basin ultimately was transferred to the Kern Water Bank Authority, a quasi-public district controlled by a non-SWP party. Water from this basin has been sold to water districts at monopoly prices though the current drought. If the SWP had continued to own and operate the basin, the costs of the water through the drought would be governed by SWP contractual pricing. It is this aspect of the Twin Tunnels project that is most disquieting**. It potentially allows the privatization of large amounts of project water with no guarantee of price limitations of any sort. Without a complementary SWP storage element south of the Delta, the Twin Tunnels provide no benefit to SWP contractors.**

Potential Benefits

Since there is **no public storage component south of the Delta** as part of the project, it is inconceivable that the Tunnels will deliver any new water. It could provide the capability to continue deliveries of SWP and CVP water south in the event of possible levee failures due to earthquakes, although the integrity of the delivery system itself may be jeopardized by such an event. Its merits as a hedge against climate change and consequent sea level rise are even less certain. **C-WIN sees no benefits for Santa Barbara County water users from the Twin Tunnels.**

7) CONCLUSIONS

C-WIN has documented the fundamental problems associated with the importation and distribution of SWP water. These findings have shown the ominous fiscal consequences for Santa Barbara County generally and for the South Coast water districts specifically: The City of Santa Barbara, Goleta, Carpinteria and Montecito. Costs estimated for construction of Governor Brown's Twin Tunnel/ CA WaterFix would add to the burden, forcing these agencies even closer to insolvency. Meanwhile ratepayers are responding to the price elasticity of supply and demand by using less water, resulting in declining district revenue.

Costs

For Water Districts:

- Presently, significant portions of water district budgets must be dedicated to the fixed costs of State Water Project delivery infrastructure and expenses.
- The four South Coast water districts addressed in this report presently have great difficulty with cost recovery, and the consequent drawdown of cash reserves signals that they are operating at a continuing deficit.
- All the districts in this study experience high effective unit costs for SWP water; this applies to normal years, but spikes during drought years when water supplies decrease.
- The Twin Tunnels will add significantly to these present burdens with no prospect of commensurate benefits.

For Both Ratepayers and Water Districts:

- Agencies have increased water rates substantially and local customers and ratepayers will see continued appreciation in water rates to cover ongoing State Water Project costs especially with Twin Tunnels' burdens added in. To recover all costs and rebuild reserves without going into additional debt, the water agencies would need to continue increasing monthly water service (i.e., fixed access) charges.
- Increased water rates and drought awareness have increased water conservation; this reduces revenue, incentivizing larger water users to turn to private sources, e.g. wells.
- Water districts are paying high fixed and operational costs for state water they either don't take, or take in small amounts. In times of need such as our current drought, state water is either unavailable or available only in deeply reduced allocations. The Twin Tunnels will only make this circumstance worse.

Approval and construction of the Twin Tunnels is not inevitable. This report finds that the extra costs of the project will produce significant budgetary impacts and no benefit.

We fear that it is too late for Santa Barbara County and its water agencies to withdraw from the burdensome financial obligations that they have incurred by connecting to the State Water Project. However, it is not too late to withdraw from the Bay-Delta Conservation Plan/CA WaterFix and any subsequent plan to construct tunnels under or around the Sacramento-San Joaquin Bay Delta. Santa Barbara County needs its financial resources to explore and create alternative water conservation projects and new local water resources such as desalination.

APPENDIX A

California WaterFix:

Potential Costs to Santa Barbara County

July 2016

Prepared for:

California Water Impact Network

FINAL REPORT

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ECONOMICS • FINANCE • PLANNING

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Acknowledgments

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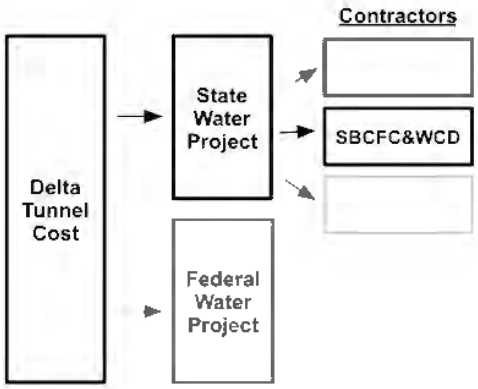
Introduction

In this report we summarize our analysis of the potential costs of the California WaterFix project to Santa Barbara County Flood Control and Water Conservation District (SBCFC&WCD). Our study has two primary scenarios: a low-cost scenario and a high-cost scenario. For each of these scenarios, we conduct several analyses using alternative assumptions about (1) how the costs of the WaterFix project would be allocated between the State and Federal Water Projects and (2) how the costs allocated to the State Water Project would be distributed among the 29 contractors (including SBCFC&WCD) participating in the State Water Project. (See Figure 1 below).

Figure 1. Flow of Costs of the Bay-Delta Conveyance Structure to Santa Barbara County Flood Control and Water Conservation District



Source: ECONorthwest

I. Cost of California WaterFix Project

In this section we describe our calculations of the cost of building and operating the California WaterFix project. We base our calculations on publicly available information about the project's costs.

The costs of the project would be paid, at least in part, by the State Water Project (SWP). The SWP would, in turn, pass the costs along to the 29 contractors that participate in the SWP. Ultimately, ratepayers, including those in Santa Barbara County, would bear the burden of paying for the project.

Given the preliminary nature of the available cost information, we conducted our analysis using two primary scenarios: a low-cost scenario and a high-cost scenario, as we describe below and in Table 1.

A. Low-Cost Scenario (Excluding Finance Charges)

Information from the California Natural Resources Agency (CNR) released in June 2016 identifies the estimated cost of the California WaterFix project. According to CNR, the project's design, construction, O&M, and related mitigation cost is an estimated $17.1 billion (in 2014 dollars).[1] We use this estimated cost in the low-cost scenario. Additional detail about the construction and mitigation costs (but not the O&M costs) is included in a January 2016 agreement between the Department of Water Resources and the Conveyance Project Coordination Agency.[2] We gleaned additional information about the costs by reviewing the cost data, and underlying documentation, for the previous proposals.[3]

We adjusted the costs to account for likely inflation of costs between the time of the cost estimate, 2014, and the estimated year construction would begin. For the design and construction costs, we also account for inflation during the 10-year construction period. For purposes of our analysis, we inflate the $17.1 billion in costs (in 2014 dollars) by applying an annual inflation rate of 2 percent, which is the same inflation rate used in previous analyses of the BDCP.[4] As Table 1 shows, the result is $20.3 billion (in 2017 dollars).

B. High-Cost Scenario (Excluding Finance Charges)

To address the uncertainty associated with the cost estimates, we use a high-cost estimate with double the design and construction costs of the low-cost estimate. As Table 1 shows, we use the same mitigation and O&M costs as in the low-cost estimate. Cost overruns on large construction projects are not uncommon. In its analysis of the costs of the WaterFix project, the San Diego Water Authority also used a high-cost estimate that was twice the size of the low-cost estimate to help capture the uncertainty associated with the cost estimates.[5] For purposes of this analysis, we use a high-cost estimate of $38.2 billion (in 2017 dollars).

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[1] California Natural Resources Agency. 2016. "Fast Facts." June. Accessed at http://www.californiawaterfix.com/.

[2] State of California, Department of Water Resources and Conveyance Project Coordination Agency. 2016. "Agreement Regarding Construction of Conveyance Project Between the Department of Water Resources and the Conveyance Project Coordination Agency." January. Accessed at http://www.californiawaterfix.com/resources/design-and-construction-enterprise/.

[3] *See*, for example, California Department of Water Resources. 2013. *Bay Delta Conservation Plan. Public Draft. November.* Sacramento, CA. Prepared by ICF International (ICF 00343.12). Sacramento, CA; and California Department of Water Resources. 2012. *Bay Delta Conservation Plan. Administrative Draft. November.* Sacramento, CA. Prepared by ICF International. Sacramento, CA.

[4] Ibid.

[5] San Diego County Water Authority. 2015. "Bay Delta Conservation Plan/California WaterFix: Potential Cost Impact to the Water Authority." December.

Table 1. California WaterFix: Low-Cost and High-Cost Scenarios without Financing Costs

		Design & Construction	Mitigation	O&M	Finance Costs	Total
Low-Cost Scenario	2014 $	$14.9 billion	$796 million	$1.4 billion	Not included	**$17.1 billion**
	2017 $	$17.9 billion	$845 million	$1.49 billion	Not included	**$20.3 billion**
High-Cost Scenario	2017 $	$35.8 billion	$845 million	$1.49 billion	Not included	**$38.2 billion**

Source: "Low Cost Scenario" data are from CNR "Fast Facts"
"High Cost Scenario" data are based on calculations by ECONorthwest.
Note: all dollar values are undiscounted.

II. Financing California WaterFix

The most recent publicly available information about the WaterFix project does not include details on how the project would be financed. For purposes of this analysis, we assume the project would be financed similar to the financing plan outlined for the project in the Bay Delta Conservation Plan (BDCP).[6] According to this plan, four revenue bonds would be used to finance the design and construction elements of the project.[7] Each bond would fund a portion of these costs over time. All of the bonds would have a period of capitalized interest and a 40-year pay-back period, with interest rates ranging from 6.132 to 6.135 percent.[8]

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[6] *See,* for example, California Department of Water Resources. 2013. *Bay Delta Conservation Plan. Public Draft. November.* Sacramento, CA. Prepared by ICF International (ICF 00343.12). Sacramento, CA; California Department of Water Resources. 2012. *Bay Delta Conservation Plan. Administrative Draft. November.* Sacramento, CA. Prepared by ICF International. Sacramento, CA; and Southern California Water Committee and The PFM Group. 2012. *Bay Delta Conservation Plan: Economic Benefits and Financing Strategies*. March.

[7] As we understand, these bonds would be issued by DWR. Financing costs would be different if the contractors had to issue separate bonds for their shares.

[8] These interest rates represent the "all in true interest cost." *See,* for example, California Department of Water Resources. 2013. *Bay Delta Conservation Plan. Public Draft. November.* Sacramento, CA. Prepared by ICF International (ICF 00343.12). Sacramento, CA; and California Department of Water Resources. 2012. *Bay Delta Conservation Plan. Administrative Draft. November.* Sacramento, CA. Prepared by ICF International. Sacramento, CA.

Table 2. Overall Costs of California WaterFix, with Finance Costs Included

	Design & Construction	Mitigation	O&M	Finance Costs	Total	Annual Cost
Low-Cost Scenario	$17.9 billion	$845 million	$1.49 billion	$30.5 billion	**$50.8 billion**	**$1.27 billion**
High-Cost Scenario	$35.8 billion	$845 million	$1.49 billion	$61.1 billion	**$99.2 billion**	**$2.48 billion**

Source: ECONorthwest.

Table 2 shows the financing costs associated with the two cost scenarios. Adding the costs of financing brings the overall cost of the low-cost scenario to $50.8 billion and the high-cost scenario to $99.2 billion. It also shows, for budgeting purposes, the peak annual costs associated with payments on the bonds and the mitigation and O&M costs. See the Appendix for more detailed tables of results.

III. Allocation of Costs Between State and Federal Water Projects

In this section we calculate the share of the overall WaterFix costs that would be allocated to the State Water Project (SWP). This is the first step in identifying the potential costs that the SBCFC&WCD would bear.

Based on the information we have reviewed, we assume that the State and Federal Water Projects would share the costs of California WaterFix.[9] Although the split between the state and federal projects has not been determined, there is precedent for a 55/45 cost share ratio (the SWP would pay 55 percent of the cost, and the federal project would pay 45 percent of the cost).[10] Therefore, for one set of calculations, we assume the SWP would be allocated 55 percent of the overall cost. We also run a second set of calculations using an assumption that the SWP would pay 100 percent of the cost.

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[9] According to the California Natural Resources Agency, "state/federal funding" may also cover an unidentified portion of the $1.4 billion O&M. *See* California Natural Resources Agency. 2016. "Fast Facts." June. Accessed at http://www.californiawaterfix.com/.

[10] California Department of Water Resources. 2013. *Bay Delta Conservation Plan. Public Draft. November.* Sacramento, CA. Prepared by ICF International (ICF 00343.12). Sacramento, CA. *See also,* San Diego County Water Authority. 2015. "Bay Delta Conservation Plan/California WaterFix: Potential Cost Impact to the Water Authority." December.

Table 3. State Water Project Share of California WaterFix Costs

	SWP Share	Total
Low-Cost Scenario	55	$27.9 billion
	100	$50.8 billion
High-Cost Scenario	55	$54.6 billion
	100	$99.2 billion

Source: ECONorthwest.

Table 3 shows that the SWP would bear $27.9 billion to $99.2 billion of costs for the project, depending on how the cost estimates would be allocated between the State and Federal Water Projects.

IV. Allocation of Costs to State Water Contractors

In this section we calculate the potential costs that the Santa Barbara County Flood Control and Water Conservation District (SBCFC&WCD) would bear. We assume that the State Water Project would pass the WaterFix costs onto its 29 contractors, including SBCFC&WCD.

For this part of the analysis, we allocated the costs in two different ways. First, we allocated the costs based on SBCFC&WCD's share of the water allotment from the State Water Project. We used the "Table A" maximum amount. SBCFC&WCD has a maximum volume of 45,486 acre-feet, which is 1.1 percent of the total maximum volume of the State Water Project.[11] Therefore, one set of our calculations is based on allocating 1.1 percent of the SWP's WaterFix costs to SBCFC&WCD.

Second, we used a different allocation of costs, based on SBCFC&WCD's share of total payments to the SWP. According to the latest data available, SBCFC&WCD payments account for 3.4 percent of the total payments to the SWP through 2013.[12] Therefore, a second set of our calculations is based on allocating 3.4 percent of the SWP's WaterFix costs to SBCFC&WCD.

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[11] California Department of Water Resources. 2016. "California State Water Project Contractors: Maximum Table A Amounts." January. Accessed at www.water.ca.gov/swpao.

[12] California Department of Water Resources. 2015. *Management of the California State Water Project.* Bulletin 132-14. November.

Table 4. Allocation of Costs to SBCFC&WCD

	SWP 55/45		SWP 100	
SBCFC&WCD Share:	1.1%	3.4%	1.1%	3.4%
Low-Cost Scenario	$304 million	$554 million	$944 million	$1.7 billion
High-Cost Scenario	$595 million	$1.08 billion	$1.84 billion	$3.35 billion

Source: ECONorthwest.

Table 4 shows SBCFC&WCD's shares of the California WaterFix costs. The results range from $304 million to $3.35 billion using the different allocation assumptions for the SWP allocations and, in turn, for the SBCFC&WCD allocations.

Summary

This analysis provides a range of results identifying SBCFC&WCD's potential share of the costs of the California WaterFix project over a 10-year construction period and 40 years of operations.

Based on the low-cost scenario of $50.8 billion in overall costs, SBCFC&WCD would bear costs ranging from $304 million to $1.7 billion depending on how the costs are allocated to the SWP and to SBCFC&WCD.

Based on the high-cost scenario of $99.2 billion in overall costs, SBCFC&WCD would bear costs ranging from $595 million to $3.35 billion depending on how the costs are allocated to the SWP and to SBCFC&WCD.[13]

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[13] See the Appendix for more detailed tables of results.

Appendix: Detailed Tables

Total Payments, Low-Cost Scenario

								SWP Pays	SWP Pays	SB % of SWP (vol)	SB % of SWP (vol)	SB % of SWP ($)	SB % of SWP ($)
								55%	100%	1.1%	1.1%	3.4%	3.4%
Date	1st Series Payment	2nd Series Payment	3rd Series Payment	4th Series Payment	O&M	Mitigation	Total	Cost Paid by SWP (55/45)	Cost Paid by SWP (SWP 100)	Cost Paid by SB (55/45)	Cost Paid by SB (SWP 100)	Cost Paid by SB (55/45)	Cost Paid by SB (SWP 100)
6/1/17	-	-	-	-		$68,128,450	$68,128,450	$37,470,648	$68,128,450	$408,454	$742,643	$1,266,256	$2,302,284
6/1/18	$295,065,303	-	-	-		$70,839,023	$365,904,326	$201,247,379	$365,904,326	$2,193,723	$3,988,588	$6,800,811	$12,365,111
6/1/19	$295,065,303	-	-	-		$70,839,023	$365,904,326	$201,247,379	$365,904,326	$2,193,723	$3,988,588	$6,800,811	$12,365,111
6/1/20	$295,065,303	$285,192,400	-	-		$40,621,645	$620,879,348	$341,483,641	$620,879,348	$3,722,387	$6,767,977	$11,539,856	$20,981,556
6/1/21	$295,065,303	$285,192,400	$436,328,085	-		$40,621,645	$1,057,207,433	$581,464,088	$1,057,207,433	$6,338,325	$11,524,228	$19,649,585	$35,726,518
6/1/22	$295,065,303	$285,192,400	$436,328,085	-		$40,621,645	$1,057,207,433	$581,464,088	$1,057,207,433	$6,338,325	$11,524,228	$19,649,585	$35,726,518
6/1/23	$295,065,303	$285,192,400	$436,328,085	$194,767,054		$40,603,737	$1,251,956,580	$688,576,119	$1,251,956,580	$7,505,914	$13,647,117	$23,269,253	$42,307,732
6/1/24	$295,065,303	$285,192,400	$436,328,085	$194,767,054		$39,962,417	$1,251,315,260	$688,223,393	$1,251,315,260	$7,502,069	$13,640,126	$23,257,333	$42,286,060
6/1/25	$295,065,303	$285,192,400	$436,328,085	$194,767,054		$39,962,417	$1,251,315,260	$688,223,393	$1,251,315,260	$7,502,069	$13,640,126	$23,257,333	$42,286,060
6/1/26	$295,065,303	$285,192,400	$436,328,085	$194,767,054		$34,798,759	$1,246,151,602	$685,383,381	$1,246,151,602	$7,471,111	$13,583,839	$23,161,359	$42,111,563
6/1/27	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$25,620,645	$32,088,186	$1,269,061,674	$697,983,921	$1,269,061,674	$7,608,465	$13,833,573	$23,587,173	$42,885,769
6/1/28	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$25,620,645	$32,088,186	$1,269,061,674	$697,983,921	$1,269,061,674	$7,608,465	$13,833,573	$23,587,173	$42,885,769
6/1/29	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$25,620,645	$20,964,010	$1,257,937,498	$691,865,624	$1,257,937,498	$7,541,772	$13,712,312	$23,380,416	$42,509,847
6/1/30	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$25,620,645	$20,964,010	$1,257,937,498	$691,865,624	$1,257,937,498	$7,541,772	$13,712,312	$23,380,416	$42,509,847
6/1/31	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$25,620,645	$20,964,010	$1,257,937,498	$691,865,624	$1,257,937,498	$7,541,772	$13,712,312	$23,380,416	$42,509,847
6/1/32	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228	$20,964,010	$1,271,105,080	$699,107,794	$1,271,105,080	$7,620,716	$13,855,847	$23,625,153	$42,954,823
6/1/33	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228	$20,964,010	$1,271,105,080	$699,107,794	$1,271,105,080	$7,620,716	$13,855,847	$23,625,153	$42,954,823
6/1/34	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228	$20,964,010	$1,271,105,080	$699,107,794	$1,271,105,080	$7,620,716	$13,855,847	$23,625,153	$42,954,823
6/1/35	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228	$20,964,010	$1,271,105,080	$699,107,794	$1,271,105,080	$7,620,716	$13,855,847	$23,625,153	$42,954,823
6/1/36	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228	$20,964,010	$1,271,105,080	$699,107,794	$1,271,105,080	$7,620,716	$13,855,847	$23,625,153	$42,954,823
6/1/37	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228	$20,964,010	$1,271,105,080	$699,107,794	$1,271,105,080	$7,620,716	$13,855,847	$23,625,153	$42,954,823
6/1/38	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228	$20,964,010	$1,271,105,080	$699,107,794	$1,271,105,080	$7,620,716	$13,855,847	$23,625,153	$42,954,823
6/1/39	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228	$20,964,010	$1,271,105,080	$699,107,794	$1,271,105,080	$7,620,716	$13,855,847	$23,625,153	$42,954,823
6/1/40	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228	$20,964,010	$1,271,105,080	$699,107,794	$1,271,105,080	$7,620,716	$13,855,847	$23,625,153	$42,954,823
6/1/41	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228	$20,964,010	$1,271,105,080	$699,107,794	$1,271,105,080	$7,620,716	$13,855,847	$23,625,153	$42,954,823
6/1/42	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228	$20,964,010	$1,271,105,080	$699,107,794	$1,271,105,080	$7,620,716	$13,855,847	$23,625,153	$42,954,823
6/1/43	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228		$1,250,141,070	$687,577,589	$1,250,141,070	$7,495,030	$13,627,326	$23,235,509	$42,246,380
6/1/44	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228		$1,250,141,070	$687,577,589	$1,250,141,070	$7,495,030	$13,627,326	$23,235,509	$42,246,380
6/1/45	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228		$1,250,141,070	$687,577,589	$1,250,141,070	$7,495,030	$13,627,326	$23,235,509	$42,246,380
6/1/46	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228		$1,250,141,070	$687,577,589	$1,250,141,070	$7,495,030	$13,627,326	$23,235,509	$42,246,380
6/1/47	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228		$1,250,141,070	$687,577,589	$1,250,141,070	$7,495,030	$13,627,326	$23,235,509	$42,246,380
6/1/48	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228		$1,250,141,070	$687,577,589	$1,250,141,070	$7,495,030	$13,627,326	$23,235,509	$42,246,380
6/1/49	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228		$1,250,141,070	$687,577,589	$1,250,141,070	$7,495,030	$13,627,326	$23,235,509	$42,246,380
6/1/50	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228		$1,250,141,070	$687,577,589	$1,250,141,070	$7,495,030	$13,627,326	$23,235,509	$42,246,380
6/1/51	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228		$1,250,141,070	$687,577,589	$1,250,141,070	$7,495,030	$13,627,326	$23,235,509	$42,246,380
6/1/52	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228		$1,250,141,070	$687,577,589	$1,250,141,070	$7,495,030	$13,627,326	$23,235,509	$42,246,380
6/1/53	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228		$1,250,141,070	$687,577,589	$1,250,141,070	$7,495,030	$13,627,326	$23,235,509	$42,246,380
6/1/54	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228		$1,250,141,070	$687,577,589	$1,250,141,070	$7,495,030	$13,627,326	$23,235,509	$42,246,380
6/1/55	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228		$1,250,141,070	$687,577,589	$1,250,141,070	$7,495,030	$13,627,326	$23,235,509	$42,246,380
6/1/56	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228		$1,250,141,070	$687,577,589	$1,250,141,070	$7,495,030	$13,627,326	$23,235,509	$42,246,380
6/1/57	$295,065,303	$285,192,400	$436,328,085	$194,767,054	$38,788,228		$1,250,141,070	$687,577,589	$1,250,141,070	$7,495,030	$13,627,326	$23,235,509	$42,246,380
6/1/58	-	$285,192,400	$436,328,085	$194,767,054	$38,788,228		$955,075,767	$525,291,672	$955,075,767	$5,726,011	$10,410,928	$17,751,334	$32,275,152
6/1/59	-	$285,192,400	$436,328,085	$194,767,054	$38,788,228		$955,075,767	$525,291,672	$955,075,767	$5,726,011	$10,410,928	$17,751,334	$32,275,152
6/1/60	-	-	$436,328,085	$194,767,054	$38,788,228		$669,883,367	$368,435,852	$669,883,367	$4,016,183	$7,302,151	$12,450,660	$22,637,563
6/1/61	-	-	-	$194,767,054	$38,788,228		$233,555,282	$128,455,405	$233,555,282	$1,400,245	$2,545,900	$4,340,931	$7,892,601
6/1/62	-	-	-	$194,767,054	$38,788,228		$233,555,282	$128,455,405	$233,555,282	$1,400,245	$2,545,900	$4,340,931	$7,892,601
6/1/63	-	-	-	-	$38,788,228		$38,788,228	$21,333,525	$38,788,228	$232,549	$422,816	$720,930	$1,310,782
6/1/64	-	-	-	-	$38,788,228		$38,788,228	$21,333,525	$38,788,228	$232,549	$422,816	$720,930	$1,310,782
6/1/65	-	-	-	-	$38,788,228		$38,788,228	$21,333,525	$38,788,228	$232,549	$422,816	$720,930	$1,310,782
6/1/66	-	-	-	-	$38,788,228		$38,788,228	$21,333,525	$38,788,228	$232,549	$422,816	$720,930	$1,310,782
						TOTAL	**$50,784,476,175**	**$27,931,461,896**	**$50,784,476,175**	**$304,470,557**	**$553,582,830**	**$943,895,995**	**$1,716,174,537**

Total Payments, High-Cost Scenario

								SWP Pays	SWP Pays	SB % of SWP (vol)	SB % of SWP (vol)	SB % of SWP ($)	SB % of SWP ($)
								55%	100%	1.1%	1.1%	3.4%	3.4%
Date	1st Series Payment	2nd Series Payment	3rd Series Payment	4th Series Payment	O&M	Mitigation	Total	Cost Paid by SWP (55/45)	Cost Paid by SWP (SWP 100)	Cost Paid by SB (55/45)	Cost Paid by SB (SWP 100)	Cost Paid by SB (55/45)	Cost Paid by SB (SWP 100)
6/1/17	-	-	-	-		$68,128,450	$68,128,450	$37,470,648	$68,128,450	$408,454	$742,643	$1,266,256	$2,302,284
6/1/18	$590,130,606	-	-	-		$70,839,023	$660,969,629	$363,533,296	$660,969,629	$3,962,742	$7,204,986	$12,284,986	$22,336,338
6/1/19	$590,130,606	-	-	-		$70,839,023	$660,969,629	$363,533,296	$660,969,629	$3,962,742	$7,204,986	$12,284,986	$22,336,338
6/1/20	$590,130,606	$570,384,800	-	-		$40,621,645	$1,201,137,051	$660,625,378	$1,201,137,051	$7,201,233	$13,093,152	$22,324,705	$40,590,373
6/1/21	$590,130,606	$570,384,800	$872,656,171	-		$40,621,645	$2,073,793,221	$1,140,586,272	$2,073,793,221	$12,433,110	$22,605,654	$38,544,163	$70,080,296
6/1/22	$590,130,606	$570,384,800	$872,656,171	-		$40,621,645	$2,073,793,221	$1,140,586,272	$2,073,793,221	$12,433,110	$22,605,654	$38,544,163	$70,080,296
6/1/23	$590,130,606	$570,384,800	$872,656,171	$389,534,109		$40,603,737	$2,463,309,422	$1,354,820,182	$2,463,309,422	$14,768,395	$26,851,627	$45,783,831	$83,243,330
6/1/24	$590,130,606	$570,384,800	$872,656,171	$389,534,109		$39,962,417	$2,462,668,102	$1,354,467,456	$2,462,668,102	$14,764,550	$26,844,636	$45,771,912	$83,221,658
6/1/25	$590,130,606	$570,384,800	$872,656,171	$389,534,109		$39,962,417	$2,462,668,102	$1,354,467,456	$2,462,668,102	$14,764,550	$26,844,636	$45,771,912	$83,221,658
6/1/26	$590,130,606	$570,384,800	$872,656,171	$389,534,109		$34,798,759	$2,457,504,444	$1,351,627,444	$2,457,504,444	$14,733,592	$26,788,349	$45,675,938	$83,047,161
6/1/27	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$25,620,645	$32,088,186	$2,480,414,516	$1,364,227,984	$2,480,414,516	$14,870,946	$27,038,083	$46,101,752	$83,821,367
6/1/28	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$25,620,645	$32,088,186	$2,480,414,516	$1,364,227,984	$2,480,414,516	$14,870,946	$27,038,083	$46,101,752	$83,821,367
6/1/29	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$25,620,645	$20,964,010	$2,469,290,340	$1,358,109,687	$2,469,290,340	$14,804,252	$26,916,823	$45,894,995	$83,445,445
6/1/30	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$25,620,645	$20,964,010	$2,469,290,340	$1,358,109,687	$2,469,290,340	$14,804,252	$26,916,823	$45,894,995	$83,445,445
6/1/31	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$25,620,645	$20,964,010	$2,469,290,340	$1,358,109,687	$2,469,290,340	$14,804,252	$26,916,823	$45,894,995	$83,445,445
6/1/32	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228	$20,964,010	$2,482,457,923	$1,365,351,858	$2,482,457,923	$14,883,197	$27,060,358	$46,139,731	$83,890,421
6/1/33	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228	$20,964,010	$2,482,457,923	$1,365,351,858	$2,482,457,923	$14,883,197	$27,060,358	$46,139,731	$83,890,421
6/1/34	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228	$20,964,010	$2,482,457,923	$1,365,351,858	$2,482,457,923	$14,883,197	$27,060,358	$46,139,731	$83,890,421
6/1/35	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228	$20,964,010	$2,482,457,923	$1,365,351,858	$2,482,457,923	$14,883,197	$27,060,358	$46,139,731	$83,890,421
6/1/36	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228	$20,964,010	$2,482,457,923	$1,365,351,858	$2,482,457,923	$14,883,197	$27,060,358	$46,139,731	$83,890,421
6/1/37	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228	$20,964,010	$2,482,457,923	$1,365,351,858	$2,482,457,923	$14,883,197	$27,060,358	$46,139,731	$83,890,421
6/1/38	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228	$20,964,010	$2,482,457,923	$1,365,351,858	$2,482,457,923	$14,883,197	$27,060,358	$46,139,731	$83,890,421
6/1/39	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228	$20,964,010	$2,482,457,923	$1,365,351,858	$2,482,457,923	$14,883,197	$27,060,358	$46,139,731	$83,890,421
6/1/40	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228	$20,964,010	$2,482,457,923	$1,365,351,858	$2,482,457,923	$14,883,197	$27,060,358	$46,139,731	$83,890,421
6/1/41	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228	$20,964,010	$2,482,457,923	$1,365,351,858	$2,482,457,923	$14,883,197	$27,060,358	$46,139,731	$83,890,421
6/1/42	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228	$20,964,010	$2,482,457,923	$1,365,351,858	$2,482,457,923	$14,883,197	$27,060,358	$46,139,731	$83,890,421
6/1/43	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228		$2,461,493,913	$1,353,821,652	$2,461,493,913	$14,757,510	$26,831,837	$45,750,088	$83,181,978
6/1/44	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228		$2,461,493,913	$1,353,821,652	$2,461,493,913	$14,757,510	$26,831,837	$45,750,088	$83,181,978
6/1/45	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228		$2,461,493,913	$1,353,821,652	$2,461,493,913	$14,757,510	$26,831,837	$45,750,088	$83,181,978
6/1/46	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228		$2,461,493,913	$1,353,821,652	$2,461,493,913	$14,757,510	$26,831,837	$45,750,088	$83,181,978
6/1/47	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228		$2,461,493,913	$1,353,821,652	$2,461,493,913	$14,757,510	$26,831,837	$45,750,088	$83,181,978
6/1/48	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228		$2,461,493,913	$1,353,821,652	$2,461,493,913	$14,757,510	$26,831,837	$45,750,088	$83,181,978
6/1/49	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228		$2,461,493,913	$1,353,821,652	$2,461,493,913	$14,757,510	$26,831,837	$45,750,088	$83,181,978
6/1/50	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228		$2,461,493,913	$1,353,821,652	$2,461,493,913	$14,757,510	$26,831,837	$45,750,088	$83,181,978
6/1/51	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228		$2,461,493,913	$1,353,821,652	$2,461,493,913	$14,757,510	$26,831,837	$45,750,088	$83,181,978
6/1/52	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228		$2,461,493,913	$1,353,821,652	$2,461,493,913	$14,757,510	$26,831,837	$45,750,088	$83,181,978
6/1/53	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228		$2,461,493,913	$1,353,821,652	$2,461,493,913	$14,757,510	$26,831,837	$45,750,088	$83,181,978
6/1/54	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228		$2,461,493,913	$1,353,821,652	$2,461,493,913	$14,757,510	$26,831,837	$45,750,088	$83,181,978
6/1/55	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228		$2,461,493,913	$1,353,821,652	$2,461,493,913	$14,757,510	$26,831,837	$45,750,088	$83,181,978
6/1/56	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228		$2,461,493,913	$1,353,821,652	$2,461,493,913	$14,757,510	$26,831,837	$45,750,088	$83,181,978
6/1/57	$590,130,606	$570,384,800	$872,656,171	$389,534,109	$38,788,228		$2,461,493,913	$1,353,821,652	$2,461,493,913	$14,757,510	$26,831,837	$45,750,088	$83,181,978
6/1/58	-	$570,384,800	$872,656,171	$389,534,109	$38,788,228		$1,871,363,307	$1,029,249,819	$1,871,363,307	$11,219,472	$20,399,041	$34,781,738	$63,239,523
6/1/59	-	$570,384,800	$872,656,171	$389,534,109	$38,788,228		$1,871,363,307	$1,029,249,819	$1,871,363,307	$11,219,472	$20,399,041	$34,781,738	$63,239,523
6/1/60	-	-	$872,656,171	$389,534,109	$38,788,228		$1,300,978,507	$715,538,179	$1,300,978,507	$7,799,818	$14,181,487	$24,180,389	$43,964,344
6/1/61	-	-	-	$389,534,109	$38,788,228		$428,322,336	$235,577,285	$428,322,336	$2,567,941	$4,668,984	$7,960,932	$14,474,421
6/1/62	-	-	-	$389,534,109	$38,788,228		$428,322,336	$235,577,285	$428,322,336	$2,567,941	$4,668,984	$7,960,932	$14,474,421
6/1/63					$38,788,228		$38,788,228	$21,333,525	$38,788,228	$232,549	$422,816	$720,930	$1,310,782
6/1/64					$38,788,228		$38,788,228	$21,333,525	$38,788,228	$232,549	$422,816	$720,930	$1,310,782
6/1/65					$38,788,228		$38,788,228	$21,333,525	$38,788,228	$232,549	$422,816	$720,930	$1,310,782
6/1/66					$38,788,228		$38,788,228	$21,333,525	$38,788,228	$232,549	$422,816	$720,930	$1,310,782
						TOTAL	$99,238,589,870	$54,581,224,429	$99,238,589,870	$594,969,781	$1,081,763,239	$1,844,479,152	$3,353,598,459

Appendix B

SWP AND CVP OPERATIONS, THE INDICES THAT GOVERN THEM AND THEIR VALIDITY

By: Arve R. Sjovold
February 29, 2016

INTRODUCTION

In State Water Resources Control Board Decision 1485, an index was promulgated for the classifying of water year types. This index provides varied tables, and sets of values for a variety of Delta protection standards. No supporting analysis was cited to show how and why this index, and its, water year type derivative were established. The Water Year Index is specified by the following formula:

$$\text{INDEX} = 0.4*X + 0.3*Y + 0.3*Z$$

Where:
X = Current calendar year's April-July Sacramento Valley unimpaired run-off

Y = Current calendar year's October-March Sacramento Valley unimpaired run-off

Z = Previous calendar year's index

Once an index has been calculated, its value is used to determine one of five water year types: Wet, Above Normal, Below Normal, Dry, and Critical. This water year type designation is then used to set a multitude of water quality and flow standards throughout the Delta. Variations on this type of designation (e.g. the Shasta Index, American River Index, and the Trinity River Index) are also used in a multitude of operational and flow release standards for reservoirs throughout the Sacramento Basin. All of these indexes are used as well in the CALSIM II model.

D-1485 also specifies that when it is too early in the water year to have observations in hand for April-July and October-March, run-off forecast values should be based on “normal” precipitation for the unknown parts of the water year. “Normal” precipitation is not precisely defined, nor is it specified how it is to be used to calculate a value for run-off.

It is clear from a careful examination of the requirements of D-1485 that water year type is a very important parameter in managing the water resources of the Delta. Because of that high level of importance, it is fair to question both the reliability of this index and the wisdom of using it to manage the operation of the SWP and CVP.

SACRAMENTO BASIN HYDROLOGY

It is clear that the Water Year Index is profoundly dependent on the characteristics of the Sacramento Basin Hydrology. The three most important derivatives of that hydrology - particularly in regard to forecast reliability - are run-off flows for April-July and October-March, the reliance of the previous year's Water Year Index, and the notion of “normal” precipitation. If we take the statement “normal” precipitation to mean “normal” run-off, then we may perform some analyses to address these important characteristics.

A careful, quantitative examination of Sacramento Basin Hydrology was performed using the 4-river index as a surrogate for total Sacramento Basin run-off. Figure B-1 is a graph of the run-off history based on the 4-river index. A rudimentary look at the distribution of annual run-off from the 98-year record shows that the data divides into distinct groups; a drier year group comprising 56% of the years and a wet year group comprising 44% of the years as shown in figure B-2. Very few years are found near the average or “normal” value, in fact, the average value is at the relative minimum between the drier group and the wet group. Each of these groups does exhibit characteristics of a more normal distribution when taken separately.

Accordingly, each group was analyzed as a separate distribution and a statistical test was performed to determine the likelihood that they might actually be drawn from a single population. Table B-3 presents the characteristics of each of these groups.

Figure B-1
Sacramento 4 River Index
% of Historical Average

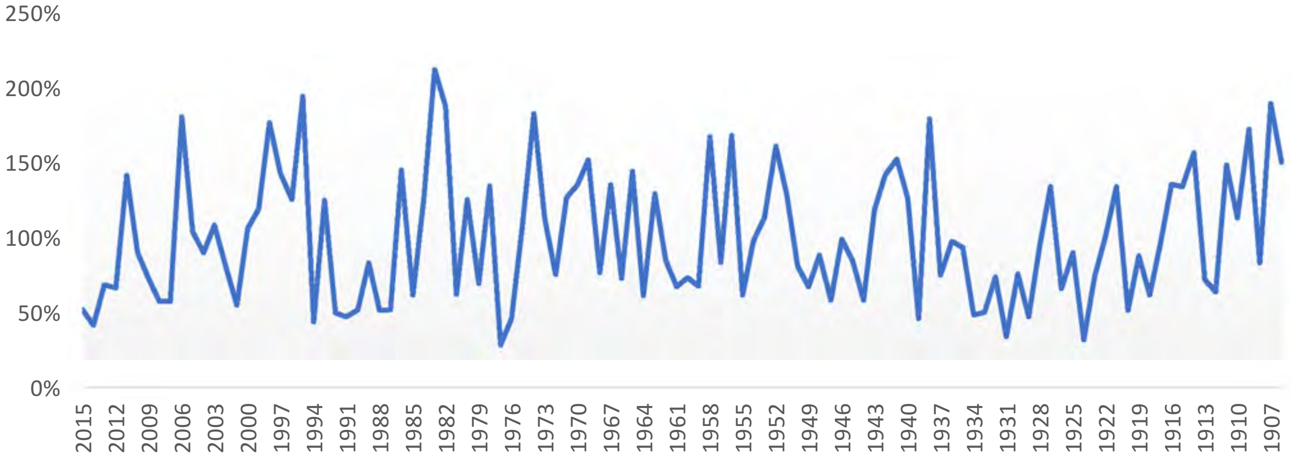


FIGURE B-2
ANNUAL SACRAMENTO 4-RIVER RUN-OFF,
98 YEARS

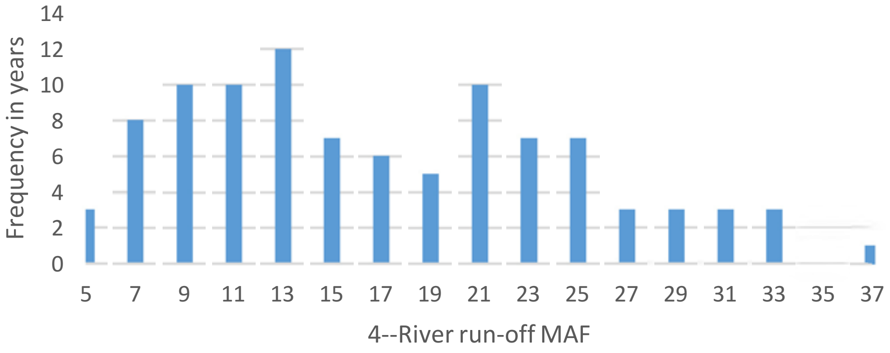


Table B-3
Statistical Characteristics of Wet and Dry Groups
4-River Index (MAF)

Dry	Wet

Mean	12.18	25.55
Standard Deviation	3.27	4.65
Std. Error of Mean	.441	.709

The standard t-test between means showed less than a 1% chance that the means of these two distributions came from a single population.

VALIDITY OF INDEXES

The water year index formula comprises three terms, two dealing with the current water year run-off and the third being a weighted run-off of the previous year's water year index. We investigated the validity and reliability of the three terms as predictors of the current water characteristics.

Influence of Previous Water Year

To test the validity of using the previous year's water year index, we determined if there was any significant serial correlation between successive years within the 98-year record of annual run-off. The serial correlation co-efficient [R] was found to be 0.084, which indicates no significant serial correlation, even though drought sequences of up to 5 years and wet sequences of several years were noted. (The probability that there was a real correlation was much less than 1%). The persistence of wet and dry sequences probably reflects shifts in the jet stream that may be stable for several years before shifting. This, in turn reflects typical Pacific, synoptic weather patterns. With such an insignificant correlation co-efficient we must conclude there is very little chance that a previous year's run-off has any effect on predicting the run-off of a successive year. *This conclusion requires that the last term in the formula for water year index must be eliminated from the equation.* If we eliminate the last term in the equation there is little need to use any weighting coefficients because the remaining two terms comprise all but about 4% of the expected total run-off for the current water year. The remaining task is to estimate run-off for the unknown months to come.

Forecasting Future Months of the Water Year

The ability to forecast run-off accurately for future months depends on the information at hand. Upon entering a new water year, there is very little information available, especially given the fact that data from the previous water year is not relevant. There is potential information in the measurements of snow pack but snow in the Sierra Nevada and southern Cascades only begins to accumulate in late winter and early spring. The only factual information early in the water year is the current measure of run-off, which in the fall is extremely low. Since the distribution of annual run-off really comprises two independent distributions, it is virtually impossible to designate in which domain, dry or wet, the coming water year falls.

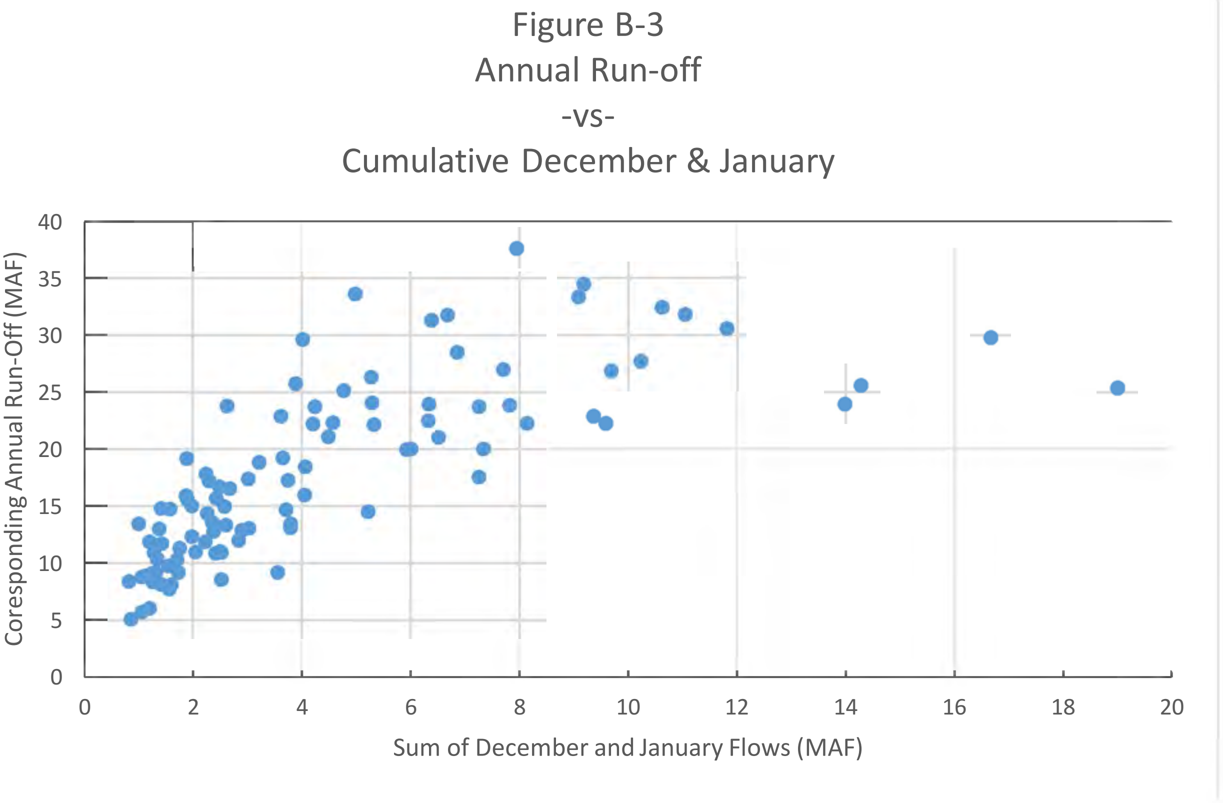
Each of these distributions has its own “normal” begging the question: which one should be chosen for forecasting purposes? D-1485 states that when a forecast value is needed for the formulation it should be based on the value for normal precipitation. *We have shown that there is no "grand normal” for run-off.* (Usually the average or mean value is meant by this term); it is therefore very likely that there is no such thing as a "grand normal” for precipitation. Precipitation data exhibits extreme variation, and because the physical relationship between precipitation and run-off is not linear and is dependent on such parameters as antecedent moisture in the soil, precipitation is probably not a good choice for basing a forecast.

The most prudent choice is to assume that the coming water year will be dry until there is sufficient data to state otherwise. Assuming that the coming water year will be wet runs a 56% or higher chance of being wrong, hardly a prudent assumption given the importance of obtaining a reliable supply from the SWP. If the average for the dry group is chosen for the initial forecast there will be roughly a 25% chance of over-estimating the subsequent run-off. Prudence would dictate that perhaps a 5% chance of such a mistake would be tolerable. At a 5% chance the basis for the forecast would produce annual run-off in the range of 7-8 MAF. In terms of the 4-river index; actual run-off would be 20% to 25% higher. In effect, *a forecast* *range this low would likely cause a suspension in SWP and CVP operations for the first few months of the new water year*, though some export might be possible if there is reservoir storage to support it in these early months.

How soon in the water year can it be stated with some confidence how the water year will play out? October and November produce little to no excess run-off. The first month with the potential for large run-off is December followed by an even more likely run-off in January, February, March, April, and May when snow melt really begins in earnest (and possibly June) are the main run-off producers. Therefore, we must look at the earliest run-off months for an indicator.

An investigation was begun to find early indicators to assess the likelihood of a dry or wet future water year. We first examined whether the run-off of December alone would suffice. Our findings were inconclusive. The same DWR data base from which the annual run-off data was used to generate the graph in Figure 1, also contains the record of monthly run-offs which was used in this investigation. That was inconclusive. We then examined the sum of December and January run-off, and *we found that the sum of December and January could reliably predict if the coming water year would be dry*. A maximum threshold of 3.9 MAF for the sum would capture all but 2 of 55 dry years, which indicates a less than 5% chance of error. That same threshold also falsely designated 6 of 43 wet years as dry. However, that error is not critical since the unfolding water year could easily allow positive corrections in operations.

A scatter plot of the map of total annual run-off versus the sum of January and December run -off is presented in Figure B-3 on the following page. Axes are drawn vertically at a value of 3.9 and horizontally at the grand average of total run-off, creating four quadrants labeled dry winter-wet spring, wet winter-wet spring, wet winter-dry spring, and dry winter-dry spring. Most of the data points are found in either the dry winter-dry spring or wet winter-wet spring designations, which effectively constitute the dry and wet groups used in our analysis. The lack of data points in the other two quadrants confirms that these two groups are distinct. The figure also shows the few data points not in the populated quadrants, demonstrating the low likelihood of error in using the 3.9 MAF locus as a decision basis for declaring a dry winter-dry spring in the early part of the water year.



With further examination of the dry group distribution, we found a bounding locus that contains the entire dry group set except for two points. The equation of this locus is:

$$\mathbf{RUN\text{-}OFF} = 2.877 * \mathbf{DEC\text{-}JAN} + 2.67$$

Where: **RUN-OFF** = minimum annual run-off, MAF

DEC-JAN = sum of December and January run-off, MAF

provided **DEC-JAN** is less than or equal to 3.9 MAF

This equation provides a minimum run-off for the dry group with only about a 5% chance of a lower run-off. With this equation, prudent SWP operations can be devised for the months past January until subsequent run-off data can supersede it. It may be possible to find additional bounding equations to guide SWP operations, assuming December and January data are already known. This process may be repeated for successive months and should converge on the actual run-off by the end of the run-off season.

The analyses above establish several constraints in developing prudent SWP operations:

1) No reliance can be placed on a previous water year's run-off in forecasting run-off for a given water year.

2) If run-off through January for a given water year is low (less that 3.9 MAF) it is very likely that the remainder of the water year will be low.

3) There is no meaningful value in referring to the grand average of the hydrologic record as "normal". The record indicates strongly that there are two distinct groups that cluster below and above the grand average, each with its characteristic average or normal value.

4) The equation for calculating the Water Year Index is without merit; the same applies to its derivative, Water Year Type.

POTENTIAL EFFECTS ON SWP OPERATIONS

Winter Pumping

Because low winter run-off through January indicates the very strong likelihood of a dry year overall, winter pumping through January should be minimal if not altogether suspended until further run-off data shows that pumping can be done without jeopardizing the reliability of future deliveries or threatening Delta health. The prudent level of pumping from the Delta during such low periods of winter run-off remains to be investigated.

Overall Project Yield

Since dry years predominate the record, and no confident statement can be made at the beginning of a water year concerning expected project yield, the project yield should be base-lined on the amount that can be reliably exported given the expectation that the ensuing water year will be dry. *This finding necessarily will lead to an export level that is much lower than the current value of 4.1 MAF.* The project can now be studied to determine the amounts of surplus water that can be safely delivered until winter run-off is sufficient to conclude that the total water year will be wet. This implies that the safe level of export will be continuously evaluated as the water year progresses.

Reservoir Operations

Because the designations of water year type are based on a calculated water year index which has been shown to have no validity, *all reservoir operations must be re-examined to determine prudent levels of release* *and storage.*

SWRCB Regulations and Constraints

Because so many of the regulations and constraints that have been promulgated by the SWRCB are based on the flawed water year type, *all such regulations and constraints must be re-visited.*

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Appendix C

References

Central Coast Water Authority Comprehensive Annual Financial Reports, Fiscal Years 1998-2011. Available at http://www.ccwa.com/archives.html.

Central Coast Water Authority Budgets, Fiscal Years 1998-2011. Available at http://www.ccwa.com/archives.html.

2010 Central Coast Water Authority Urban Water Management Plan Update. Available at: http://www.ccwa.com/Archives/UWMPs/uwmp-2010.pdf.

Goleta Water District 2010 Urban Water Management Plan Update. Available at http://www.goletawater.com/assets/GWD_2010UWMP_Final.pdf.

Goleta Water District Water Rates and Meter Charges. Available at: http://www.goletawater.com/rates-bills-and-budget/water-rates-and-meter-charges/.

Goleta Water District Budgets. Available at: http://www.goletawater.com/rates-bills-and-budget/budget/

Montecito Water District Urban Water Management Plan Update 2005. Available at http://www.montecitowater.com/2005%20UWMP%2010-05.pdf.

Montecito Water District Water Rates and Meter Charges. Available at: http://www.montecitowater.com/fees_charges.htm.

Montecito Water District Budgets and Comprehensive Annual Financial Reports. Available at: http://www.montecitowater.com/public.htm

2010 Carpinteria Valley Water District Urban Water Management Plan Update. Available at http://www.water.ca.gov/urbanwatermanagement/2010uwmps/Carpenteria%20Valley%20Water%20District/CVWD-Final-UWMP-June-2011-all.pdf.

Carpinteria Valley Water District Water Rates and Meter Charges. Available at: http://www.cvwd.net/water_rates.htm.

Carpinteria Valley Water District Water District Budgets. Available at: http://www.cvwd.net/about_budget.htm

City of Santa Barbara Urban Water Management Plan Update 2010. Available at: http://www.santabarbaraca.gov/NR/rdonlyres/B9E0F766-6384-480A-A944-0F87003F8882/0/UWMPCityofSantaBarbara2010UpdateFINAL.pdf.

City of Santa Barbara Water and Sewer Rates. Available at: http://www.santabarbaraca.gov/Resident/Water/Rates/WaterSewer.htm.

City of Santa Barbara Budgets and Comprehensive Annual Financial Reports. Available at: http://www.santabarbaraca.gov/Government/Finance/

California Department of Water Resources Bulletin 132, "Management of the California State Water Project." Available at: http://www.water.ca.gov/swpao/bulletin.cfm.

Madrid, Carlos. 1985. Santa Barbara County State Water Project alternatives. Los Angeles, Calif. Dept. of Water Resources, Southern District and Santa Barbara County Flood Control and Water Conservation District.

Santa Barbara County Grand Jury 2006-07 Report- "Carpinteria Valley Water District- Is Improved Direction Needed?" http://www.sbcgj.org/2007/carpwater.pdf.

California Department of Water Resources, "The State Water Project Delivery Reliability Report 2007", published August 2008. http://www.water.ca.gov/pubs/swp/swp_delivery_reliability_report_2007/swpdrr07.pdf

Edited by Alan Lufkin, "California's Salmon and Steelhead- The Struggle to Restore an Imperiled Resource", Chapter 17- The North Coast Water Wars: An Interview with Peter Behr. UC Press E-books selection. http://publishing.cdlib.org/ucpressebooks/view?docId=ft209nb0qn&chunk.id=d0e4513&toc.id=d0e4513&brand=ucpress.

Carollo Engineers. City of Santa Barbara, California Seawater Desalination Rehabilitation Project. March 2009.

David M. Rosenbaum, "Coastal Aqueduct Lessons to Guide Next Pipeline Project". Engineering News-Record, June 30, 1997. Volume 238, No. 26.

Business Forecasting Center, Eberhardt School of Business, University of the Pacific, 2012. Benefit-Cost Analysis of Delta Water Conveyance Tunnels. http://forecast.pacific.edu/articles/BenefitCostDeltaTunnel_Web.pdf

ECONorthwest. "Analysis of a cost of a Bay-Delta Conveyance structure: Rate Impacts to Santa Barbara County." July 2012. http://www.c-win.org/webfm_send/244

Central Coast Water Authority Comprehensive annual financial report. June 2015. http://www.ccwa.com/Archives/CAFRs/2015CAFR.pdf

Central Coast Water Authority 2010 Urban Water Management Plan. June 2011 http://www.water.ca.gov/urbanwatermanagement/2010uwmps/Central Coast Water Authority/CCWA 2010 Urban Water Management Plan.pdf

california water impact network

Attachment 2

Board of Directors

Carolee Krieger
co-founder
president
executive director

Michael Jackson
co-founder
secretary

Joshua Green
treasurer

Yvon Chouinard
co-founder

Malinda Chouinard

Dan Bacher

Nick Di Croce

Conner Everts

Bill Jennings

Huey Johnson

Tom Stokely
water policy
analyst

Barbara Vlamis

In memoriam
Dorothy Green
co-founding
secretary

Web Site:

www.c-win.org

Staff

Tim Stroshane
senior research
associate

Glen Martin
media consultant

Advisors
Maude Barlow
Gray Brechin
Jim Edmondson
Larry Farwell
Joan Wells

Testimony on Water Availability Analysis for Trinity, Sacramento, and San Joaquin River Basins Tributary to the Bay-Delta Estuary

Submitted by
Tim Stroshane
Senior Research Associate
California Water Impact Network (C-WIN)

and on behalf of
California Sportfishing Protection Alliance
and AquAlliance

October 26, 2012

for

Workshop #3
Analytical Tools for Evaluating the Water Supply,
Hydrodynamic, and Hydropower Effects of the Bay-Delta Plan
November 13 and 14, 2012

The State Water Resources Control Board called for workshops to receive information from and discuss with participating parties the scientific and technical bases for considering potential changes to the 2006 Water Quality Control Plan for the San Francisco/Sacramento-San Joaquin Delta Estuary for Phase II of the Board's comprehensive review of this plan.

According to the State Board's public notice for these workshops, the prompts for Workshop 3 testimony are:

1. What types of analyses should be completed to estimate the water supply, hydrodynamic, and hydropower effects of potential changes to the Bay-Delta Plan?

2. What analytical tools should be used to evaluate these effects? What are the advantages, disadvantages and limitations of these tools?

Water Availability Analysis

Workshop 3 Testimony, Bay Delta Plan

Submitted by California Water Impact Network,
California Sportfishing Protection Alliance, and AquAlliance

The California Water Impact Network, the California Sportfishing Protection Alliance, and AquAlliance (hereinafter, C-WIN) are pleased to submit this testimony to the State Water Resources Control Board. This testimony addresses the close linkage between the Board's public trust responsibilities on behalf of the State of California, its water quality control planning function, and its duty to regulate water rights in California. Water quality control planning efforts to date have led the Board to consider proportional tributary contributions needed to meet Delta inflow objectives from the Sacramento and San Joaquin River Basins to improve water quality and protect all beneficial uses, including fish and wildlife, in the Delta. The State Water Resources Control Board has authority over water rights in the Basins that would enable it to reallocate water usage and ensure compliance with the Board's new instream flow objectives.

Water availability analysis is an important method for modeling how the Board would implement new flow objectives. Our testimony illustrates the use of a planning-level water availability analysis for the Trinity River (much of whose flows are diverted to the Central Valley watershed of the Bay-Delta Estuary), and the major tributaries of the Sacramento and San Joaquin River Basins. We incorporate into the analysis the Basins' hydrologic variability, instream flow requirements based on the Board's 2010 public trust Delta flow determinations, and then operate publicly available water rights data and priorities on the divertable flows that remain in the system. We find that under public trust protective flow determinations, the promised water represented in water rights claims far exceed flow conditions available to these claims in most years.

We recommend for the Bay-Delta Plan's implementation program that the State Water Resources Control Board draw on its new flow determinations to increase the seasons during which rivers in the Bay-Delta Estuary's Central Valley watershed are fully appropriated, and push back the water rights priority date on which Term 91 curtailments are now based. Our water availability analysis suggests distinct parameters for both actions.

Finally, we conclude that the Board should use the Bay-Delta Plan process to tighten up its regulation of surplus water usage and export by the State Water Project and Central Valley Project to avoid permanently damaging Sacramento Valley groundwater resources. The Board's Delta flow determinations, coupled with comprehensive enforcement of water rights priorities, can help to protect both groundwater and surface water resources in the Sacramento Valley over the long term.

Government's Public Trust Responsibility

Governments have a permanent fiduciary responsibility and obligation to protect the public trust. In *National Audubon Society v. Superior Court* (1983) 33 Cal 3d 419, 441, the court held that "the public trust is more than an affirmation of state power to use public property for public purposes. It is an affirmation of the duty of the state to protect the people's common heritage of streams, lakes, marshlands and tidelands, surrendering that right of protection only in rare cases when abandonment of that right is consistent with the purposes of the trust." The act of appropriating water is an acquisition of a property right from the waters of the state, an act that is therefore subject to regulation under the state's public trust responsibilities.

The State Water Resources Control Board has invoked its public trust responsibilities in regulating the waters of California and now acknowledges that the public trust is one of its ongoing regulatory responsibilities. Its most publicly prominent instance came in Water Rights Decision 1631 (D-1631) in 1994. In D-1631, the Board balanced the needs of the City of Los Angeles for water supply from the tributaries of Mono Lake with the lake's own needs for water to sustain its ecosystem. It required Los Angeles to make releases from each of its tributaries that would sustain riparian ecosystems and help restore fish populations to the tributaries by prescribing lake level targets in a specified time period. (State Water Resources Control Board 1994) The Board has also adopted regulations governing how it treats the public trust in matters of the appropriation of water in California. (State Water Resources Control Board 2011b: Article 14, Standard Permit Terms and Conditions)

The trial court in *United States v. State Water Resources Control Board* (1986, 182 Cal.App.3d 82) determined that the State Water Resources Control Board had the authority to modify an appropriative water right permit once it had been issued, and that it could reduce the US Bureau of Reclamation's Central Valley Project permits to gain compliance from the Bureau. But the trial court held new fish and wildlife objectives the Board had approved in Water Rights Decision 1485 (D-1485) in 1978 to be invalid because the Board failed to identify the *source* of its authority. Justice John Racanelli, the author of the subsequent appellate court decision cited above, stated that the source of the Board's authority to issue and enforce new fish and wildlife objectives such as those contained in Water Rights Decision 1485 (D-1485) was the Public Trust Doctrine:

> ...the state as trustee of the public trust retains supervisory control of the state's waters such that no party has a vested right to appropriate water in a manner harmful to the interests protected by the public trust. (182 Cal.App.3d 82, 149)

Stevens (2005) summarizes the present range of coverage that American and California law gives the public trust doctrine:

1. It applies to all navigable streams.
2. It applies to ecological preservation.
3. It applies to wetland areas.
4. It applies underground (citing the Waiahole decision from Hawai'i).
5. It applies to artificially enlarged waters.
6. It applies to wild animals, including fish.[1]

The Public Trust and Paper Water

In the next few years, the State Water Resources Control Board is expected to make several crucial decisions on California's water future. These decisions include:

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[1] The California Constitution also provides an absolute right to fish among the fundamental declared rights it accords all California citizens. Article I, Section 25 states:

> ARTICLE 1 DECLARATION OF RIGHTS
>
> Section 25. The people shall have the right to fish upon and from the public lands of the State and in the waters thereof, excepting upon lands set aside for fish hatcheries, and no land owned by the State shall ever be sold or transferred without reserving in the people the absolute right to fish thereupon; and no law shall ever be passed making it a crime for the people to enter upon the public lands within this State for the purpose of fishing in any water containing fish that have been planted therein by the State; provided, that the legislature may by statute, provide for the season when and the conditions under which the different species of fish may be taken.

In combination with California Fish and Game Code Section 5937, which provides that owners of dams must preserve fish populations downstream in "good condition", preservation of this right logically should be construed as an important aspect of the public trust responsibilities of government. It retains meaning as a right only when there exist sufficient fish to catch sustainably.

- Determining how to provide sufficient flows from the Sacramento and San Joaquin River's major tributaries to the Bay-Delta Estuary.
- Updating its 2006 Bay-Delta Water Quality Control Plan to include those new Sacramento and San Joaquin River flow and South Delta salinity objectives.
- Deciding whether to extend the water rights *permits* of the California State Water Project and the federal Central Valley Project, or instead *license* them at levels that represent reasonable and public trust protective water usage.
- Deciding whether and/or how to permit a "north Delta diversion"—a diversion that is now more familiarly known as the Peripheral Tunnels Project.
- Deciding whether and/or how to permit new reservoirs on the San Joaquin River and in the southwestern Sacramento Valley (and/or to raise existing dams to increase storage elsewhere) that would be added to the storage capacities of the Central Valley Project and the State Water Project.

As a regulatory agency, the State Water Resources Control Board is not known for making and holding to courageous or visionary decisions that protect beneficial uses of water throughout California. Their record of delay and incrementalism has contributed to the poor condition of the Bay Delta Estuary and the great rivers of its watershed, the great Sacramento and San Joaquin Rivers.

The State Water Resources Control Board has authority to make bold decisions and hold to them. (Cahill 2008)

The State Water Resources Control Board will need to balance protection of the public trust with other competing beneficial uses of water reliant on the Delta. The Board has already determined the flows that fish and other aquatic species need. (State Water Resources Control Board 2010: 114-123) In completing and implementing the Bay-Delta Plan, the Board's next step is to evaluate the feasibility of measures needed to protect public trust resources fully. (California Supreme Court 1983; Kibel 2011: 6) These steps will need to include: determination of flow needs of public trust resources, water rights reallocation, flow modification, benefit-cost analysis, and habitat restoration. In the process. key questions must be answered:

1. How does the State Water Resources Control Board intend to prioritize water use in terms of coequal goals, of public trust balancing? How does its long-established water rights priority system fit into this policy framework?

2. What does water supply reliability mean in an arid state where we have granted rights to far more water than actually exists? Should water supply reliability be conditioned upon specific requirements to maximize reclamation, reuse, conservation and development of alternative local sources of water?

3. Is the standard by which we measure water supply reliability the same for junior and senior appropriators? Do uses of water that require vast public subsidies have the same priority as uses that don't require subsidy of public funds? Are uses that internalize adverse impacts equal in priority to uses that externalize them?

4. Should the worth of water be confined only to its economic value in use? Or does water supply reliability apply to both public trust resource needs as well as consumptive uses (i.e., is legislation needed for better protection of public resources through water rights)?

5. Are statutory requirements to protect water quality and listed species equivalent to water supply reliability for lawns or surplus, subsidized, and non-food crops? Are food crops more

important than non-food commodities when it comes to allocating water? Does health and safety take precedence over certain agricultural uses of water?

6. Does efficient use of water have higher priority over wasteful and inefficient use? Is protection of the Bay-Delta Estuary as a "national treasure" and one of the world's great estuaries more valuable to society than irrigating impaired soils, that by their nature when irrigated, discharge prodigious quantities of salt and toxic wastes back to our waterways and aquifers?

Answers to these questions are central to resolving California's water problems.

The California Legislature consolidated the State of California's water rights and water quality control responsibilities in the State Water Resources Control Board in 1967. Since that time, the Board has considerable authority to grapple with these questions and arrive at answers and solutions from them. The Board has authority to:

- Plan for water quality control.
- Receive, condition, and approve new water rights applications as permits.
- Regulate and license water rights permits specifying the point of diversion, diversion flows, place of use, and purpose of use for water.
- Investigate pre-1914 and riparian water rights to determine whether such claims to divert and use water are legal, including follow-up enforcement against illegal uses when determined (discussed below).
- Investigate and enforce the state's prohibition of waste and unreasonable use and wasteful and unreasonable method of diversion of water under the California Constitution, Article X, Section 2.
- Protect the public trust. As an agency of the state, the Board is charged with ensuring the state of California carries out its fiduciary responsibility to protect air, running water, the sea, and the seashore, "these things that are common to all," as stated originally in Roman law (the Institutes of Justinian).

California's constitution promises water rights only up to what is a reasonable use. No one has a right in California to use water unreasonably, not even the federal government. (California Constitution, Article X, Section 2) The Public Trust Doctrine provides that no one has a vested right to appropriate water in a manner harmful to the interests protected by the public trust. (*National Audubon Society v. Superior Court*, 33 Cal.3d 419, 189 Cal.Rptr 346, 658 P.2d 709) And the dictionary definition of usufructuary rights, of which both riparian and appropriative water rights are examples, indicates that a fundamental principle of usufruct is that it connotes only a right to *use* a resource like water, not to waste or use it unreasonably. The State Water Resources Control Board, in taking up all of the key questions we outline above, will be deciding whether and how California's abundant legal authorities apply to the Bay-Delta Estuary's Central Valley watershed.

The Public Trust and Proportional Delta Inflows

In mid-2009, the State Water Resources Control Board updated its review of the Water Quality Control Plan which its Water Right Decision 1641 (D-1641) implements. The Board took the position that to change its water quality and flow criteria it needed more scientific information about flows reasonably needed to protect fish and wildlife beneficial uses (State Water Resources Control Board, 2009: 17). Its impetus to consider making changes at that time included pronounced fisheries declines among both open water resident and migratory fish, and the still-unfolding impacts of climate change and its impacts on the Bay-Delta estuarine system (State Water

Resources Control Board, 2009: 9). The California Department of Fish and Game sought to build a salmon survival model to assist the Board's need for additional information. (California Department of Fish and Game 2010)

Later in 2009, the California Legislature directed the State Water Resources Control Board to prepare a report on Delta flow criteria that would "develop new flow criteria for the Delta ecosystem necessary to protect public trust resources" and in so doing "use the best available scientific information." The Legislature directed the Board to gather the information as part of an "informational proceeding" rather than through an evidentiary hearing. And the Legislature charged the Board with including volume, quality and timing of water necessary for the Delta ecosystem under different conditions (California Water Code: Section 85086(c)).

The Board produced its Delta flow criteria report after taking detailed testimony on the best available science for key fish species and ecosystems. The report identified a set of broad flow regimes for upstream tributaries providing inflow to the Bay-Delta Estuary that fish need to survive and recover. They represent the Board's consideration of the best available fishery and hydrologic science it considered during 2010 addressing the question: what flows do fish need? The Board confirms this when it stated in a footnote, "...the flow criteria developed in this proceeding are intended to halt population decline and increase populations of certain species," and acknowledged that, "Recent Delta flows are insufficient to support native Delta fishes for today's habitats….Flow and physical habitat interact in many ways, but they are not interchangeable." (State Water Resources Control Board 2010: 5, 120)

The Board states that the flow criteria "must be considered" in context:

- The flow criteria do not consider any balancing of public trust resource protection with public interest needs for water.
- The State Water Board does not intend that the criteria should supersede requirements for health and safety such as the need to manage water for flood control.
- There is sufficient scientific information to support increased flows to protect public trust resources; ***while there is uncertainty regarding specific numeric criteria, scientific certainty is not the standard for agency decision making.*** (State Water Resources Control Board 2010: 4; emphasis added)

The Board's flow determinations are:

- 75 percent of unimpaired Delta outflow from January through June.
- 75 percent of unimpaired Sacramento River inflow from November through June.
- 60 percent of unimpaired San Joaquin River inflow from February through June.
- Increased fall Delta outflow in wet and above normal years.
- Fall pulse flows on the Sacramento and San Joaquin Rivers to stimulate migrating fish.
- Flow criteria in the Delta interior to help protect fish from mortality in the central and southern Delta caused by operations of the state and federal water export pumps.

In essence, these flow determinations represent the Board's answer to the question, "what flows do fish need in the Central Valley watershed and the Bay-Delta Estuary?" The State Water Resources Control Board's 2010 Delta flow criteria report acknowledged that protective Delta outflows start with protective tributary inflows to the Delta. The Board's Delta inflow criteria rely on a percentage of unimpaired flow measure, which enables the flow criteria on the Sacramento and San Joaquin rivers to more closely mimic their natural hydrographs than now occurs.

For the San Joaquin River, the State Water Resources Control Board approved its determination that 60 percent of unimpaired flow from February through June for the river basin would protect juvenile Chinook salmon during their peak emigration period. For the Sacramento River, the Board adopted the criterion of 75 percent of unimpaired flow from November through June. (This is because numerous runs of migratory salmon use the Sacramento River Basin for more of the year.) These constrained periods would also benefit the rearing period of juvenile salmon in the basin's major tributaries upstream. The Board also adopted in that report (2010) a fall season Delta inflow criterion calling for an average flow of 3,600 cubic feet per second for 10 days sometime during late October.

Nearly all scientists testifying to the Board in March 2010 agreed that mimicking the natural hydrograph (in shape if not in magnitude and volume of flow) is necessary to improve conditions for native fish species, and to counter invasive species in the Delta. Existing Board water quality and flow objectives intended to protect fish and wildlife beneficial uses in the south Delta are not working, as shown in abundant evidence presented to the Board at its hearings for the Delta Flow Criteria report. The Board includes much of that data in its report. (State Water Resources Control Board 2010) C-WIN provide a brief evaluation of the Vernalis Adaptive Management Plan to supplement this record of failure in Appendix A to this testimony.

In August 2010, the State Water Board approved these currently nonbinding Delta inflow determinations for the Sacramento and San Joaquin rivers. (State Water Resources Control Board 2010: 114-123) The State Water Resources Control Board observed that using such flow criteria would mean that "to achieve the attributes of a natural hydrograph, the criteria are advanced as a percentage of unimpaired flow on a 14-day average, *to be achieved on a proportional basis from the tributaries to the San Joaquin River.*" (State Water Resources Control Board, 2010: 120, emphasis added) The Board makes an important point that mimicking natural hydrograph and improving prospects for species recovery depends on achieving proportional flow allocations from all the major tributaries. Proportional tributary contributions would be needed to implement the Board's broader Delta inflow criteria. The Board will need to answer key questions including: what should those proportions be, how should responsibility for them be assigned, and who will be responsible for providing them? And: when will the upper San Joaquin River be included by the Board in making these determinations? (Right now, the Board excludes the upper San Joaquin River from its Bay-Delta Estuary planning deliberations. C-WIN evaluates the Board's stance in Appendix B.)

The question for the Board is how to do proportional flows *legally.* Proportional tributary contributions from Delta inflow are not new. In 1992, the California Department of Fish and Game proposed a method to identify tributary contributions to Delta inflows based on the pro rata share of unimpaired runoff each tributary generates to the Delta, as identified in the California Department of Water Resource's Bulletin 120 each year (California Department of Fish and Game, 1992). Other allocation methods could be devised as well, such as one based on reservoir storage on these same tributaries. The State Water Board in its Draft Water Right Decision 1630 presented such a method, but which excluded contributions from the San Joaquin River above Mendota Pool (State Water Resources Control Board, 1992: Tables IV and V).

Proportional tributary contributions needed to fulfill Delta inflow determinations from the Trinity River, and the major tributaries of the Sacramento and San Joaquin River Basins will require changes to the water rights of major water users in these Basins. The State Water Resources Control Board has authority over water rights to reallocate water usage and ensure compliance with the Board's Delta inflow objectives.

Paper Water Means Boundary Disputes and Clouded Titles

Property is often legally conceived as a bundle of rights representing "investment-backed expectations" of a future stream of benefits accruing to its owner, usually in the form of money. Water rights are a form of property, conveying to their owners rights to use water from a stream. Unlike real property in land, however, we have a situation in which far more in rights to use water have been granted by the state or claimed by right holders than Nature and reality actually provide.

California's modern water code and its body of water rights case law is the result of more than a hundred and sixty years of legislation and legal precedent. Riparian water rights are the most paramount rights, followed by pre-1914 appropriative rights and, lastly, post-1914 appropriative rights, as determined by the seniority requirements of first-in-time-and-use.

But despite this accumulated legal tradition, human promises of water exceed Nature's provisions. A shorthand description of this condition is "paper water." The paper water problem in the area of water and rivers in California has close analogies in concepts like "clouded title," and "boundary dispute" for a piece of real property (say, a house, or a plot of land) that has more than one owner claiming the same piece or portion of ground. Typically, boundary disputes are resolved by one or more disputants engaging the services of a surveyor to establish where the boundary is actually located. From there, the owners have a common set of facts on which they may agree to resolve their boundary dispute.

"Clouded title" has relevance here as well. A clouded title means the ownership of a title in water has some defect or potential defect arising from a competing claim for the same source of water.

One of the earliest recognitions of the problem of paper water in California occurred over a century ago and helps illustrate the clouded condition of paper water. In 1900, Frank Soulé, a professor of civil engineering at the University of California, was retained by the US Department of Agriculture's Office of Irrigation Investigations to study water rights claims in the San Joaquin River basin. Soulé found that the San Joaquin River's average winter and spring months' flows were approximately 5,000 to 6,000 cubic feet per second. In drier late summer and fall months, flows could get as low as 150 cubic feet per second. Soulé researched water rights claims to all tributaries of the San Joaquin River watershed to see how they matched up with flows in the river. Actual flows from the 1895-1909 period averaged about 2.02 million acre-feet, according to state records. (State Water Resources Board 1951: Table 62) He visited the recorders' offices for Stanislaus, Merced, and Fresno counties and itemized 315 claims to San Joaquin River waters totaling 36,571,471 miners inches of flow (there are 50 miners inches to a cubic foot per second). This converts to 731,429 cubic feet per second. Stretched out over a year (Soulé did not specify the seasons for which the claims were made), this translated into an annual claim of water rights of 529.9 million acre-feet of water, over 260 times greater than average flow of the San Joaquin River in that period. For an eight-month irrigation season of about 246 days, such flows would amount to 356.9 million acre-feet, nearly 180 times greater than San Joaquin River flows. These, Soulé contended, were the "definite claims," ones that had well-defined diversion points and amounts claimed. Six separate individuals claimed "all the water flowing in the San Joaquin River," a definite claim, if exaggerated. His summary for the San Joaquin did not include claims to the Fresno and Chowchilla rivers, which are much smaller watersheds, but the grandiosity continued there. On the Fresno River, some 670,799 miner's inches were the subject of 50 claims (about 13,416 cubic feet per second or 9.7 million acre-feet a year), and on the Chowchilla just 14 claims aggregated to 31,008 cubic feet per second (or about 22.5 million acre-feet annually). (Soulé 1901: 222, 232)

Clouded titles in water have been allowed to fester since before Professor Soulé began studying the problem in 1900. Failure by the State of California to quiet titles to water since assuming authority for appropriative water rights in 1914 contributes untold expectations for benefit streams that fuel controversy in California water resources planning and development ever since.

C-WIN is not a lone contemporary voice on the problem of paper water. In September 2008, State Water Resources Control Board staff informed the Delta Vision Blue Ribbon Task Force about water rights, use, and flows in the Delta watershed. It stated in part:

- The "total face value of the approximately 6,300 active water right permits and licenses within the Delta managed by the State Water Board, including the already assigned portion of state filings, is approximately 245 million AFA [acre-feet annually]." Our organizations note that this 245 million acre-feet of face value in water rights was permitted by the Board and its predecessors in the Central Valley watershed (including imports from watersheds like that of the Trinity River). (State Water Resources Control Board 2008)

- Face value "does not include pre-1914 and riparian water rights." Riparian water rights, in the absence of some form of watershed adjudication, are usually unquantified but nonetheless require real, wet water. (State Water Resources Control Board 2008) And,

- That "the total face value of the unassigned portion of state filings for consumptive use (excluding state filings for the beneficial use of power) within the Delta watershed is approximately 60 million [acre-feet annually]." These are claims the State has filed to reserve water for further expansion of the State Water Project. (State Water Resources Control Board 2008; see also Appendix C.)

Other matters exacerbate the paper water problem:

- The SWRCB does not know how much water is actually used (and by whom) since state law has yet to require full accounting of either surface or ground water use.

- The SWRCB does not know the extent of paramount riparian or senior pre-1914 water rights either.

- Climate change is likely to alter the timing and reduce the volume of runoff into California's rim dams and overall state and federal water systems. (Knowles and Cayan 2002) It is also likely to decrease natural groundwater recharge as well, which would further reduce runoff volumes where river reaches benefit from groundwater inflows.

- Increased cold water pools and groundwater support from gaining streams will be needed to maintain water temperatures below rim dams according to estimates by the SWRCB and Department of Fish and Game of the increased inflow and outflow necessary to protect rivers and the Delta public trust resources. (California Department of Fish and Game 2010: 51, Table 5)

Given these constraints, the obligation to achieve a public trust balancing of water supply reliability with fish and ecosystem survival cannot rest on maintenance of existing levels of supply from either Delta exports or the rim dams on all major Central Valley tributaries in the Delta watershed. The State Water Resources Control Board must use its water rights authority in the service of meeting these water quality challenges on behalf of public trust resources.

The Delta Watermaster acknowledges the problem of paper water in a recent report on the State Water Resources Control Board's role in the Delta Stewardship Council's Delta Plan process (Wilson 2011). He expresses concern, however, that "the face value of water rights is not a sufficient measure of water that can be used to determine the over-allocation of water in the [Delta] watershed." He cites four main reasons for his concern:

- The face value of many water rights are for nonconsumptive uses, such as hydropower.
    - **C-WIN Response:** As much as possible, water availability analysis should factor out water rights claims that are primarily devoted to nonconsumptive uses and hydropower generation in particular. C-WIN's analysis factors out all single-purpose hydropower generation water rights claims, whether pre- or post-1914. Where multiple purpose of use claims include hydropower generation, we assume these rights are still primarily consumptive use claims, especially when irrigation is one of the other purposes of use for which claims are made. Hydropower generation is considered incidental to the other consumptive uses.

- The face value represents a maximum possible water diversion, which is far greater than what is actually used;
    - **C-WIN Response:** We agree that face value often represents a maximum possible diversion (and/or storage amount). We also agree that it may be far greater than what is actually used in many cases. But C-WIN's review of water right claims shows that some rivers' claims far exceed maximum unimpaired flows and even reservoir capacity on that river. (The Trinity River is a good example of this.) This is less a criticism of face value than an acknowledgement of paper water by the Delta Watermaster. Nor does it justify continuation of the practice by the State Water Resources Control Board. Since the maximum possible flow (and use) can occur only relatively rarely in California's hydrology, C-WIN suggests that this extra increment of claims be eliminated because it will occur in the future with even less frequency than now occurs. Reliable rights are only meaningful when they can be exercised with relative frequency.

- Permit/license terms, such as those for protection of instream uses, further reduce below the face value the amount of water that can be diverted;
    - **C-WIN Response:** The State Water Resources Control Board needs to continue having some standard method for quantifying the value of water rights as property. This is the only way that increments of title to water as property can be described and titles cleared or quieted in the event of dispute. Moreover, quantified water rights are the only way to conduct reality-based water resources planning and development. This extends to employing a standard method for quantifying and measuring instream flows that benefit public trust resources. If the Board and Delta Watermaster are to enforce instream flows, they must quantify instream flow commitments and ensure that they are fulfilled *prior* to the exercise of permitted or licensed water rights claims.

- Water, when applied, is typically not consumed up to the full face value and the same water (return flow) is often used multiple times as it runs downstream.
    - **C-WIN Response:** While C-WIN acknowledges the reality of return flow in diversion of water for consumptive irrigation uses, there is no consistently available data that measures the volume and occurrence of return flow to rivers. Some estimates, both recent (California Department of Water Resources 2005: water balances for Sacramento and San Joaquin River Basins) and historical (Wiel 1928: 259) put return flow at between 60 and 65 percent of originally diverted volumes. Of course, the reality of return flow, however, means that river flow can decrease by as much as a third of diversion quantities each time it is applied; the more frequently water is diverted to consumptive use, the sooner surface flows are depleted in the immediate

> river reach downstream. Return flows do not reach the river from which they were diverted instantaneously. Once diverted there occurs a time lag between the diversion and its application, and when water actually returns to the river, and even then, it may only reach the river in small increments, depending on the surface return flow and/or subsurface transmissivity getting back to the river. Meanwhile, the diverted water is gone from the river, thereby depleting its flow until some later time and lower location. If return flow is truly important to determining water availability and avoiding boundary disputes and clouded water titles, then California needs to invest in getting data from each watershed that quantifies the volume, timing, and duration of return flow, instead of ignoring it. (State Water Resources Control Board 1983: 9-10)

C-WIN's methodology recognizes each of these facets of "face value" or face amount of water rights. Unfortunately, the Delta Watermaster's remarks do not clarify whatever else it is that face value quantities in water rights are supposed to positively describe. If the quantities in water rights are not relevant to face value, then on what basis can separable, stable, and reliable rights to water use be analyzed and judged? The Watermaster acknowledges that "while actual water use may be only a fraction of the face value of water rights, the state's water supplies have been over-allocated in many areas."[2] (Delta Watermaster 2011b: 5) C-WIN shows in this testimony that it is possible to use the "data" of water rights in combination with data on flows and diversions to generate a consistent and meaningful picture of the problem of overallocation of water supplies and rights in the San Joaquin River Basin. Our water availability analysis illustrates the usefulness of having *some idea* of the magnitude of the paper water problem as compared with having *no idea*. All of California needs better data on all facets of the problem of paper water.

Tables 1 and 2 provide static (snapshot) views of total water rights in the Trinity, San Joaquin River and Sacramento River Basins. Total water rights reported in these two tables are for consumptive uses. Hydropower generation water rights have been excluded from this analysis.

In Table 1, average annual unimpaired flow for the San Joaquin River Basin is about 6.2 million acre-feet compared with 32.7 million acre-feet of consumptive water rights claims. The ratio of total claims to average unimpaired flow for the San Joaquin Basin is 5.3 acre-feet of consumptive use claims to every acre-foot of unimpaired flow in the Basin. About 49 percent of total consumptive water claims are by riparian and pre-1914 claimants, while 51 percent is by post-1914 claimants (that is, permits and licenses) regulated by the State Water Resources Control Board.

Specifically on the major tributaries of the San Joaquin River Basin, the ratio of total consumptive use claims to unimpaired flow ranges from about 5.6 on the Stanislaus to 6.3 acre-feet of claims to every unimpaired acre-foot of flow on the San Joaquin River (including valley floor and upper watershed claims).

In Table 2, average annual unimpaired flow in the Sacramento Valley (essentially, average Sacramento River inflow to the Delta) is about 21.6 million acre-feet. Consumptive water rights claims are estimated at about 120.6 million acre-feet. The ratio of total consumptive use claims to averge unimpaired flow in the Sacramento River Basin is about 5.6 acre-feet of claims per acre-foot of unimpaired flow. Ratios of claims to unimpaired flow to range from 2.2 on the Yuba River to 6.8 on the Trinity River.

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[2] The Delta Watermaster suggests that for the Delta the process for determination of fully appropriated streams from the Water Code Sections 1205 through 1207 be used (p. 5).

Table 1
Consumptive (Irrigation) Water Rights Summary for San Joaquin River Basin

Flows and Consumptive Water Rights	Thousands of Acre-Feet				
	Stanislaus River	**Tuolumne River**	**Merced River**	**San Joaquin**	**Basin Total**
Average Annual Unimpaired Flow	957	1,851	956	1,728	6,181
Total Consumptive Water Right Claims	5,318	11,015	5,495	10,828	32,656
Ratio of Total Claims to Unimpaired Flow	5.56	5.95	5.75	6.27	5.28
Total Riparian & Pre-1914 Claims	1,401	8,185	4,525	2,014	16,125
Ratio of Riparian & Pre-1914 Claims to Unimpaired Flow	1.46	4.42	4.73	1.17	2.61
Total Post-1914 Claims	3,917	2,831	970	8,814	16,532
Ratio of Post-1914 Claims to Unimpaired Flow	4.09	1.53	1.01	5.10	2.67

Sources: State Water Resources Control Board (e-WRIMS); Public Record Act responses from various public water and irrigation districts; California Water Impact Network. Sum of major tributaries' unimpaired flow does not equal Valley total due to omission of other watersheds from the table.

Table 2
Consumptive (Irrigation) Water Rights Summary for Trinity and Sacramento River Basins

Flows and Consumptive Water Rights	Thousands of Acre-Feet				
	Trinity River	**Feather River**	**Yuba River**	**American River**	**Sacramento Valley Total**
Average Annual Unimpaired Flow	1,283	4,370	2,287	2,621	21,619
Total Consumptive Water Right Claims	8,725	15,717	5,093	9,847	120,571
Ratio of Total Claims to Unimpaired Flow	6.80	3.60	2.23	3.76	5.58
Total Riparian & Pre-1914 Claims	134	3,855	92	286	47,883
Ratio of Riparian & Pre-1914 Claims to Unimpaired Flow	0.10	0.88	0.04	0.11	2.21
Total Post-1914 Claims	8,591	11,863	3,596	9,561	72,688
Ratio of Post-1914 Claims to Unimpaired Flow	6.70	2.71	1.57	3.65	3.36

Sources: California Department of Water Resources, 2007; State Water Resources Control Board (e-WRIMS); Public Record Act responses from various public water and irrigation districts; California Water Impact Network. Sum of major tributaries' unimpaired flow does not equal Valley total due to omission of other watersheds from the table. Trinity River is included because a large portion of its runoff is exported to the Sacramento River via federal Central Valley Project facilities.

On a basin-wide basis, riparian and pre-1914 water claims account for about 40 percent of total consumptive use claims of 120.7 million acre-feet, and post-1914 claims (permits and licenses) in the Sacramento River Basin amount to about 60 percent of total consumptive use claims.

The largest water claims on Sacramento River Basin tributaries belong to the Feather River and the American River. The mainstem Sacramento (which is incorporated into the total for the Valley) includes the Pit and McCloud rivers and numerous small creeks that enter it from the east and west. C-WIN estimate that the largest component of pre-1914 water rights claims is held by the Glenn-Colusa Irrigation District. This District claims 26 million acre-feet in rights to divert directly from the Sacramento, as well as another 12 million acre-feet in rights from west side creeks.

On the Trinity River, the US Bureau of Reclamation is a significant claimant of post-1914 water rights, and given the small amount of riparian and pre-1914 water rights claims on the Trinity, the Bureau's Trinity River rights are reliable, as conditioned and limited by the Trinity River Record of Decision. (US Department of the Interior 2000) The Trinity's ratio of total consumptive claims to average unimpaired flow is 6.8 acre-feet of claims to every acre-foot of unimpaired flow.

There is another, more dynamic approach that we also include in this testimony to characterize excess claims to water use relative to flows. This planning-level analysis of water availability incorporates into the model hydrologic variability, instream flow requirements and publicly available water rights priorities on the divertable flows that remain in the system.

Applying Water Availability Analysis

In Tables 3A and 3B and accompanying charts, we present results of applying both a diversion cap (derived from the State Board's 2010 Delta flow determinations) and the water rights priority system in the manner that the State Water Resources Control Board is legally authorized to proceed. The unimpaired flow hydrology for this analysis was obtained from the California Department of Water Resources (2007). This analysis proceeds from the basic water rights premises that:

1) Instream flows needed to meet water quality and flow objectives have top priority.
2) When applying water rights, riparian rights are paramount, followed by—
3) Pre-1914 water rights claim water based on seniority date, followed by—
4) Any water left over is provided to junior water rights holders, in order of priority date (whether pre-1914 rights or post-1914 permits and licenses).

Detailed model results, water rights, and flow data employed in the analysis are found in Appendix D. Assumptions embedded in the method are itemized in Appendix E of this report.

To apply the water rights priority system in the context of providing new Delta inflows from the major tributaries, C-WIN's analysis builds in a range of flows from the 10th through 90th percentiles of the 82-year unimpaired flow hydrology available from the California Department of Water Resources (2007). 25th, 50th (median), and 75th percentile (quartile) flows are also considered. C-WIN's analysis summarizes total regulated period unimpaired flow, the Delta inflow contribution, and calculates a "diversion cap." (See Appendices D.1, D.2, and E.)

Water rights priorities are then assigned to allocate the diversion cap flows for the regulation period to paramount riparian and senior water right holders first. Detailed tables of our model results are provided in Appendix D.1 for the Trinity and the major Sacramento and San Joaquin River Basin tributaries. On the major tributaries, there are generally few significant water rights holders, and relatively small blocs of riparians may be known and allocated flows prior to pre-1914

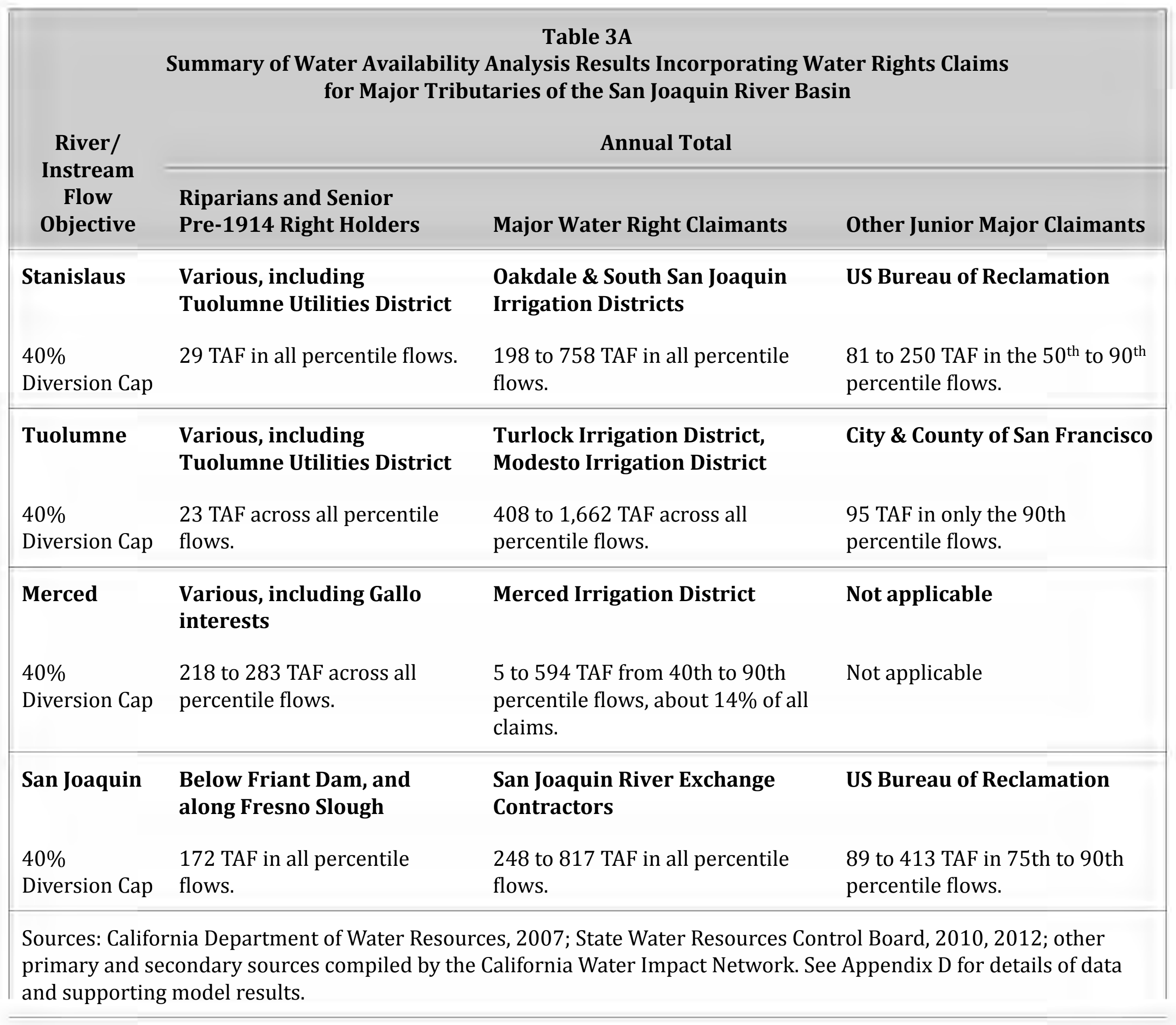


Table 3A
Summary of Water Availability Analysis Results Incorporating Water Rights Claims for Major Tributaries of the San Joaquin River Basin

River/ Instream Flow Objective	Annual Total		
	Riparians and Senior Pre-1914 Right Holders	**Major Water Right Claimants**	**Other Junior Major Claimants**
Stanislaus	**Various, including Tuolumne Utilities District**	**Oakdale & South San Joaquin Irrigation Districts**	**US Bureau of Reclamation**
40% Diversion Cap	29 TAF in all percentile flows.	198 to 758 TAF in all percentile flows.	81 to 250 TAF in the 50th to 90th percentile flows.
Tuolumne	**Various, including Tuolumne Utilities District**	**Turlock Irrigation District, Modesto Irrigation District**	**City & County of San Francisco**
40% Diversion Cap	23 TAF across all percentile flows.	408 to 1,662 TAF across all percentile flows.	95 TAF in only the 90th percentile flows.
Merced	**Various, including Gallo interests**	**Merced Irrigation District**	**Not applicable**
40% Diversion Cap	218 to 283 TAF across all percentile flows.	5 to 594 TAF from 40th to 90th percentile flows, about 14% of all claims.	Not applicable
San Joaquin	**Below Friant Dam, and along Fresno Slough**	**San Joaquin River Exchange Contractors**	**US Bureau of Reclamation**
40% Diversion Cap	172 TAF in all percentile flows.	248 to 817 TAF in all percentile flows.	89 to 413 TAF in 75th to 90th percentile flows.

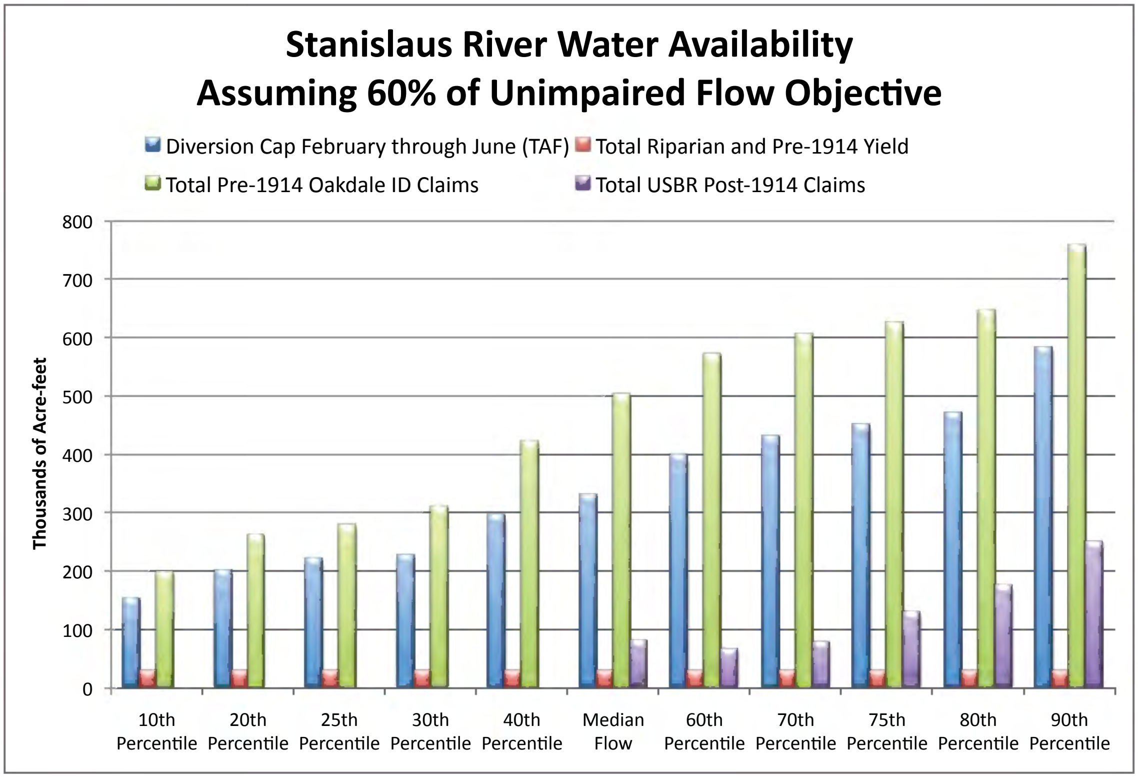
Sources: California Department of Water Resources, 2007; State Water Resources Control Board, 2010, 2012; other primary and secondary sources compiled by the California Water Impact Network. See Appendix D for details of data and supporting model results.

right holders. Pre-1914 water right claims tend to comprise the majority, or in most cases exceed the unimpaired flows in most (and in some cases, all) decile flows reported in the analysis.

Table 3B
Summary of Water Availability Analysis Results Incorporating Water Rights Claims for the Trinity River and the Major Tributaries of the Sacramento River Basin

River/ Instream Flow Objective	Annual Total		
	Riparians and Senior Pre-1914 Right Holders	**Major Water Right Claimants**	**Other Junior Major Claimants**
Trinity	**Various, small claimants**	**US Bureau of Reclamation**	**Not applicable**
25% Diversion Cap	134 TAF in all percentile flows.	77 to 454 TAF across all percentile flows.	Not applicable.
Sacramento River above Feather River Confluence	**Various, including Anderson-Cottonwood ID and Glenn Colusa ID**	**Early Post-1914 to early 1927 claimants**	**CVP and Feather River Project Filings from 1927 through 1961**
25% Diversion Cap	2,094 to 5,983 TAF ranging across all percentile flows.	0 TAF across range of all percentile flows.	0 TAF across range of all percentile flows.
Feather River	**Western Canal WD and Joint Water Districts, adjudication decrees**	**South Feather and Thermalito 1920s Rights**	**DWR 1927, 1951, and 1956 Claims**
25% Diversion Cap	729 to 1,972 TAF ranging across all percentile flows.	4 to 34 TAF from 20th to 90th percentile flows.	7 to 236 TAF in all percentile flows.
Yuba River	**Various, including Nevada ID, City of Nevada City**	**Nevada ID and Yuba Co WD 1920s Rights**	**Yuba County Water Agency 1927 Claims**
25% Diversion Cap	258 to 1,004 TAF ranging across all percentile flows.	10 to 12 TAF only at 25th to 80th percentile flows.	20 to 81 TAF among 50th to 80th percentile flows.
Bear River	**Various, including Nevada ID**	**Camp Far West and Nevada ID Claims**	**South Sutter Water District Claims**
25% Diversion Cap	26 to 92 TAF ranging across all percentile flows.	1 to 54 TAF across all percentile flows.	4 to 9 TAF from 50th to 90th percentile flows.
American River	**Various, including San Juan Water District, Nevada ID and City of Sacramento Post-1914 Claims**	**Georgetown Divide PUD and Placer County Water Agency**	**US Bureau of Reclamation**
25% Diversion Cap	291 to 1,006 TAF ranging across all percentile flows.	8 to 183 TAF from 50th from all percentile flows.	9 to 139 TAF in all percentile flows.

Sources: California Department of Water Resources 2007; State Water Resources Control Board 2010 and 2012; other primary and secondary sources compiled by the California Water Impact Network. See Appendix D for details of data and supporting model results.



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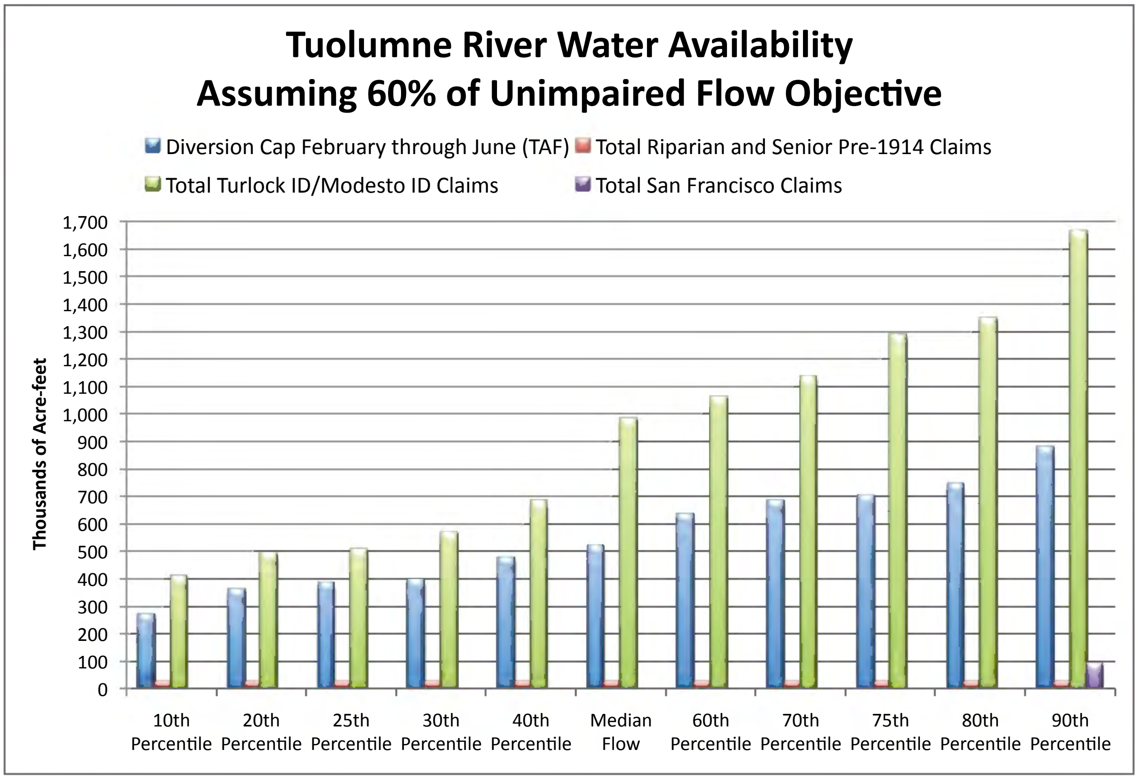

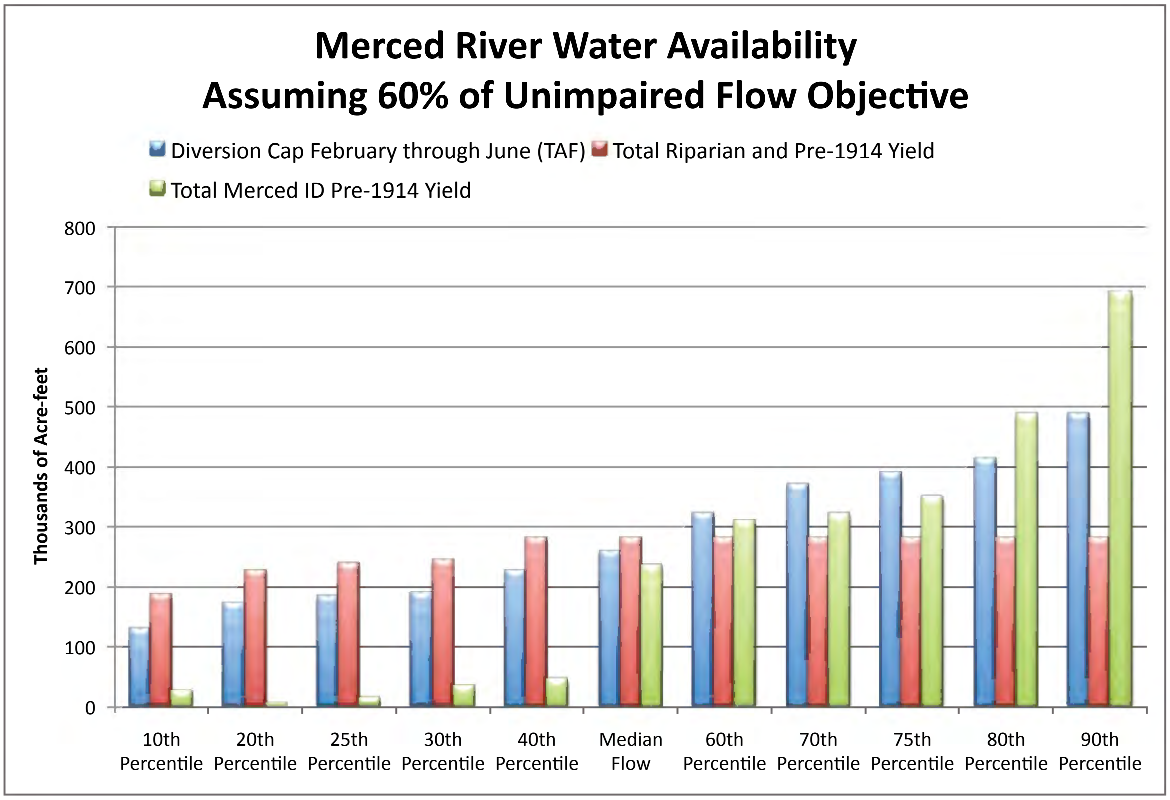

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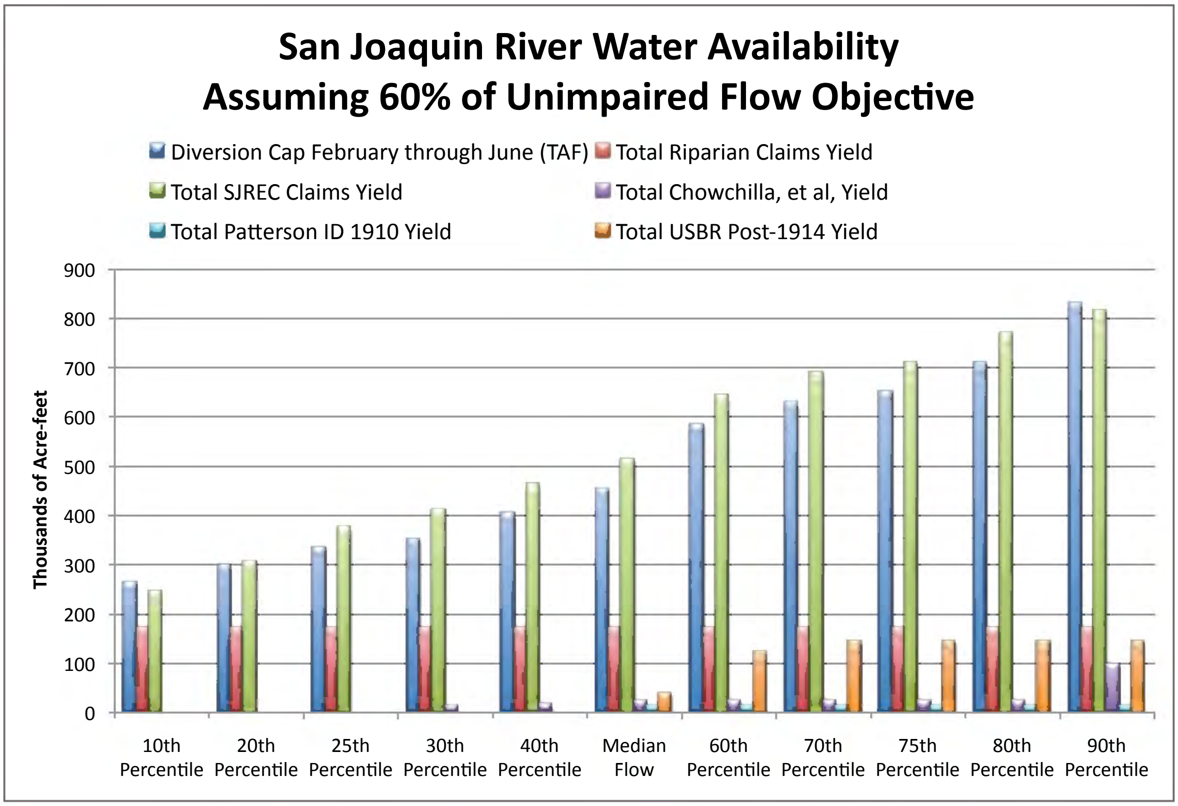

Stanislaus River (Figure 1)

Implications: Under strict application of both the 40 percent diversion cap and the water rights priority system in the Stanislaus River watershed, the US Bureau of Reclamation's water rights for New Melones Reservoir yields only a small fraction of Bureau claims in actual supplies.

Tuolumne River (Figure 2)

Implications: Under strict application of both the 40 percent diversion cap and the water rights priority system, the City and County of San Francisco would have reliable rights to water only in the wettest 10 percent of flows.

Merced River (Figure 3)

Implications: Under strict application of the water rights priority system to the 40 percent diversion cap, Merced Irrigation District's pre-1914 water rights exceed its post-1914 claims significantly, but are junior to a large amount of riparian and senior pre-1914 right holders.

San Joaquin River (Figure 4)

Implications: Only the small riparian allocations along the upper San Joaquin River would have fully reliable flows. The Exchange Contractors would have full claims on flows about 30 percent of the time (at the 70th percentile flows and above). The Bureau of Reclamation would not receive allocations except in the wettest 30 percent of years at all, and would receive its full allocation no more than about 10 percent of the time.

Trinity River (Figure 5)

Implications: Riparian and pre-1914 water right holders on this river system are few. The Bureau's post-1914 water rights to develop Trinity Reservoir and Lewiston Dam, and the hydropower complex linked to Keswick Dam along Clear Creek are the dominant water rights on the Trinity River. As noted in Table 2, however, the consumptive use rights alone appear to be quite excessive relative to Trinity River's unimpaired flow hydrology.[3]

Sacramento River Above Feather River Confluence (Figure 6)

Implications: Because of large pre-1914 water rights claims by Glenn-Colusa Irrigation District along the Sacramento River, no water would be available to the US Bureau of Reclamation, except from Trinity River exports. Strict application of this pattern of water rights claims would dramatically reduce water available for export from the Sacramento River Basin and potentially undermine the San Joaquin River Exchange Contract.

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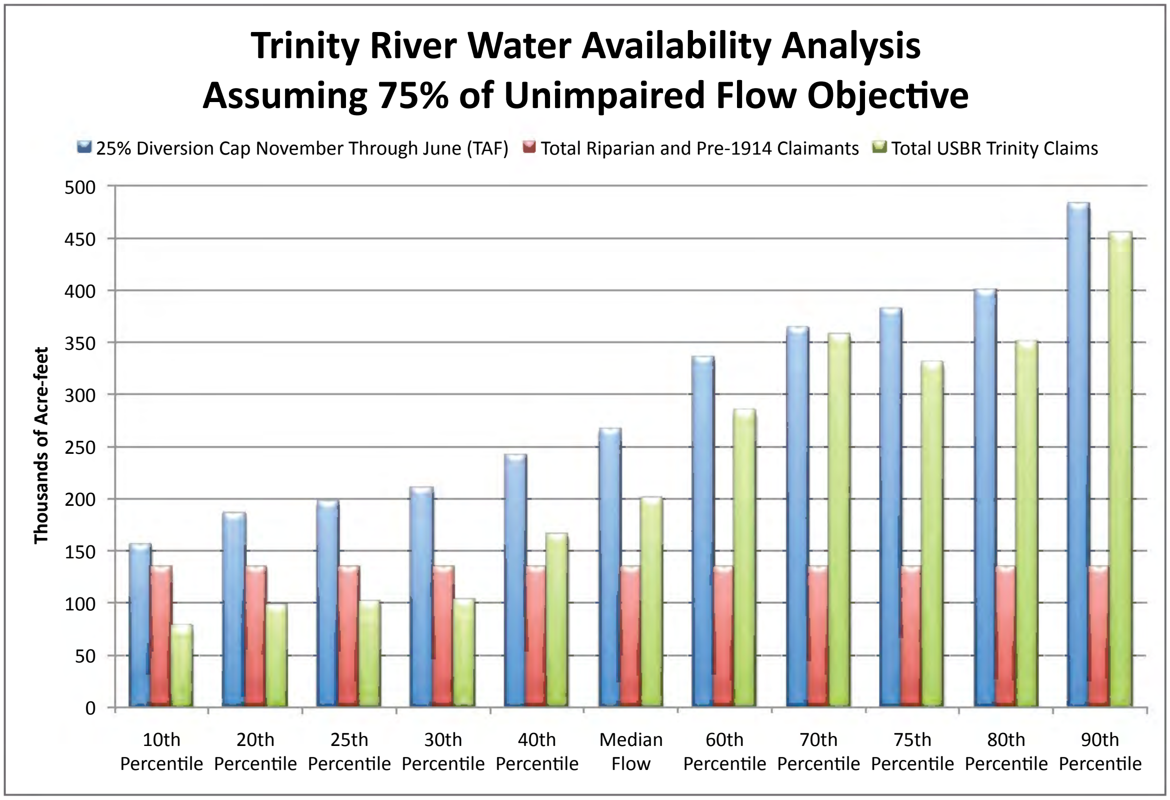
[3] Our analysis applies to the Trinity the Board's 75 percent of unimpaired flow determination for November through June. This flow determination exceeds those of the 2000 Trinity Restoration Record of Decision. (US Department of the Interior 2000)



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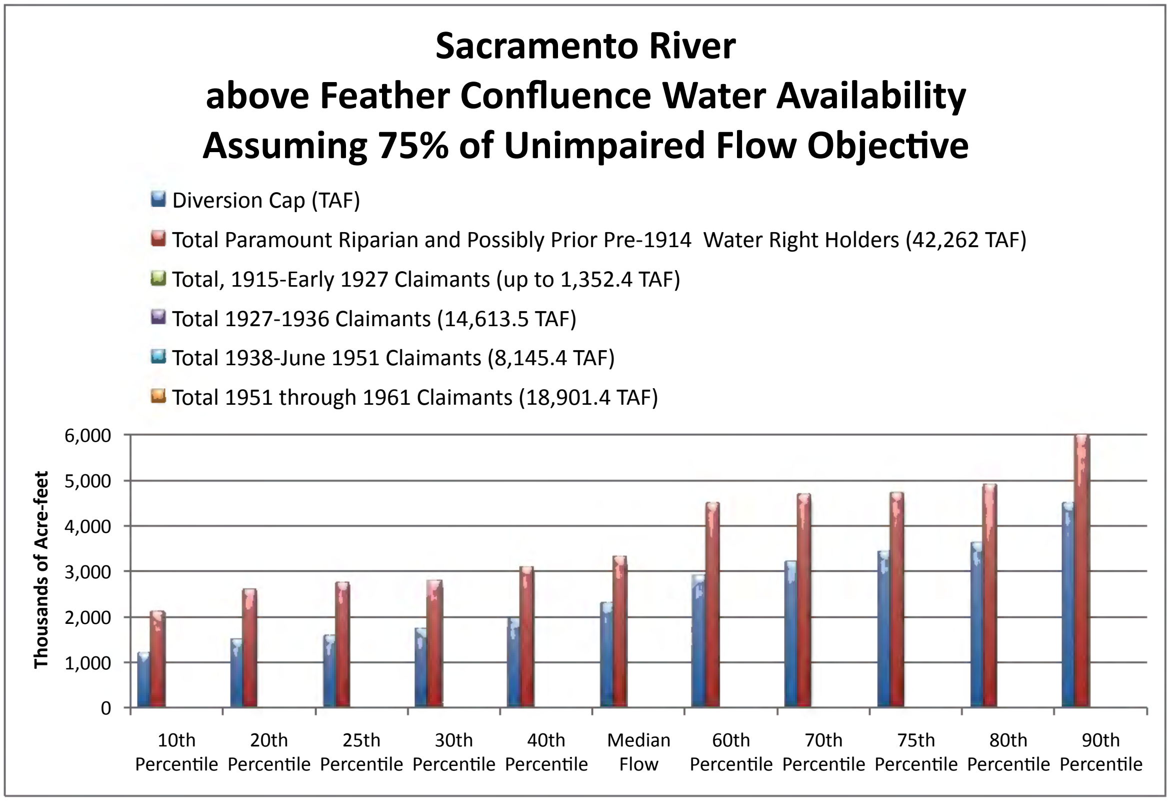

Feather River (Figure 7)

Implications: The Department of Water Resources' 1927, 1951, and 1956 water rights claims for the Feather River Project (now the State Water Project) would receive almost no water under a 25 percent diversion cap scenario. In drier years, even at relaxed diversion cap scenarios, DWR would receive only very small amounts. This is due to senior pre-1914 water rights claimants such as the Joint Water Districts[4] and Western Canal Water District, whose rights predate the cultivation of rice in the Butte County region, and were adjudicated in 1923. DWR's claims amount to about 10.4 million acre-feet (MAF) on the Feather River alone for consumptive uses.

Yuba River (Figure 8)

Implications: Nevada Irrigation District and Yuba County Water District, through their pre-1914 claims and 1920s water rights claims, would have senior claims to Yuba River flows. Full operation of these claims would nearly eliminate Yuba County Water Agency diversions under a 25 percent diversion cap scenario.

Bear River (Figure 9)

Implications: Because of senior water rights claims by Nevada Irrigation District and Camp Far West Irrigation District, South Sutter Water District would see its supplies reduced significantly relative to its claimed rights under a 25 percent diversion cap scenario.

American River (Figure 10)

Implications: The US Bureau of Reclamation's Central Valley Project facilities along the American River would receive very little water supplies from operation of the water rights priority system under a 25 percent diversion cap, despite having claimed up to 5.35 million acre-feet.

Discussion

Assuming that the State Water Board adopts the 75 percent unimpaired flow determination for the upstream tributaries of the Sacramento River Basin, the 60 percent of unimpaired flow determination for the San Joaquin River Basin, and that the water rights priority system is applied, it becomes evident that several significant water rights claimants that are junior in priority contribute dramatically to the problem of paper water: They have been promised water far in excess of flow conditions available to them in most years.

Table 4 summarizes the major water rights claimants whose titles to water in the Central Valley watershed tributaries should be considered clouded, whose property "boundaries" are in dispute.

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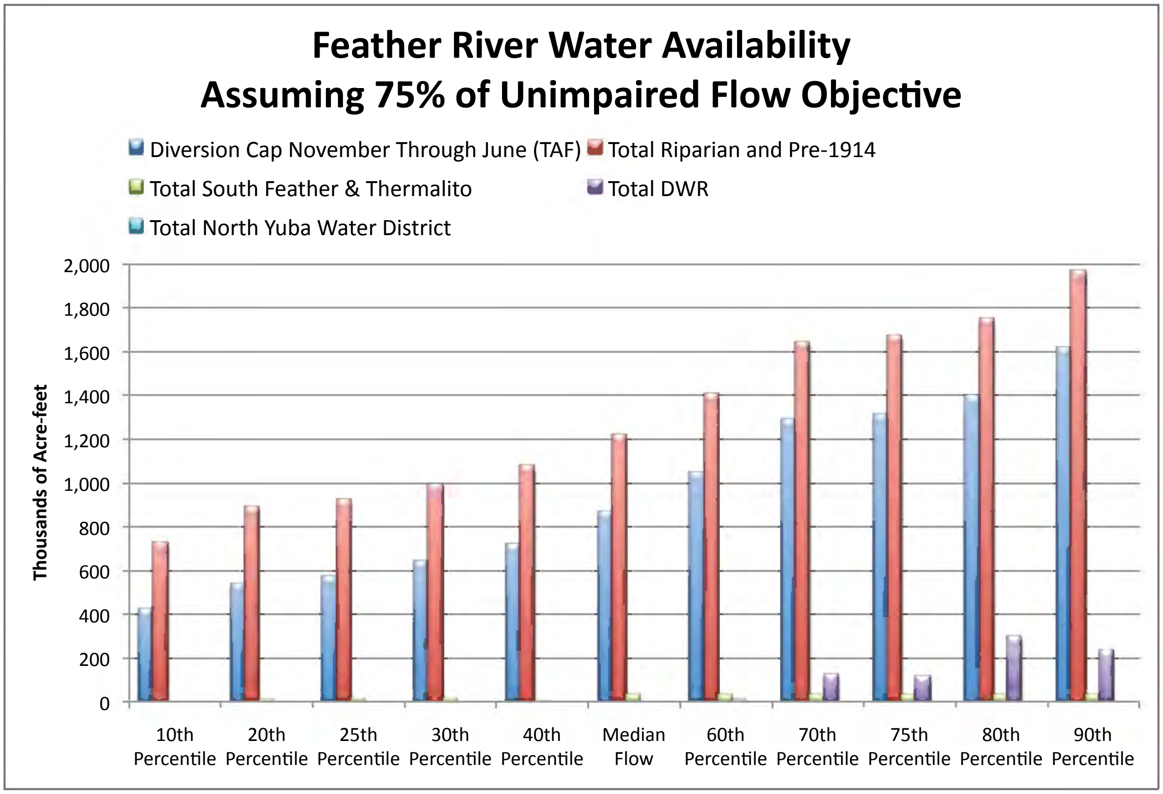
[4] The Joint Water Districts include Butte Water District, Biggs-West Gridley Water District, Richvale Irrigation District, and Sutter Extension Water District, the successors to pre-1914 water rights accumulated by the Sutter Butte Canal Company.



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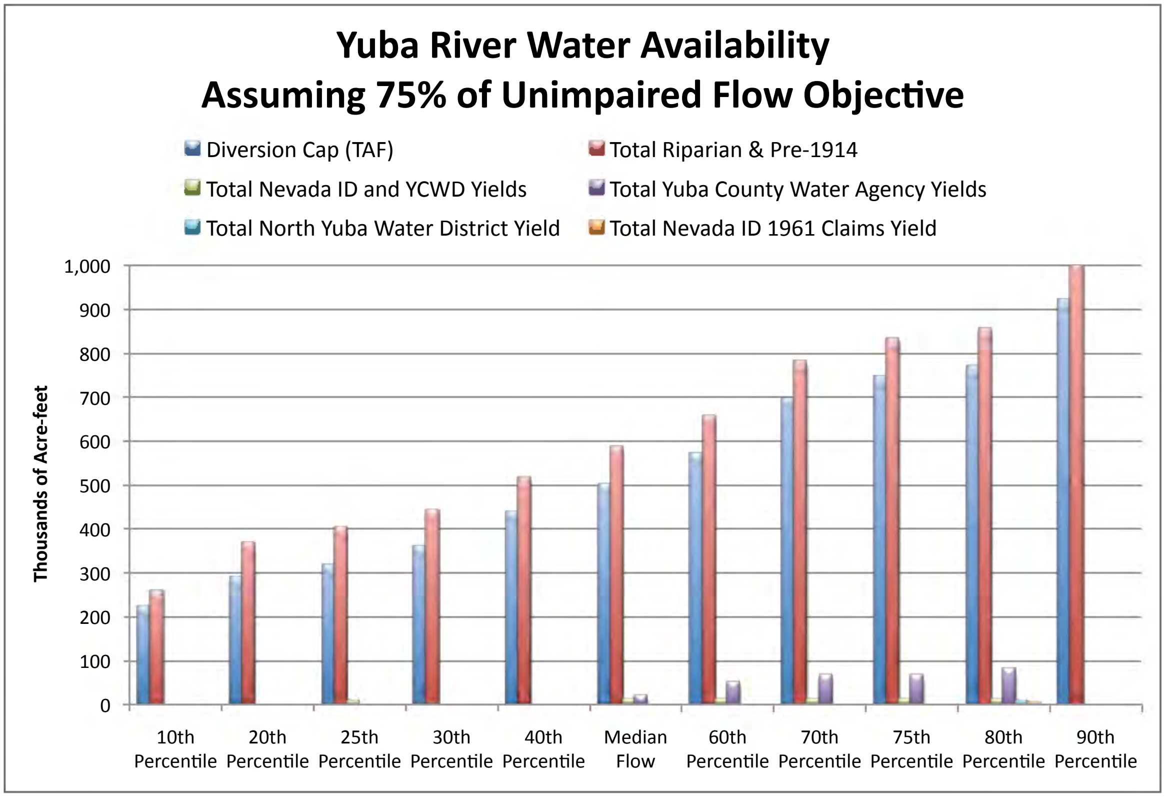

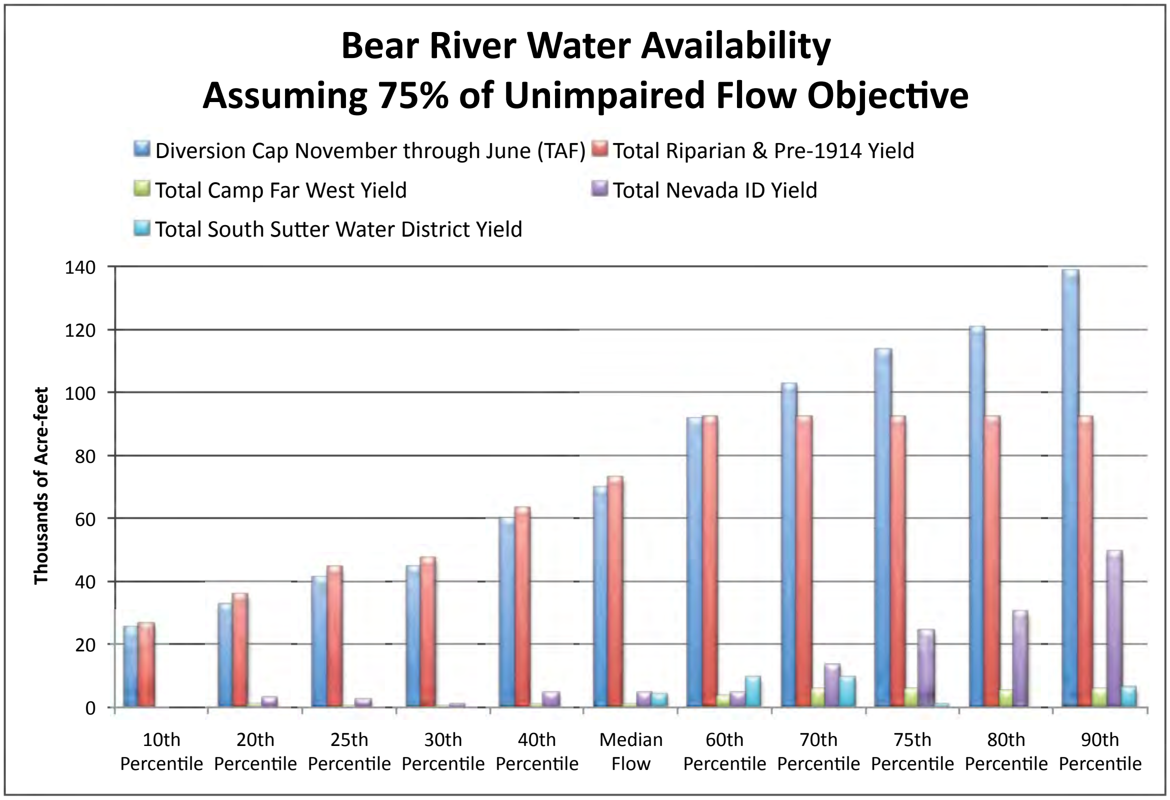

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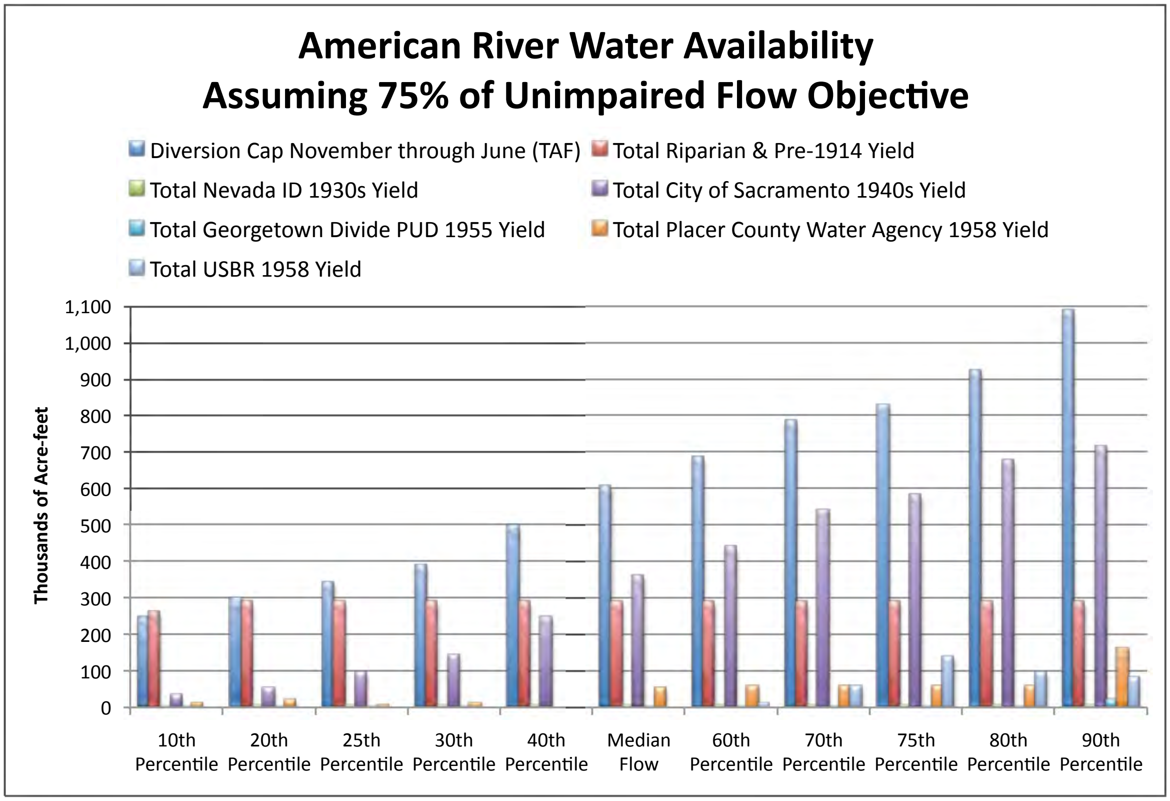

Table 4
Summary of Watershed Consumptive Water Rights Claimants by Reliability (Based on Legal Priority) of Claims

Watershed	Claimants with Highly Reliable Rights	Claimants with Potentially Clouded Titles to Water
Stanislaus River	Various claimants covered by Stanislaus River decree of 1929; Oakdale ID, South San Joaquin ID	US Bureau of Reclamation (New Melones)
Tuolumne River	Tuolumne Utilities District, Turlock Irrigation District, Modesto Irrigation District	City and County of San Francisco (1901 through 1911 rights)
Merced River	Gallo, various riparian and pre-1914 parties to early Merced River decrees	Merced Irrigation District (post-1914 rights)
San Joaquin River	Paramount riparian claimants, San Joaquin River Exchange Contractors, Chowcilla WD, Tranquillity & James IDs, Patterson ID	US Bureau of Reclamation (post-1916 rights)
Trinity River	Various small riparian and pre-1914 claimants, US Bureau of Reclamation	US Bureau of Reclamation (has overstated water claims compared with actual basin hydrology)
Sacramento River (including west and east creeks, Pit and McCloud Rivers)	Various small riparian and pre-1914 claimants, claimants among adjudicated watersheds in Pit River region, Anderson-Cottonwood Irrigation District, Glenn-Colusa Irrigation District	US Bureau of Reclamation (Shasta Lake)
Feather River	Upper watershed adjudicated claimants, Joint Water Districts, Western Canal WD	California Department of Water Resources (Lake Oroville)
Yuba River	Browns Valley ID, Nevada ID, Yuba County WD	Yuba County Water Agency (1927 rights), Nevada ID (1930s rights), and North Yuba Water District (1958 rights)
Bear River	Nevada ID, Camp Far West ID	South Sutter Water District (1952 and 1981 rights)
American River	City of Folsom, San Juan WD, Georgetown Divide PUD, El Dorado ID, Nevada ID, Placer County Water Agency, City of Sacramento	US Bureau of Reclamation (Folsom Lake), Foresthill PUD

Sources: California Department of Water Resources; State Water Resources Control Board; California Water Impact Network.

By adopting its public trust Delta inflow determinations as flow objectives in the Bay-Delta Plan for each major tributary, and applying water rights priorities—in that order—the State Water Resources Control Board can use its authority to eliminate paper water (water claims that do not have a basis in water rights law) in the Bay-Delta Estuary's Central Valley watershed. The California Constitution reminds us that no one in California has a right to use or divert water wastefully or unreasonably. The state's public trust responsibility requires protection of the waters of the state for the benefit of all beneficial users, not just water rights holders. The state's water quality control planning obligations carry out this responsibility. It also helps the state meet its public trust obligations as well. The doctrine of prior appropriation requires that senior water right holders be served before junior water right holders. The water quality control planning process and the water rights priority system on the major tributaries of the Sacramento and San Joaquin River Basins should be used as tools for eliminating paper water—that is, for quieting water titles, and ending trespasses and boundary disputes that compromise public trust resources—from the Bay-Delta Estuary's Central Valley watershed.

Paths for Aligning Water Rights with All Other Beneficial Uses and River Flows

We see three primary paths by which the State Water Resources Control Board can align water rights with all other beneficial uses and river flows:

- Water quality control plan implementation,
- Fully-appropriated streams declaration and Term 91, and
- Court adjudication.

Water Quality Control Plan Implementation. The State Water Resources Control Board has approved a Delta inflow determination for the San Joaquin River at Vernalis of 60 percent of unimpaired flow during the February through June period. For the Sacramento the Board approved a 75 percent of unimpaired flow determination for the November through June period. In doing so, the Board would implicitly place a cap on total diversions for each major tributary of 40 percent of unimpaired flow for the San Joaquin River and 25 percent of unimpaired flow for the Sacramento River Basin. These objectives would result in instream flows that are substantially greater in most years than current instream flow requirements now provide. In our water availability analysis, we also apply the Sacramento River Basin 75 percent objective rather than the Trinity Record of Decision flow objectives to the water availability analysis for the Trinity River. (US Department of the Interior 2000: 12)

Key water rights holders in these basins possess riparian and pre-1914 water rights that exist prior to the regulatory powers of the State Water Resources Control Board. On the question of implementing water quality control plans and adhering to state water rights law, the issue has arisen of the Board's jurisdiction over those water rights that the Board did not originally consent to.

Attorney Tim O'Laughlin, representing the San Joaquin River Group Authority (SJRGA), has asked the State Water Resources Control Board to "identify the legal theory or approach it will use at the implementation proceeding in order to obtain the necessary flows to meet the additional flow requirements identified" in the Board's flow studies. Without that legal theory or approach, O'Laughlin argues, the State Water Resources Control Board will be unable to complete economic or other impacts analysis in its Substitute Environmental Document on the San Joaquin River Flow and South Delta salinity objectives. He further contended in February 2011 that the Board is operating according to *some* kind of theory since it

> blatantly **suggests** that additional flows will come from the Stanislaus, Tuolumne, and Merced Rivers. [State Water Resources Control Board 2011c, pp. 78, 81, and 85-89] This foreshadowing demonstrates that the SWRCB not only believes that, regardless of the Vernalis flow alternative eventually adopted, it will be able to obtain flow from all the tributaries, but that it intends to do so. That approach, however, completely ignores the existence of the water right priority system. (See, e.g., *Pleasant Valley Canal Company v. Borror* (1998) 61 Cal.App.4th 742, 770; *City of*

> *Barstow v. Mojave Water Agency* (2000) 23 Cal. 4th 1224, 1243; see also *El Dorado Irrigation District v. State Water Resources Control Board* (2006) 142 Cal. App.4th 937, 961). As the SJRGA has pointed out to the SWRCB on numerous occasions, any approach to allocating responsibility for new Vernalis flow requirements must incorporate the water rights priority system. That said, the SJRGA recognizes that strict application of the water right priority system does not produce straightforward results such that the water required to meet the selected Vernalis flow alternative would come from a particular waterway or tributary, or that such water would roughly be divided equally or proportionally among such waterways and tributaries. (O'Laughlin 2011a: 1-2; emphasis in original)

O'Laughlin, on behalf of SJRGA, asserts that the Board has no jurisdiction to regulate pre-1914 appropriative water rights or riparian rights, regardless of any legal theory the Board intends to use in the implementation phase. If responsibility for new Vernalis flow requirements is determined solely based on the water rights priority system, writes O'Laughlin, "junior water right holders will be required to reduce or completely cease their water use before senior appropriators will be required to reduce theirs" as required in California's doctrine of prior appropriation. (O'Laughlin 2011a)

He wrote to the Board subsequently in June 2011 about its jurisdiction in the Bay-Delta proceedings. There he stated, "It now appears that the [Substitute Environmental Document] is being prepared solely on the basis of percentage of natural flow, without regard to the nature or priority of the water rights affected, and will therefore be the subject of immediate litigation." (He is here apparently referring to the Board's proposed use of a percentage of unimpaired flow as the basis for limiting diversions.) O'Laughlin also reiterated in this letter to the Board that it

> does not have jurisdiction over pre-1914 appropriative water rights for any reason, including the implementation of water quality objectives adopted pursuant to the State Water Resources Control Board's authority under Porter-Cologne. Given the prevalence of pre-1914 appropriative rights held in the San Joaquin River Basin, and the scope of the percentage of natural flow that the [Board] is considering, it is almost certain that there will be times and conditions where the [Board] will not be able to implement a percentage of natural flow. It is arbitrary and capricious for the [Board] to continue to consider a percentage of natural flow as one of its objectives without knowing how often, if ever, it will be able to require such percentages be met. (O'Laughlin 2011b)

O'Laughlin argues that the Board's flow objective results may not be achievable if, for example, flow is 100 cfs and the Board applies a 60 percent instream flow criterion to this waterway while pre-1914 water right holders may claim 80 percent of the flow in the stream. In that case, the Board, contends O'Laughlin, "would not be able to obtain the full 60 percent flow it desired." O'Laughlin contends that this not only renders the Delta flow criterion infeasible, it means that evaluation of criterion alternatives under the California Environmental Quality Act in the Substitute Environmental Document will also be infeasible and the SED thus inadequate.

Of course, contrary to the Racanelli decision, O'Laughlin elevates the water rights priority system to paramount status in California water and environmental law. It is plain from a review of state water case law that water rights priorities, while important, are not paramount considerations when the Board takes up the protection of beneficial uses of water. As Justice Racanelli stated, water quality control planning must concern itself with the regulation of *beneficial uses*, not water rights strictly speaking. Beneficial uses include, and go well beyond, water rights and their relative priorities. (See sidebar, page 26.) The Racanelli decision made clear that the State Water Resources Control Board has authority to implement its water quality control plan by regulating all beneficial uses. Adjusting quantities in water rights is within its authority.

Beneficial Uses Served in the Bay-Delta Water Quality Control Plan:

- **Municipal and Domestic Supply**
- **Industrial Service Supply**
- **Industrial Process Supply**
- **Agricultural Supply**
- **Ground Water Recharge**
- **Navigation**
- **Water Contact Recreation**
- **Non-Contact Water Recreation**
- **Shellfish Harvesting**
- **Commercial and Sport Fishing**
- **Warm Freshwater Habitat**
- **Cold Freshwater Habitat**
- **Migration of Aquatic Organisms**
- **Spawning, Reproduction, and/or Early Development**
- **Estuarine Habitat**
- **Wildlife Habitat**
- **Rare, Threatened, or Endangered Species**

Source: State Water Resources Control Board 2006: 8-9.

Moreover, the Board retains authority to regulate pre-1914 water rights under its constitutional authority to prohibit waste and unreasonable use of water. The Legislature provided in the California Water Code key sections that do not limit the Board's authority to investigate rivers and streams in the service of the state's constitutional provisions (emphases added).

> 275. *The department and board shall take all appropriate proceedings or actions* before executive, legislative, or judicial agencies *to prevent waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of water in this state*.
>
> ...
>
> 1050. This division is hereby declared to be in furtherance of the policy contained in Section 2 of Article X of the California Constitution and in all respects for the welfare and benefit of the people of the state, for the improvement of their prosperity and their living conditions, and *the board and the department shall be regarded as performing a governmental function in carrying out the provisions of this division*.
>
> 1051. The board for the purpose of this division may:
> (a) *Investigate all streams, stream systems, portions of stream systems, lakes, or other bodies of water*.
> (b) Take testimony in regard to the rights to water or the use of water thereon or therein.
> (c) *Ascertain whether or not water heretofore filed upon or attempted to be appropriated is appropriated under the laws of this State*.
>
> ...
>
> 1052. (a) The *diversion or use of water subject to this division other than as authorized in this division is a trespass*.
> (b) Civil liability may be administratively imposed by the board pursuant to Section 1055 for a trespass as defined in this section in an amount not to exceed five hundred dollars ($500) for each day in which the trespass occurs.
> (c) The Attorney General, upon request of the board, shall institute in the superior court in and for any county wherein the diversion or use is threatened, is occurring, or has occurred appropriate action for the issuance of injunctive relief as may be warranted by way of temporary restraining order, preliminary injunction, or permanent injunction.
> (d) Any person or entity committing a trespass as defined in this section may be liable for a sum not to exceed five hundred dollars ($500) for each day in which the trespass occurs. The Attorney General, upon request of the board, shall petition the superior court to impose, assess, and recover any sums pursuant to this subdivision. In determining the appropriate amount, the court shall take into consideration all relevant circumstances, including, but not limited to, the

> extent of harm caused by the violation, the nature and persistence of the violation, the length of time over which the violation occurs, and the corrective action, if any, taken by the violator.
>
> (e) All funds recovered pursuant to this section shall be deposited in the Water Rights Fund established pursuant to Section 1550.
>
> (f) The remedies prescribed in this section are cumulative and not alternative.
>
> ...
>
> 1825. It is the intent of the Legislature that *the state should take vigorous action* to enforce the terms and conditions of permits licenses, certifications, and registrations to appropriate water, to enforce state board orders and decisions, and *to prevent the unlawful diversion of water.*
>
> ...
>
> 2501. The board may determine, in the proceedings provided for in this chapter, all rights to water of a stream system whether based upon appropriation, riparian right, or other basis of right.

Nothing in these sections of the Water Code prevents the Board from investigating pre-1914 water rights and eliminating illegal diversions should they be found. Water Code Section 275, appears to extend this authority of the Board to determining whether any water use is wasteful or unreasonable, or any method of use, or method of diversion is wasteful or unreasonable.

These sections provided authority for the Board to investigate pre-1914 and riparian water rights in the Delta recently. In these investigations, the Board has issued water rights orders that in at least one instance adjusted the rights of a riparian water right holder. (Wilson 2012) Mr. O'Laughlin is surely aware of this authority. On behalf of the San Joaquin River Group Authority, his comments on the Board's 2008-2012 strategic work plan helped initiate the Delta water rights investigations in 2008. He cited California Water Code Section 1825 to support the San Joaquin River Group Authority's recommendation that the Board investigate Delta riparian and pre-1914 water rights. (San Joaquin River Group Authority 2008: 64)

When the Board moves to adjust diversion amounts in the Delta's major tributaries. The Board should apply a diversion cap during the regulated period applicable to each tributary (including the Upper San Joaquin River; see Appendix B) and then allocate diversions according to water rights priority. C-WIN analyzes operation of the water rights priority system in the following river profiles.

Our testimony analyzes water availability using water rights priorities as a way of identifying the legal method for allocating responsibility for Delta inflows that are fully protective of public trust resources in the Delta.

The Board announced in two notices (dated February 13, 2009, and April 1, 2011, the latter containing revisions to the earlier Notice) its intent to revise the Bay Delta Water Quality Control Plan of 2006. This plan traces its lineage to the 1995 Bay Delta Water Quality Control Plan and the Bay-Delta Accord. The San Joaquin River flow and South Delta salinity objective process is likely to be a step in the right direction away from these failed plans. The well-documented failures of this misguided loyalty include:

- Anadromous fishery declines throughout the Central Valley watershed of the Delta estuary.
- Declines of pelagic (open water) aquatic ecosystem regimes throughout the Delta
- Continued listing of endangered species, including salmon, steelhead, Delta smelt, longfin smelt, Sacramento splittail, and green sturgeon.
- Chronic violations from 2005 through 2009 of south Delta salinity objectives in both the Bay-Delta Water Quality Control Plan and Water Rights Decision 1641 that are intended to protect agricultural beneficial uses in this part of the Delta.

- Historic record Delta pumped exports between 2000 and 2006, peaking at nearly 6.4 million acre-feet. (More recently, 2011 exports reached 6.7 million acre-feet.)

From the two NOPs, it appears the Board prepares to incorporate flow objectives for major tributaries of the San Joaquin River: the Stanislaus, the Tuolumne, and the Merced rivers. It appears to us the Board intends to require fair share flow contributions from each of these important rivers to flows of the mainstem San Joaquin as inflow to the Delta as measured at Vernalis. Our organizations welcome this prospect in concept, and support the Board's efforts toward this goal, despite legal, ecological, and engineering challenges ahead.

The 1986 Delta Water Cases decision (also named as the "Racanelli decision" for its author, presiding Justice John Racanelli of the Third District Court of Appeals in California) bears review because it defines the Board's water quality planning duties for the Delta and its watershed. (California Appeals Court, Third District 1986) When it comes to the Board's role in undertaking its duty to fulfill its water quality planning function, the Racanelli court stated:

> In its *water quality* role of setting the level of water quality protection, the Board's task is not to protect water rights, but to protect 'beneficial uses.' The Board is obligated to adopt a water quality control plan consistent with the overall statewide interest in water quality [citation to California Water Code §13240] which will ensure 'the reasonable protection of *beneficial uses*' (§13241, emphasis added). Its legislated mission is to protect the 'quality of all the waters of the state...for use and enjoyment by the people of the state." (§ 13000, 1st para., emphasis added.) (California Appeals Court, Third District 1986: 178)

Thus, protection of beneficial uses must be the Board's paramount goal in this process. Beneficial uses make up "all competing demands for water" which must receive Board attention during public trust balancing and analysis. Water rights are among the Board's implementation tools for achieving the protection of beneficial uses in California's Central Valley watershed and Delta estuary, not strictly ends in themselves in this context.

Justice Racanelli wrote that the State Water Resources Control Board has a dual role of regulating both water quality and adjudicating water rights. The Racanelli court stated:

> In performing its dual role, including development of water quality objectives, the Board is directed to consider not only the availability of unappropriated water...but also *all* competing demands for water in determining what is a reasonable level of water quality protection. (California Appeals Court, Third District 1986: 179-180)

The Delta Water Cases came about because the Board construed its scope for water quality planning too narrowly, focusing on the major stakeholders in the Delta: the Bureau, the Department of Water Resources, and their respective contractors. The Board erred in doing so, the Racanelli court stated.

> ...the Board must consider 'past, present, and probable future beneficial uses of water'...as well as 'water quality conditions that could reasonably be achieved through the coordinated control of *all* factors which affect water quality in the area'. Unfortunately, the Board neglected to do so. (California Appeals Court, Third District 1986: 180)

That was 26 years ago. As we will indicate below, C-WIN is deeply concerned that the Board may still neglect significant, realistic alternatives that will be essential to fulfilling its water quality planning role for solving problems in the Bay-Delta estuary and the larger Central Valley watershed.

Fortunately, the Board can avoid such neglect. Justice Racanelli wrote that the Board "need only take *the larger view of the water resources* in arriving at a reasonable estimate of all water uses, an activity well within its water rights function to determine the availability of unappropriated water." And he added, "We think a similar *global perspective* is essential to fulfill the Board's water quality planning obligations." (California Appeals Court, Third District 1986, emphasis added) Justice Racanelli stated later that the Board compromised its role in previous water quality control plans when it defined its scope for action too narrowly "in terms of enforceable water rights. In fact," the judge wrote, "the Board's water quality obligations are not so limited."

> ...in order to fulfill adequately its water quality planning obligations, we believe the Board cannot ignore other actions which could be taken to achieve Delta water quality, such as remedial actions to curtail excess diversions and pollution by other water users. (California Appeals Court, Third District 1986: 182)

The Board's "paramount duty" remains to "provide 'reasonable protection' to beneficial uses, considering all the demands made upon the water." Finally, Justice Racanelli concludes about the Board's water quality planning powers:

> Thus, we do not believe that difficulty in enforcement justifies a bypass of the legislative imperative to establish water quality objectives which in the judgment of the Board will ensure reasonable protection of beneficial uses. (California Appeals Court, Third District 1986: 182)

C-WIN believes that a credible water quality control plan for the Bay Delta estuary must take what Racanelli deemed the "global perspective" in order to redress the ecological collapse and cumulative salinization and pollution resulting from the Board's water quality planning efforts to date. The 1994 Bay-Delta Accord's water quality control planning pendulum swung too far in favor of water right holders and water contractors, and their respective beneficial uses. The Board's duty now is to credibly balance all of the beneficial uses of water in the estuary so that public trust resources are protected, and so that reasonable uses and methods of diversion of water are employed by all water users.

In addition to the water quality planning obligations that Justice Racanelli eloquently addressed, recent state legislation provides additional authority to the State Water Resources Control Board. Using this added authority, the Board can better protect water quality and beneficial uses in the Bay-Delta Estuary and the Central Valley watershed. We point to two new laws enacted in 2009.

The State Water Resources Control Board has already fulfilled its obligation under California Water Code Section 85086(c) and (e) to prepare a public trust assessment of the Bay-Delta flow criteria needed to protect fish and wildlife beneficial uses. While not a "balancing" analysis required under public trust doctrine, the Board's *Delta Flow Criteria Report* provides valuable scientific analysis and findings that must be used to help the Board fulfill its water quality planning responsibilities and achieve protective public trust resource outcomes in the Bay-Delta estuary. The report employed the best available science in arriving at its findings. (State Water Resources Control Board 2010b)

The same legislative package also changed the California Water Code to recognize the need to reduce reliance on the Delta as a source of water for California:

> 85021. The policy of the State of California is to reduce reliance on the Delta in meeting California's future water supply needs through a statewide strategy of investing in improved regional supplies, conservation, and water use efficiency. Each region that depends on water from the Delta watershed shall improve its regional self-reliance for water through investment

> in water use efficiency, water recycling, advanced water technologies, local and regional water supply projects, and improved regional coordination of local and regional water supply efforts.[5]

These new laws provide the Board with additional legal and political tools aiding the protection of all beneficial uses, particularly fish and wildlife beneficial uses whose protection has been neglected for decades.

The Water Code's Fully Appropriated Stream Provisions and Term 91. The Board will need to revise its 1998 water rights order concerning fully appropriated streams, and revisit its application of Term 91 curtailment of post-1978 water rights permittees. Our water availability analysis helps show where key seasonal and priority thresholds may occur under the Board's new Delta inflow objectives.

California's Water Code implicitly acknowledges the potential for over-appropriation to occur and provides a process by which the State Water Resources Control Board may take steps to avoid or prevent excessive water promises. The Board can declare streams to be fully-appropriated on a month by month basis in every watershed of California under Sections 1205 through 1207. Its statutory language is reproduced in Appendix F to this testimony.

Section 1205(b) provides that a declaration that a stream system is fully appropriated shall contain a finding that the supply of water in the stream system is fully applied to beneficial uses where the Board finds that previous water rights decisions have determined that no water remains available for appropriation. According to Section 1206(a) once a stream system is declared fully appropriated by the Board, the Board shall not accept for filing any application for a permit to appropriate water from the stream system described in the declaration, and may cancel an application pending on that date. Section 1206(b) states that the the Board may provide for exceptions to application filings under specified conditions, which may limit the purpose of use, the instantaneous rate of diversion, the season of diversion or the amount of water diverted annually.

Past State Water Resources Control Boards have declared fully-appropriated streams in California. (State Water Resources Control Board 1989; 1991; and 1998) The Board's most recent 1998 declaration included major reaches of all tributaries to the Sacramento and San Joaquin River Basins as fully appropriated, including the Trinity River. (State Water Resources Control Board 1998: Exhibit A)

The Board has also designated as fully appropriated some rivers and streams that are adjudicated or have reaches designated for protection under state and federal wild and scenic river legislation. Major portions of the Trinity, Middle Fork of the Feather, the Tuolumne, and the Merced are designated as wild and scenic rivers. Wild and scenic rivers are off-limits to appropriations year-round. Other rivers and streams are fully-appropriated primarily during irrigation season. Appendix G summarizes selected critical reaches of the Bay-Delta Estuary's Central Valley Watershed that are designated as fully-appropriated by the State Water Resources Control Board.

The Board's Full Appropriation Declaration blurs the distinction between water rights claims and water usage by claimants. Commendably, the Board has identified reaches of streams that are off-limits to new permanent applications to appropriate water. C-WIN identified several streams where it appears that the Board has excluded riparian and pre-1914 water rights in formulating its declaration. This appears to be the case on the Sacramento mainstem, the Tuolumne, the Merced, and the Yuba. On these rivers, substantial periods of the year are still officially open under the

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[5] California Water Code §85021, passed November 2009.

Board's declaration to applications to appropriate. Substantial amounts of pre-1914 water rights do not appear to be considered in the Board's determination that a stream is fully appropriated.

Section 1205(b) does require that the Board's declaration "shall contain a finding that the supply of water in the stream system is being fully applied to *beneficial uses* where the board finds that previous water rights decisions have determined that no water remains available for appropriation." (For a list of all Bay-Delta beneficial uses, see sidebar, page 26, above.) Note that the full-appropriation declaration legislation states that the supply of water is "being fully applied to beneficial uses" and not merely to the claims of water right holders.

There is no explicit analysis in the 1998 declaration by the State Water Resources Control Board of full application of water to beneficial uses as a direct consequence of citing its water rights decisions. This means that the full appropriation declarations are likely incomplete, albeit from a different standpoint. The Board may have construed Water Code Section 1205(b) as requiring the Board to rely on its archive of water rights decision, appropriately enough. But Water Code Section 1205(b) does not expressly limit the Board to use only water rights decisions, adjudications, and other determinative documents to justify these findings as evidenced by the Board's additional reliance on wild and scenic river designations. Its approved 2010 flow objectives for the Sacramento and San Joaquin River basin (while legislated to be informational and predecisional in Water Code Section 85086(c)(1)), could also be used to support findings of full appropriation for the Sacramento River, the San Joaquin River, and their other major tributaries. Instream flows serve natural beneficial uses as surely as water rights claims serve economic uses. Accounting for these instream flows as part of full appropriation declarations would increase the periods of full appropriation to include November through June throughout the Sacramento Basin, and February through June in the San Joaquin Basin, given the magnitude of water rights claims we have identified.

Moreover, Board decisions like Water Rights Decision 1594 (D-1594) acknowledge the Board's duty to account for all beneficial uses, such as those protected by the Board's Delta water quality and flow objectives.

C-WIN's planning-level water availability analysis allocates unimpaired flow hydrology, among instream flow objectives first, followed by water rights in order of priority status for the Sacramento and San Joaquin River basins. This planning-level method of water availability analysis demonstrates that the waters of the Sacramento and San Joaquin River Basin, from a planning standpoint, should indeed be declared fully appropriated. The full spectrum of beneficial uses is fully accounted for in allocating the Basins' flows to full protection of instream beneficial uses as well as those of all water rights claimants in California's water rights priority system. Moreover, this water availability analysis uses instream flow determinations that the Board itself endorsed in 2010 as Delta protective of public trust resources. It also indicates which major claimants have either poorly reliable or no water rights once all beneficial uses are accounted for.

A problem with the State Water Resources Control Board's fully-appropriated declaration involves its reliance on Water Right Decision 1594 (D-1594) from 1984. D-1594 authorizes the Board to place into permits (whose priority dates come after August 16, 1978) a new permit condition (called Term 91) notifying all permittees of its intent to curtail diversions of water right permittees. Curtailment occurs when flow and water quality conditions in the Delta demand that reservoir releases are needed to enable the California Department of Water Resources and the US Bureau of Reclamation to meet Delta water quality standards established by the Board. August 16, 1978, is significant as the date on which the Board adopted Water Right Decision 1485. This decision made the Bureau and the Department responsible for meeting water quality objectives in the Delta.

D-1594 expressly addresses water availability for appropriation (diversion) in the Bay-Delta Estuary's Central Valley watershed by subordinating junior appropriative water rights to adherence to Delta water quality objectives. D-1594 is cited by the State Water Board as the water right decision authority for including the Sacramento-San Joaquin Delta in the 1998 fully-appropriated streams water right order. This decision reaffirms the Board's reserved jurisdiction to revisit the season of diversion of water right permittees in the Bay-Delta Estuary watershed, and it establishes with standard permit Term 91 its authority to curtail diversions by post-1978 diverters so that storage releases by the Bureau and the Department can meet Delta water quality objectives.

In this decision, the Board states:

> The availability of water for appropriative water right permittees is affected by the quantity needed to satisfy holders of prior rights and the quantity necessary for protection of other beneficial uses. (State Water Resources Control Board 1983: 2)

In the process leading up to D-1594, the Board initiated a process to conduct a planning-level water availability analysis. Unfortunately, it abandoned that analysis:

> Staff had originally proposed a comprehensive analysis of water supply and demand which attempted to identify and quantify water usage by all diverters below the foothill reservoirs within the Delta watershed. [SWRCB Exhibit. 1, pp. 19-20] This approach was discontinued [apparently in April 1983, according to reporter's transcript dated April 11, 1983, p. 14, lines 16-20] due to the lack of adequate data for factors such as return flow, groundwater accretions, unmeasured tributary inflow, riparian use, appropriative use, and Delta consumptive use. (State Water Resources Control Board 1983: 9-10)

D-1594 states at least twice that application of Term 91 to post-1978 permittees is an "interim solution" or an "interim measure." Nearly 30 years later, the Board still employs Term 91's method of calculating water availability. D-1594 commits the Board to occasionally requiring the post-1978 permittees in the Delta's extensive watershed to curtail deliveries when flows are insufficient to meet Delta water quality objectives and protect the Delta's beneficial uses.

Our planning-level water availability analysis focuses on water rights claims compared to historical hydrology. As we earlier showed, it finds there are far more water right diversion claims than there are flows in the Bay-Delta Estuary's Central Valley watershed (including the Trinity River claims of the Bureau). Our water availability analysis incorporates Board-approved instream flow determination the Board approved as fully protective of public trust resources in the Bay-Delta Estuary and its watershed. Its results suggest that *making Delta water quality and flow objectives fully protective of public trust resources will require moving the priority date of Term 80 permittees far earlier than 1978 for determining when and for whom Term 91 diversion curtailments would occur*. This is necessary because the State Water Resources Control Board (2010) found that current Delta flow objectives on the mainstem and tributaries of the two basins, including the Vernalis Adaptive Management Plan on the San Joaquin River, are insufficiently protective of the Delta's fish and wildlife beneficial uses. (State Water Resources Control Board 2010: 9-10) Conversely, this means that Term 91 *currently* applies Delta water quality objectives that are well known to be ineffective at protecting public trust resources in the Delta.

C-WIN believes it will be necessary for the State Water Resources Control Board to revisit Term 91 and D-1594's method of estimating water availability in the Bay-Delta Estuary's Central Valley watershed when implementing new Delta inflow (instream flow) objectives for the Sacramento and San Joaquin River Basins and their major tributaries upstream of the Delta. For the same reason, the Board's 1998 water rights order must also be revisited to update and expand the seasons where appropriations would be prohibited as a matter of protecting all beneficial uses in compliance with Water Code Section 1205 through 1207. The Board should include these actions in the Bay-Delta Plan's implementation program.

In sum: the Board has acknowledged that existing Delta water quality and flow objectives for the Bay-Delta Estuary are inadequate. (State Water Resources Control Board 2000: 5) However, the Board *assumes* these water quality and flow objectives when it enforces Term 91 on post-1978 water rights permittees. Improving these objectives will mean the Board must curtail diversions by water right permittees (also probably licensees) with priority dates *earlier* than August 16, 1978, in order for Board-required Delta water quality and flow objectives to perform their functions protecting Delta watershed public trust resources. As part of its Phase III process to implement the Bay-Delta Plan, the Board must take testimony on how to determine this earlier priority date.

In all types of hydrology and using the Sacramento River Basin flow determination of 75 percent of unimpaired flow from November through June, C-WIN's water availability analysis suggests that for the Sacramento River Basin above the Feather River confluence, and the Feather River basin itself, the earliest date for curtailment should be December 19, 1914. On the Yuba and the Bear Rivers, the date of curtailment could be somewhat later, ranging from 1924 on the Yuba to 1941 on the Bear. On the American River, the earliest date should coincide with the priority date of Placer County Water Agency's 1958 water rights.

In all types of hydrology and applying the San Joaquin River Basin flow determination of 60 percent of unimpaired flow from February through June, C-WIN's water availability analysis suggests that for the Stanislaus and Merced Rivers, the Term 91 curtailment date should be December 19, 1914. On the Tuolumne River, the Term 91 curtailment date should be 1871. On the upper San Joaquin River, our analysis suggests that Term 91 curtailment dates should be on or before the dates of the Bureau of Reclamation's permits for Friant Dam and Millerton Lake in 1916. (See Appendix D.1 for Water Availability Analysis model results.)

The Board has acknowledged that current Delta water quality and flow objectives do not protect Delta fish and wildlife beneficial uses adequately. The Board must decrease the seasons of diversion for the Delta and its major tributaries of the Sacramento and San Joaquin River Basin watersheds, because the Board is obligated under the Public Trust Doctrine to protect all beneficial uses in the Delta. To implement this obligation, the Board must also revisit its Fully-Appropriated Streams Declaration and push back the priority date used to conduct diversion curtailments under Term 91.

Court Adjudication. Still another path that may be used is that of adjudication by a court of competing water rights claims in a watershed. It may take years of painstaking testimony and argumentation by attorneys and (usually) engineers. But the present situation of extreme uncertainty and unreliability, clouded water titles, trespassing on the public trust, and related boundary disputes of many surface and groundwater water rights throughout the Bay-Delta Estuary's Central Valley watershed argues for its consideration.

In the 1930s and 1940s, staff within the Department of the Interior and the old State Water Rights Board advocated an adjudication of water rights prior to construction of the Central Valley Project. Both Governor Earl Warren and State Water Rights Board Chairman Henry Holsinger testified during the Clair Engle's Congressional hearings in 1951 that a complete adjudication of water rights on the Sacramento River should have occurred prior to the completion of the Central Valley Project. In fact, the Engle committee concluded that, "[t]hat for all practical purposes, the developed water supplies of the Sacramento River are overcommitted and oversubscribed." This was prior to approval and construction of the State Water Project. That project was predicated on obtaining some 5,000,000 acre- feet of water annually from north coastal streams (Figure 11). With the exception of about 1 million acre-feet of Trinity River flows to the Central Valley Project service area, this “surplus” of surface water to the Delta system never arrived. Adjustments to the State Water Project should have been made earlier, but were not. The logical result is that the Delta’s native aquatic ecosystems have collapsed.

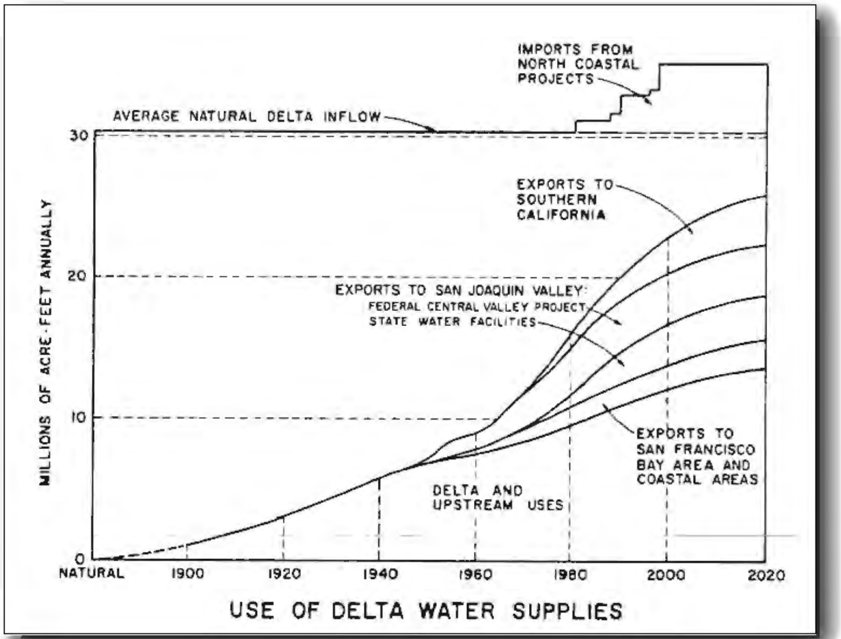

Figure 11
Source: California Department of Water Resources, 1960: 13.

A reliable source of surplus water for the State Water Project and the Central Valley Project eludes the Department and the Bureau, so far. Because surface water imports from north coast watersheds were precluded by wild and scenic river designations the Department and the Bureau have instead tried to establish a “water market” to transfer water from northern California across the Delta as an interim strategy for increasing water supplies in dry years for low-priority water service contractors south of the Delta. C-WIN, CSPA and AquAlliance see this as a grave threat to the regional aquifers of the Sacramento Valley from the Delta to Redding.

This threat is manifest in “groundwater substitution transfers.” In such water transfers, surface water rights are transferred by “willing sellers” to the Department or the Bureau. The agencies facilitate the transportation of the water in the deal to the buyer south of the Delta using their export pumps near Tracy. To continue producing their crop however, the seller replaces or substitutes the surface water supply with water pumped from underground. The seller is thus able to achieve a net profit from the gross revenues from selling surface water rights, less the cost of pumping water from below ground, and still can sell a crop after harvest.

Such transactions however assume that groundwater may be treated simply as an individual’s property under their land. Such a legal theory runs straight into the reality of groundwater in the Central Valley watershed being a regional commons, a shared resource, particularly among all individual landowners of the Sacramento Valley who overlie its extensive aquifers. One landowner or a set of landowners in one general location may cause a region-wide cone of depression by pumping a lot of groundwater to replace surface water they sold to someone south of the Delta. Such intensive pumping can damage the wells of neighbors near to and far from the scene of the original pumping. Many of the Valley’s rivers are well known as “gaining” streams—that is, surface flows are actually enhanced upslope by accretions from groundwater sources. Too much groundwater pumping lower down in the aquifers for the “surplus” benefitting only the State Water Project and the Central Valley Project could drastically lower water tables upslope and reduce river flow permanently if allowed to become “the new normal.” Potentially permanent injuries to many beneficial users of water in the Sacramento Valley would result.

A glimpse of this prospect occurred in 1994 when the Department sponsored a drought water bank program. The program resulted in damage to a municipal well and to individual wells in Durham and Cherokee areas of Butte County. More recently, the Department and the Bureau have since 2002 repeatedly sought "willing sellers" to offer surface water among the numerous public and private Sacramento Valley water right holders in Sacramento, Yolo, Sutter, Butte, Glenn, and Colusa counties. The State Water Resources Control Board in 1996 engaged in proceedings to determine the responsibility of Sacramento River Basin diverters to meet water quality standards in the Bay-Delta Estuary. The Board had completed phases 1 through 7 of the proceeding that led in 2000 to adoption of Water Rights Decision 1641 (D-1641). Phase 8 of that proceeding was to focus on the Sacramento River and its tributaries. In Phase 8, the Department of Water Resources and the Bureau of Reclamation, as operators of the state and federal export projects, claimed that certain water right holders in the Sacramento Valley must cease diversions or release water from storage to help meet water quality standards in the Delta. Sacramento Valley water users claimed that their water use has not contributed to any water quality problems in the delta, and, as senior water right holders and water users within the watershed and counties of origin, they are not responsible for meeting these standards. To avoid both litigation and independent regulatory action by the State Water Resources Control Board, water diverters throughout the Sacramento River Basin executed an agreement in April 2001. (Northern California Water Association, 2001) As a result of the Sacramento Valley Water Management Agreement, the Phase 8 process was dismissed by the State Water Resources Control Board. (State Water Resources Control Board 2001)

The Department and the Bureau have encouraged planning approaches to regional water management to facilitate water transfers, such as those in this partial list:

- The Department of Water Resources undertook a draft and final Program Environmental Impact Report in 1993 on a drought water bank, but to our knowledge has never certified this document.
- The Sacramento Valley Water Management Agreement, signed in 2002, but which ten years on still lacks a programmatic environmental review document. It expired December 31, 2010.
- The 2000 Governor's Advisory Drought Planning Panel Report, Critical Water Shortage Contingency Plan, which also promised a program environmental document on a drought response water transfer program, but was never undertaken.
- The Sacramento Valley Integrated Regional Water Management Plan of 2006, overseen by a joint powers authority of numerous water agencies in the Valley.
- DWR's last Drought Water Bank in 2009 sought authorization for over 100,000 acre-feet of temporary transfers of water, though only 16,000 acre-feet were eventually supplied to Southern California buyers.
- The Northern Sacramento Valley Integrated Regional Water Management Plan, now in development.
- The Delta Stewardship Council's Delta Plan, whose planning scope includes the entire Sacramento Valley and assumes a groundwater surplus is necessary for meeting Delta export water demands. The Council has also expressed support for water transfers using groundwater substitution.
- The Bay Delta Conservation Plan, which would provide coverage from a 50-year habitat conservation plan for Governor Brown's recently announced Peripheral Tunnels Project. This project has no identified water source, other than acknowledgement by the Bureau of Reclamation that it would reroute existing surface flows around the Delta from the Sacramento River Basin. (Vlamis et al 2012)

C-WIN, CSPA, AquAlliance, and other knowledgeable experts are concerned that long term impacts of regional use of groundwater to substitute for transferred surface supplies will accelerate the depletion of the Valley's groundwater supplies. There are significant gaps in scientists' grasp of how the aquifer system recharges; how surface flows and groundwater systems interact in the Valley's creeks and rivers; how supplies contained within upper and lower aquifers interact; how the aquifers respond in the long-term to increasingly intense demands on them, even during wetter years. And the regional effect of declines in groundwater levels on river and creek flows and riparian corridor species and wetland ecosystems has never been adequately explored. These are beneficial uses upstream along the major tributaries of the Sacramento River Basin that must also be considered part of the public trust responsibilities of the State Water Resources Control Board in its Bay-Delta Plan. (Vlamis et al 2012)

State and federal water planners assume that surface and groundwater flows will always be there to support this hoped-for surplus. Based on that assumption they continue each winter and spring to plan the next water transfer program that relies on and encourages groundwater substitution transfers. This assumption has been built into the Department and the Bureau's chief water supply and operations planning tool, CalSIM II. When surface water supplies for riparian and appropriative water right holders are exhausted in model runs through CalSIM II, the model's automatic response is to add pumped groundwater to make up for any deficit to water demands in the model. (Draper and Bourez 2004: slide 20; Close et al 2003: 26-27; California Department of Water Resources and US Bureau of Reclamation 2004: Appendix A) Sacramento Valley groundwater activity is explicitly modeled to include "minimum groundwater pumping" for those land uses that rely exclusively on groundwater in the Valley. (California Department of Water Resources and US Bureau of Reclamation et al 2004: Appendix A) San Joaquin Valley groundwater is not modeled. (Close et al 2003) This can result in low estimates of salinity reaching the south Delta. (San Joaquin Valley CalSIM II External Review 2006: 45) Upper bounds on potential pumping from aquifers in the Sacramento Valley are undefined. According to Close et al:

> This does not represent reality, since, if CalSIM II is used for statewide planning, it would allow pumping of vast quantities of water for export to southern parts of the state, something which agency staff [i.e. California Bay-Delta Authority Science Program and the Association of Bay Area Governments] claim is unrealistic. Realistic upper bounds to pumping from any of the aquifers represented in the model need to be developed and implemented. (Close et al 2003: 26-27)

The Department and the Bureau responded that CalSIM II does explicitly model the "impact on groundwater storage of each sub-basin." They state that CalSIM II runs that result in groundwater pumping over and above the natural and artificial recharge and which causes depletion of the basin will cause CalSIM II to no longer run. They also state, however, that CalSIM II "does not include local ground water inventories" but instead relies on a historically-modeled calibration of approximated inventories. They state further that "no groundwater is exported from the overlying watershed (except in the form of surface water return flow or tailwater that results from irrigation using groundwater)." (California Department of Water Resources and US Bureau of Reclamation 2004: A-1) Thus, CalSIM II assumes that groundwater "backstops"surface water rights holders and their needs for supplies, when in reality groundwater now backstops river flows (and all associated beneficial uses associated with those flows). It is small comfort that CalSIM II ceases to work when a basin is depleted from the program's operations; more to the point, it fails to assume, let alone build in a rational groundwater management strategy of sustained yield.

CalSIM II's reliance on groundwater to meet overall water demand when surface supplies must not be the de facto water supply development strategy for the state of California when supplies run low. When supplies run low—as they are forecasted to as climate change affects the American West—the state and its responsible and lead agencies must increase other means of stretching water supplies. This can be done through water recycling, reuse, conservation, and a range of urban, industrial, and agricultural efficiency measures.

Bibliography (including references in appendices)

Cahill, V., for E.G. Brown. 2008. *Reallocation of Water Under Specified Conditions*, letter representing the California Attorney General to John J. Kirlin, Executive Director of Delta Vision, 9 July. Accessible online at http://deltavision.ca.gov/BlueRibbonTaskForce/July2008/Handouts/Item_3_Attachment2.pdf.

California Appeals Court, Third District. 1986. *United States of America, et al, v. State Water Resources Control Board (and seven other cases)*, 182 Cal.App. 3d 82, July.

California Department of Fish and Game. 1992. *Summary and Recommendations for the Department of Fish and Game's Testimony on the Tributaries to the Sacramento-San Joaquin Estuary*, presented to the State Water Resources Control Board, Interim Water Rights Actions Phase, Bay-Delta Estuary Proceedings, WRINT-DFG Exhibit No. 29, 8 pages.

California Department of Water Resources and US Bureau of Reclamation. 2004. *Peer Review Response: A Report by DWR/Reclamation in Reply to the Peer Review of the CalSIM-II Model Sponsored by the CalFED Science Program in December 2003.* August. 27 pages plus six appendices. Accessible online at http://baydeltaoffice.water.ca.gov/modeling/hydrology/Peer%20Review%20Response%20(August%202004).pdf.

California Department of Water Resources. 1960. *Bulletin 76: Delta Water Facilities.* December, 61 pages.

California Department of Water Resources. 2007. *California Central Valley Unimpaired Flow Data*, 4th edition, Bay Delta Office, May, 50 pages.

California Supreme Court. 1983. *National Audubon Society, et al., v. The Superior Court of Alpine County and Department of Water and Power of the City of Los Angeles*, et al. S.F. 24368. Filed February 17, 1983. Cited as 33 Cal.3d 419, 189 Cal.Rptr. 346, cert. denied, 464 U.S. 977. Accessible online at http://www.monobasinresearch.org/images/legal/nassupct.htm.

California Water Project Authority, 1951. *Data and Information on the Central Valley Project*, October 29, 66 pages.

Close, A., Hanneman, WM, Labadie, JW, Loucks, DP, Lund, JR, McKinney DC, and Stedinger, JR. 2003. *A Strategic Review of CALSIM II and its Use for Water Planning, Management, and Operations in Central California.* December 4, 129 pages. Accessible online at http://sacramentoriverportal.org/modeling/CALSIM-Review.pdf.

Domagalski JL, Knifong DL, MacCoy DE, Dileanis PD, Dawson BJ, and Majewski MS. 1998. *Water Quality Assessment of the Sacramento River Basin, California—Environmental Setting and Study Design*. United States Geological Survey Water Resources Investigations Report 97-4254. National Water Quality Assessment Program. Accessible online at http://pubs.er.usgs.gov/publication/wri974254.

Draper, A, and Bourez, W. 2004. *CalSIM II Sacramento River Basin Hydrology Enhancements*. Powerpoint presentation, February 26. 58 slides. Accessible online at http://www.cwemf.org/Asilomar/Draper.pdf.

Garner, B.A., ed. 2010. *Black's Law Dictionary*, Abridged Ninth Edition.

Gronberg, JM, Dubrovsky NM, Kratzer CR, Domagalski JL, Brown LR, and Burow KR. 1998. *Environmental Setting of the San Joaquin-Tulare Basins, California*. United States Geological Survey Water Resources Investigations Report 97-4205. National Water Quality Assessment Program. Accessible online at http://pubs.er.usgs.gov/publication/wri974205.

Holsinger, H. 1936. *Comments Pertaining to Some Fundamental Theories of California Water Law*, An address presented before Sacramento Section, American Society of Civil Engineers on February 4, manuscript in the Water Resources Collections and Archives, University of California, Riverside.

Bibliography (including references in appendices)

Horwitz, M.J. 1977. *The Transformation of American Law, 1780-1860*, Cambridge, MA: Harvard University Press, 356 pages.

Hutchins, W.A.. 1956. *The California Law of Water Rights*, prepared for the US Department of Agriculture, 571 pages.

Kibel P.S. 2011. Instream Flow and the Public Trust: Statutory Innovation in California's 2009 Delta Reform Act. 13 Water Resources Committee Newsletter 4 (ABA, January 2011). Accessible online at http://digitalcommons.law.ggu.edu/pubs/444/

Knowles, N. and D.R. Cayan. 2002. Potential effects of global warming on the Sacramento/San Joaquin watershed and the San Francisco estuary. *Geophysical Research Letters* 29(18): 1891-1894. Accessible online at http://cirrus.ucsd.edu/~pierce/crd/globalwarming/knowles_cayan_2002.pdf.

Littleworth, A.L. and E.L. Garner, *California Water II*, 2nd edition, Point Arena, CA: Solano Press Books, 2007, 428 pages.

Northern California Water Association. 2001. *The Sacramento Valley Water Management Agreement*. 28 pages including three appendices. Accessible online at http://www.norcalwater.org/res/docs/sac_valley_water_mgmt_agrmt.pdf.

O'Laughlin, T. 2011a. *Draft Technical Workshop: Need to Disclose Legal Theory Behind Intended Plan of Implementation.* Letter to Charlie Hoppin, Frances Spivy-Weber, Tam Doduc, and Dwight Russell, State Water Resources Control Board, February 22, 3 pages. Accessible online at http://www.swrcb.ca.gov/waterrights/water_issues/programs/bay_delta/bay_delta_plan/water_quality_control_planning/docs/sjrf_spprtinfo/022211sjrga2.pdf.

O'Laughlin, T. 2011b. *SWRCB's Jurisdiction in the Bay-Delta Proceedings*, Letter to Charlie Hoppin, Frances Spivy-Weber, and Tam Doduc, State Water Resources Control Board, June 27, 2 pages. Accessible online at http://www.swrcb.ca.gov/waterrights/water_issues/programs/bay_delta/bay_delta_plan/water_quality_control_planning/docs/sjrf_spprtinfo/062711sjrga2.pdf.

Pearsall, J., ed. 1999. *Oxford Concise English Dictionary*, Tenth Edition.

Review Panel. 2010. *The Vernalis Adaptive Management Program (VAMP)*, prepared for the Delta Science Program, May 11, 45 pages. Accessible online at http://www.sjrg.org/peerreview/review_vamp_panel_report_final_051110.pdf.

San Joaquin River Group Authority. 2000. *San Joaquin River Agreement*, and Appendix A: Vernalis Adaptive Management Plan. Accessible online at http://www.sjrg.org/agreement.htm.

San Joaquin River Group Authority. 2008. *South Delta Hydrology and Water Rights: Comments of the San Joaquin River Group Authority*, prepared by O'Laughlin & Paris LLP, Chico, CA, 8 July, 73 pages plus appendices. Accessible online at http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/strategic_plan/comments/south_delta_diversion_report.pdf.

San Joaquin River Group Authority. 2011. *2010 Annual Technical Report on Implementation and Monitoring of the San Joaquin River Agreement and the Vernalis Adaptive Management Plan (VAMP)*. Prepared for the California Water Resources Control Board in compliance with D-1641. September. 167 pages. Accessible online at http://www.sjrg.org/technicalreport/2010/2010_SJRGA_Annual_Technical_Report.pdf.

San Joaquin Valley CalSIM II External Review. 2006. *Review Panel Report: San Joaquin River Valley CalSIM II Model Review.* 12 January. 87 pages. Accessible online at http://science.calwater.ca.gov/pdf/calsim/calsim_II_final_report_011206.pdf.

Bibliography (including references in appendices)

Soulé, F. 1901. "Irrigation from the San Joaquin River," in Elwood Mead, *Report of Irrigation Investigations*, US Department of Agriculture Office of Irrigation Investigations. Accessible at University of California at Riverside, Water Resources and Collections Archives, Call No. G4094 C1.

State Water Resources Board. 1951. *Bulletin No. 1: Water Resources of California*, State of California, 648 pages.

State Water Resources Control Board. 1983. *Water Right Decision 1594: In the Matter of Water Right Permits in the Sacramento-San Joaquin Delta Watershed in which the Board Reserved Jurisdiction to Change the Season of Diversion (Term 80 Permits)*, November 1983, 61 pages, plus Appendix A, and Order WR 84-2, amending and affirming Decision 1594 and Denying Petitions for Reconsideration, February 1984, 29 pages. Accessible online at http://www.waterboards.ca.gov/waterrights/board_decisions/adopted_orders/decisions/d1550_d1599/wrd1594.pdf.

State Water Resources Control Board. 1989. *Order WR 89-25: In the Matter of Declaration of Fully Appropriated Stream Systems in California: Order Adopting Declaration of Fully Appropriated Stream Systems and Specifiying Conditions for Acceptance of Applications and Registrations*. November 16, 58 pages plus Exhibit A. Accessible online at http://www.swrcb.ca.gov/waterrights/board_decisions/adopted_orders/orders/1989/wro89-25.pdf.

State Water Resources Control Board. 1991. *Order WR 91-07: In the Matter of Declaration of Fully Appropriated Stream Systems in California: Order Revising Declaration of Fully Appropriated Stream Systems*. August 22, 28 pages plus revisions to Exhibit A. Accessible online at http://www.swrcb.ca.gov/waterrights/board_decisions/adopted_orders/orders/1991/wro91-07.pdf.

State Water Resources Control Board. 1992. *Draft Water Right Decision 1630: San Francisco Bay/Sacramento-San Joaquin Delta Estuary*, December, 121 pages.

State Water Resources Control Board. 1994. *Mono Lake Basin Water Right Decision 1631: Decision and Order Amending Water Right Licenses to Establish Fishery Protection Flows in Streams Tributary to Mono Lake and to Protect Public Trust Resources at Mono Lake and in the Mono Lake Basin*, September 28, 212 pages. Accessible online at http://www.swrcb.ca.gov/waterrights/board_decisions/adopted_orders/decisions/d1600_d1649/wrd1631.pdf.

State Water Resources Control Board. 1998. *Order WR 98-08: In the Matter of Declaration of Fully Appropriated Stream Systems in California: Order Revising Declaration of Fully Appropriated Stream Systems*. November 19, 28 pages plus Exhibit A. Accessible online at http://www.swrcb.ca.gov/waterrights/board_decisions/adopted_orders/orders/1998/wro98-08.pdf.

State Water Resources Control Board. 2000. *Revised Water Right Decision 1641: In the Matter of Implementation of Water Quality Objectives for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary; A Petition to Change Points of Diversion of the Central Valley Project and the State Water Project in the Southern Delta; and A Petition to Change Places of Use and Purposes of Use of the Central Valley Project*, December 29, 1999, revised in accordance with Order WR 2000-02, March 15, 193 pages. Accessible online at http://www.waterboards.ca.gov/waterrights/board_decisions/adopted_orders/decisions/d1600_d1649/wrd1641_1999dec29.pdf

State Water Resources Control Board. 2001. *Order WR 2001-05*. April. Accessible online at http://www.swrcb.ca.gov/waterrights/board_decisions/adopted_orders/orders/2001/wro2001-05.pdf.

Bibliography (including references in appendices)

State Water Resources Control Board. 2008. *Water Rights Within the Bay-Delta Watershed.* Provided to the Delta Vision Blue Ribbon Task Force for its October 16 and 17, 2008, meeting. Document dated September 26, 2008, 4 pages. Accessible online at http://deltavision.ca.gov/BlueRibbonTaskForce/Oct2008/Respnose_from_SWRCB.pdf.

State Water Resources Control Board. 2010. *Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem*, prepared pursuant to the Sacramento-San Joaquin Delta Reform Act of 2009, 178 pages. Accessible online at http://www.swrcb.ca.gov/waterrights/water_issues/programs/bay_delta/deltaflow/final_rpt.shtml

State Water Resources Control Board. 2011a. *Revised Notice of Preparation and Notice of Additional Scoping Meeting (San Joaquin River Flow and South Delta Water Quality Objectives)*, 18 pages. Accessible online at http://www.swrcb.ca.gov/waterrights/water_issues/programs/bay_delta/bay_delta_plan/water_quality_control_planning/docs/notice_sjr_flow_southern_delta_scoping_mtg_with_attachments.pdf.

State Water Resources Control Board. 2011b. California Code of Regulations, Title 23 Waters, Division 3 State Water Resources Control Board and Regional Water Quality Control Boards (Sections pertaining to water rights), January, 168 pages. Accessible online at http://www.swrcb.ca.gov/laws_regulations/docs/wrregs.pdf.

State Water Resources Control Board. 2011c. *Technical Report on the Scientific Basis for Alternative San Joaquin River Flow and Southern Delta Salinity Objectives*. October, 170 pages, including appendices. Accessible online 6 December 2011 at http://www.swrcb.ca.gov/water_issues/programs/peer_review/docs/sanjoaquin_river_flow/technical_report.pdf.

Steinberg, T. 1991. *Nature Incorporated: Industrialization and the Waters of New England*, Amherst, MA: University of Massachusetts Press, 284 pages.

Stevens, J.S. 2005. *Applying the Public Trust Doctrine to River Protection*, presentation given June 9, 2004 at University of California at Davis, reprinted in California Department of Water Resources, *California Water Plan Update 2005, Volume 4*, pp. 393-400. Accessible online at http://www.waterplan.water.ca.gov/docs/cwpu2005/vol4/vol4-environment-applyingpublictrustdoctrine.pdf.

US Department of the Interior. 2000. *Record of Decision: Trinity River Mainstem Fishery Restoration Final Environmental Impact Statement/Environmental Impact Report.* December. 28 pages plus three appendices. Accessible online at http://odp.trrp.net/Library/Details.aspx?document=227.

Vlamis, B., Krieger, C., and Jennings, B. 2012. *Letter re: Initial Study and Proposed Negative Declaration for the Butte Water District 2012 Water Transfer Program*, to Mark Orme, General Manager, Butte Water District, Gridley, CA, March 29, 2012, 22 pages.

Wiel, S.C. 1928. The Pending Water Amendment to the California Constitution, and Possible Legislation (Concluded), *California Law Review* 16(4): 257-280, May.

Wilson, C.M. 2011. *The State Water Resources Control Board's Role in Implementing the Delta Plan*, Report to the State Water Resources Control Board and the Delta Stewardship Council by the Delta Watermaster. 8 pages. Accessible online at http://www.swrcb.ca.gov/board_info/agendas/2011/mar/031511_9att.pdf.

Wilson, C.M. 2012. *Water Right Compliance and Enforcement in the Delta.* Report to the State Water Resources Control Board and the Delta Stewardship Council by the Delta Watermaster. 9 pages. Accessible online at http://www.swrcb.ca.gov/board_info/agendas/2012/feb/020712_9_with%20report.pdf.

Appendix A
River Flow Regulation to the Bay-Delta Estuary

In 1992, the Board proposed in a draft Bay-Delta water right decision regulating flows to the Delta from the San Joaquin River Basin by apportioning responsibility for Delta inflows according to the size of major reservoirs on the Basin's major tributary streams. This draft decision was withdrawn by order of then-governor Pete Wilson. While the Board considers regulating inflows from the San Joaquin River tributaries once again, many years of delay have elapsed: This section recounts and evaluates the Board's record regulating inflows to the Delta from the San Joaquin River Basin.

After backing away from its "global" approach to regulating inflow to the Delta from the San Joaquin River in 1993, the State Water Resources Control Board instead chose to continue regulating Delta conditions in part by regulating flow and water quality at Vernalis. In Water Rights Decision 1641 (D-1641), the Board assigned responsibility for meeting the Vernalis water quality standards to the California Department of Water Resources and the US Bureau of Reclamation and added interior Delta salinity objective monitoring sites to evaluate compliance by the Department and the Bureau. The Department has no regulating reservoirs of its own on San Joaquin River Basin rivers, so it fell to the Bureau to provide most of the flows to Vernalis from the Basin to meet the Board's objectives there. The bulk of the flows the Bureau has available for this purpose come from its New Melones Dam and Reservoir facility on the Stanislaus River. This strategy has been largely unsuccessful for the Bureau, the Department and the Board. Migratory fish populations and open water fish populations endemic to the Delta have crashed over the last decade since D-1641 was implemented. An experiment to provide helpful spring flows for migratory salmon, called the Vernalis Adaptive Management Plan, has achieved only limited results (Review Panel, 2010).

Table 13 summarizes the State Water Resources Control Board's present river flow objectives set for compliance at Vernalis and Rio Vista. These flow criteria were adopted as part of its Water Right Decision 1641 (D-1641) in 2000. Under D-1641, the Board currently regulates flows on the San Joaquin River at Vernalis during two main periods of the year: February 1 through June 30, and throughout the month of October. Within the February to June period, there are two regimes as well. One flow regime is in place from February 1 through April 14 and then again from May 16 through the end of June. The second flow regime occurs generally from April 15 to May 15, a 31-day period in which spring pulse flows are required to increase over the early and late spring periods. The spring pulse flow is intended to aid young salmon smolts migrating to the ocean by improving their chances of survival as they pass through the Delta. Minimum flow criteria in this spring regime vary depending on the water year type, and the water year type is generally finally forecasted by May 1. Note that these flow rates are a monthly average, which allows for great variability as long as the average is maintained throughout the 30-day running average during these flow regimes.

October minimum flows must be 1,000 cubic feet per second or greater using a 30-day running average. This is a period of time when adult fall-run Chinook salmon return from the ocean to migrate upstream and spawn in their natal streams. Again, as with the February through June regime, the use of a 30-day running average allows upstream water right holders wide latitude in providing flows that meet the Vernalis flow standard for October as long as the 30 day running average during October is not less than 1,000 cubic feet per second of flow.

Instead of implementing D-1641 San Joaquin River flow objectives to benefit fish and wildlife, the State Water Resources Control Board approved the San Joaquin River Agreement under which the major water right holders of the San Joaquin River Basin agreed to provide spring pulse flows

Table 13
State Water Resources Control Board
D-1641 Flow Regulations at Vernalis

Compliance Location	Water Year Type	Time Period	Minimum Monthly Average Flow Rate (cfs)
Sacramento River at Rio Vista	All	September	3,000
	W, AN, BN, D	October	4,000
	Critically Dry	October	3,000
	W, AN, BN, D	Nov-Dec	4,500
	Critically Dry	Nov-Dec	3,500
San Joaquin River at Airport Way Bridge, Vernalis	W, AN	Feb-Apr 14 and May 16-Jun	2,130 or 3,420
	BN, D		1,420 or 2,280
	C		710 or 1,140
	W	Apr 15 to May 15	7,330 or 8,620
	AN		5,730 or 7,020
	BN		4,620 or 5,480
	D		4,020 or 4,880
	C		3,110 or 3,540
	All	October	1,000

Source: State Water Resources Control Board, 2000.
Key to Water Year Types: W = Wet; AN = Above Normal; BN = Below Normal; D = Dry; C = Critically Dry.

intended to benefit outmigrating salmon smolts.[1] The Board agreed to its provisions as a voluntary approach to achieve the objectives. In exchange for providing these spring pulse flows totaling up to 110,000 acre-feet, the Agreement called upon the state and federal pumps in the south Delta to limit their export rates to certain specified levels. The Agreement further called upon the state, federal and San Joaquin River Group Authority member agencies to participate in an annual experimental study of the effects of these pulse flows on salmon smolt survival and other ecological indicators in the San Joaquin River in the Vernalis area. That study was called the Vernalis Adaptive Management Plan (VAMP).

The State Water Resources Control Board hoped that by using VAMP to implement its D-1641 flow criteria for the San Joaquin River at Vernalis, the scientific study would find salmon smolt survival is closely related to the humanly manageable actions of river flow, export limits at the pumps, and maintaining a barrier at the head of Old River to direct smolts toward Suisun Bay and the Pacific Ocean via the most direct and safest route. The Board also hoped that increased smolt survival would contribute to increased salmon escapement (that is, fish leaving the ocean in late summer and early fall to spawn in the fall).

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[1] The parties to the agreement included California Departments of Water Resources and Fish and Game; United States Department of the Interior agencies Reclamation and Fish and Wildlife; and member agencies of the San Joaquin River Group Authority: South San Joaquin and Oakdale irrigation districts on the Stanislaus River; Modesto and Turlock irrigation districts on the Tuolumne; Merced Irrigation District on the Merced River; and Central California Irrigation District, Firebaugh Canal Water District, Columbia Canal Company, and San Luis Canal Company on the upper San Joaquin River. Other parties included state and federal water contractors south of the Delta export pumps, and two environmental community parties: the Natural Heritage Institute and the Bay Institute of San Francisco.

The VAMP seeks to test the hypothesis that increasing San Joaquin River flows, sharply limiting Delta export pumping during the spring pulse flow period, and blocking fish access to Old River (which leads to the state and federal export pumps) will increase survival rates of young salmon juveniles and smolts migrating through the Delta to the Pacific Ocean (San Joaquin River Group Authority, 2000: Section 2.5).

The 110,000 acre-feet of water from these agencies was intended for use in reaching "target flows" under VAMP at Vernalis that increased flow in the San Joaquin at Vernalis over defined

Table 14
Vernalis Adaptive Management Plan Target Flows

Existing Flow (cfs)	Single Step Target Flow (cfs)	Double-Step Target Flow (cfs)
0 to 1,999	2,000	3,200
2,000 to 3,199	3,200	4,450
3,200 to 4,449	4,450	5,700
4,450 to 5,699	5,700	7,000
5,700 to 6,999	7,000	Existing Flow
7,000 or greater	Existing flow	Existing flow

Source: San Joaquin River Agreement, 2000, Articles 5.5 and 5.6.

Table 15
VAMP Flows Summary, 2000-2010
(cubic feet per second, except where noted otherwise)

Year	VAMP Target Flow Period	Target flow Condition	VAMP Target Flow	Actual Mean Flow	Existing Flow	VAMP Supplementing Flows (AF)	Delta Export Target	Actual Delta Exports
2000	4/15-5/15	Double-step	5,700	5,869	4,800	77,680	2,250	2,155
2001	4/20-5/20	Single-step	4,450	4,224	2,909	78,650	1,500	1,420
2002	4/15-5/15	Single-step	3,200	3,301	2,757	33,430	1,500	1,430
2003	4/15-5/15	Single-step	3,200	3,235	2,290	58,065	1,500	1,446
2004	4/15-5/15	Single-step	3,200	3,155	2,088	65,591	1,500	1,331
2005	5/1-5/31	na[a]	>7,000	10,390	10,390	0	2,250	2,986[b]
2006	5/1-5/31	na[a]	>7,000	26.220 to 24,262 [c]	26,020	0	1,500 to 6,000	1,599 to 5,748[c]
2007	4/22-5/22	Single-step	3,200	3,263	2,721	33,330	1,500	1,486
2008	4/22-5/22	Single-step	3,200	3,163	1,939	75,250	1,500	1,520
2009	4/19-5/19	Off-ramp	na	2,260	2,260	0	na	1,990
2010	4/25-5/25	Single-step	4,450	5,140	4,830	23,980	1,500	1,515
		Average VAMP Supplementing Flows				**40,543**	**Acre-feet**	

Source: San Joaquin River Group Authority 2011: Table 2-8; California Water Impact Network. Notes: [a] Existing flow greater than maximum VAMP Target Flow of 7,000 cfs; [b] May 1 through 25 average was 2,260 cfs; exports were increased starting May 26 in conjunction with increasing existing flow; May 26 through 31 average was 6,012 cfs; [c] "First fish release-recapture period"/"Second fish release-recapture period"; "na" means not available or not applicable.

"existing flows" that would occur in the River in the absence of the VAMP flows. The VAMP flows were intended to be released during the spring pulse flow period coinciding with the State Water Resources Control Board's flow criteria period of April 15 through May 15 (or a reasonable 31-day period thereabouts based on the presence or absence of migrating salmon). The Agreement employs the State Board's water year classification scheme as an indicator for determining target flows. Wet years would have an indicator of 5, decreasing by one to Critical years having an indicator of 1. Double step target flows could be invoked under VAMP in situations where the sum of present plus current water year indicators added to 7 or greater. When that occurred, a "double step" target flow, showed in Table 14, would become the new target flow.

The Agreement also limits Central Valley Project and State Water Project export pumping during this same mid-April to mid-May period. Combined export rates for the pumps would be limited to no more than 1,500 cubic feet per second when Vernalis target flows are between 2,000 and 4,450 cubic feet per second. When the target flow reach 5,700 cubic feet per second, combined export rates are limited to no more than 2,250 cubic feet per second. And when target flows reach 7,000 cubic feet per second, the pumping plants are limited either to 1,500 or 3,000 cubic feet per second (San Joaquin River Group Authority, 2000: Article 6.4). The rationale for this "either/or" export rate at the high VAMP target flow is explained in Appendix A of the Agreement as a matter of safety and operational capacity of installing the barrier at the head of Old River and minimum pumping capacity of the export pumps, as well as the intent of the US Fish and Wildlife biological opinion that export rates in this period be less than 50 percent of the required Vernalis standard. Hence, the export pumping rate at a target flow of 7,000 cubic feet per second would be able to go as high as 3,000 cfs (San Joaquin River Group Authority, 2000, Appendix A, p. 3).

At present, VAMP is a 12-year study. Through 2010, double step target flows have been invoked once (San Joaquin River Group Authority [SJRGA], 2011: Table 2-8). Table 15 below summarizes VAMP flow activity from 2000 to 2010 (SJRGA, 2011). This table shows that over the course of the VAMP experiments through 2010, average supplemental VAMP flow contributions have averaged just 40,543 acre-feet per year, about 37 percent of the maximum annual commitment by SJRGA agencies of 110,000 acre-feet for VAMP.

Previous studies have shown that salmon smolt survival could be enhanced if increased flows were directed primarily down the mainstem of the San Joaquin River below Vernalis past Stockton (Review Panel, 2010). To facilitate fish using that route, the San Joaquin River Agreement called upon the Department of Water Resources to install a fish barrier at the head of Old River (which is a direct route for San Joaquin River water to the state and federal export pumps near Old River at the export pumps where fish can be all too easily entrained and killed).

In the event that more water than the 110,000 acre-feet was needed to meet target flows, the US Bureau of Reclamation and the California Department of Water Resources could approach the agencies making up the San Joaquin River Group Authority as willing sellers of additional water. As Table 15 reveals, neither the Bureau nor the Department needed to purchase additional water for VAMP flows, since no VAMP flows exceeded 110,000 acre-feet.

VAMP results have largely been inconclusive because there have been only a narrow range of flows subject to VAMP researchers. The State Water Resources Control Board permitted the VAMP experiment to proceed in D-1641 for over a decade. Table 16 compares spring pulse flow range criteria set by the State Board in D-1641 with mean (average) VAMP flows. For years with VAMP results (of which there were only 8 of 11 total), only four years yielded VAMP results that actually complied with D-1641 flow criteria at Vernalis (2000, 2001, 2007, and 2008). Four other VAMP flow years were *beneath* the D-1641 flow criteria, and did not comply with the Board's adopted objective. It appears that VAMP as a regulatory experiment performs adequately only half the time when it can be invoked. Of the three years with no VAMP flow results, two were wet years (2005 and 2006) where high flows on the San Joaquin overwhelmed the need to regulate or experiment. The remaining year (2009) was considered an "off-ramp" year (that is, a dry year following two critically dry years). VAMP and Agreement requirements were in part short-circuited by prolonged dry weather in order to protect upstream water supply reliability. It appears from these results that VAMP and the San Joaquin River Agreement have failed to "provide the environmental benefits in the lower San Joaquin River and Delta at a level of protection equivalent to the San Joaquin River portion of the 1995 WQCP for the duration of this Agreement (SJRGA, 2000: Section 2.5.3)." In effect, protective flows for Delta public trust resources such as Chinook salmon populations have been delayed for the sake of seeking greater scientific certainty.

Table 16
Comparison of D-1641 Spring Pulse Flow Criteria and Mean Actual VAMP Flows, 2000-2010 (Years with VAMP Results Only)

Year	San Joaquin River Basin Water Year Type	Spring Pulse Flow Range Criteria, D-1641 (cubic feet per second)	Mean Actual VAMP Flows (cubic feet per second)
2000	Above Normal	5,730 or 7,020	5,869
2001	Dry	4,020 or 4,880	4,224
2002	**Dry**	**4,020 or 4,880**	**3,301**
2003	**Below Normal**	**4,620 or 5,480**	**3,235**
2004	**Dry**	**4,020 or 4,880**	**3,155**
2007	Critically Dry	3,110 or 3,540	3,263
2008	Critically Dry	3,110 or 3,540	3,163
2010	**Above Normal**	**5,730 or 7,020**	**5,140**

Source: SJRGA, 2011; State Water Resources Control Board, 2000; California Water Impact Network. **Years in bold did not comply with minimum D-1641 flow criteria.**

Appendix B
Omission of the Upper San Joaquin River from the Bay-Delta Plan

The Board proposes different flow objectives for the Sacramento and San Joaquin Rivers. C-WIN and CSPA applaud the State Water Resources Control Board's decision to include the major tributaries of the San Joaquin River Basin (specifically, the Stanislaus, the Tuolumne, and Merced rivers) and of the Sacramento River Basin (the Trinity [via Central Valley Project facilities], Pit, Feather, Yuba, Bear, and American) in its proposed analysis of San Joaquin River flow requirements and the scope of the Bay-Delta Plan. The Upper San Joaquin River (above its confluence with the Merced River) is excluded from the Plan by the Board. The Board has not provided adequate rationale to justify excluding the Upper San Joaquin River from the "project area" for purposes of environmental evaluation of proposed San Joaquin River flow criteria. The State Water Resources Control Board wants to use the criterion of "salmon-bearing tributaries" to justify excluding the upper San Joaquin River. The Board then states in a footnote:

> Currently, the San Joaquin River does not support salmon runs upstream of the Merced River confluence (upper San Joaquin River). However, pursuant to the San Joaquin River Restoration Program (SJRRP), spring-run Chinook salmon are planned to be reintroduced to the upper San Joaquin River no later than December 31, 2012. Flows needed to support this reintroduction are being determined and provided through the SJRRP. During the next review of the Bay-Delta Plan, the State Water Board will consider information made available through the SJRRP process, and any other pertinent sources of information, in evaluating the need for any additional flows from the upper San Joaquin River Basin to contribute to the narrative San Joaquin River flow objective. State Water Resources Control Board 2011a: Map on page 1 and narrative on page 3 of Attachment 2)

In essence, if it adheres to this reasoning during this process, the State Water Resources Control Board would allow the SJRRP to determine what those flows are to be, and would allow the SJRRP to dictate the Board's time schedule for Basin-wide flow objective-setting and implementation. This provides incentive to minimize the upper San Joaquin River's contribution to overall basin flows to benefit the Delta. It will put greater pressure on the water right holders on the tributaries of the San Joaquin to provide additional flows. In its Water Rights Orders 2010-0029 and 2009-0058-DWR, the Board authorized interim schedules for "experimental flows" sought by the parties to the San Joaquin River Restoration Program and settlement agreement. At minimum, these interim flows should be incorporated into the project description, so that it is clear that upper San Joaquin River flows will contribute to solving flow and water quality problems in the Delta. In addition, there needs to be a basic description in the Substitute Environmental Document of how future contributions from the upper San Joaquin River will contribute to improving the health of the Bay-Delta estuary. This can be expressed in the form of project alternatives, but it must not be deferred.

Appendix C
Definitions and Terminology

This report relies on several definitions and terminology that readers should grasp as they read. Here too is the method C-WIN employs to describe water rights in the San Joaquin River Basin.

The geographic scope of the "San Joaquin River Basin" used in this report is that portion of the basin that extends from the measurement of flows on the San Joaquin River near Vernalis all the way upstream on both sides of the river to the headwaters of the river and its tributary creeks and streams in the Coast Range and Sierra Nevada; and including the "major tributaries" of the San Joaquin: the Stanislaus River, the Tuolumne River, and the Merced River all the way to their headwaters in the Sierra Nevada. See Figure C-1.

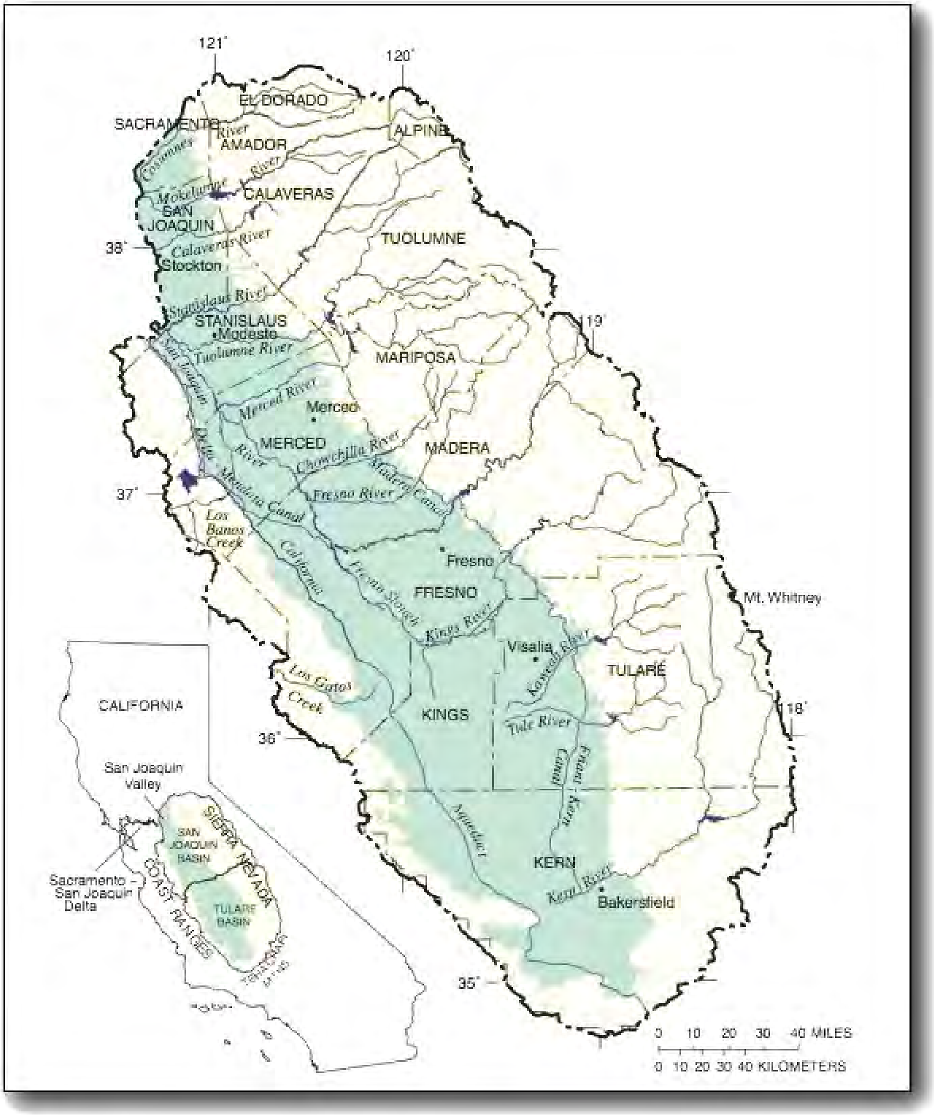

Figure C-1: Location of San Joaquin River Basin in the San Joaquin Valley, and the major rivers in the Basin. Green shading denotes the outline of the Valley floor. Source: Gronberg et al 1998.

The geographic scope of the "Sacramento River Basin" used in this report is that portion of the basin that extends from that portion of the basin that extends from the measurement of flows on the San Joaquin River at Rio Vista all the way upstream on both sides of the river to the headwaters of the river and its tributary creeks and streams in the southern Cascade range, up the McCloud River, the Pit River to their headwaters, and including east creeks (such as Deer, Butte, Battle, and others), the west creeks (such as Cottonwood, Clear, Putah, Stony, Cache and others), and the major tributary rivers including the Feather, Yuba, Bear, and American rivers all the way to their headwaters in the Coast Range (for the east and west creeks) and the Sierra Nevada. See Figure C-2.

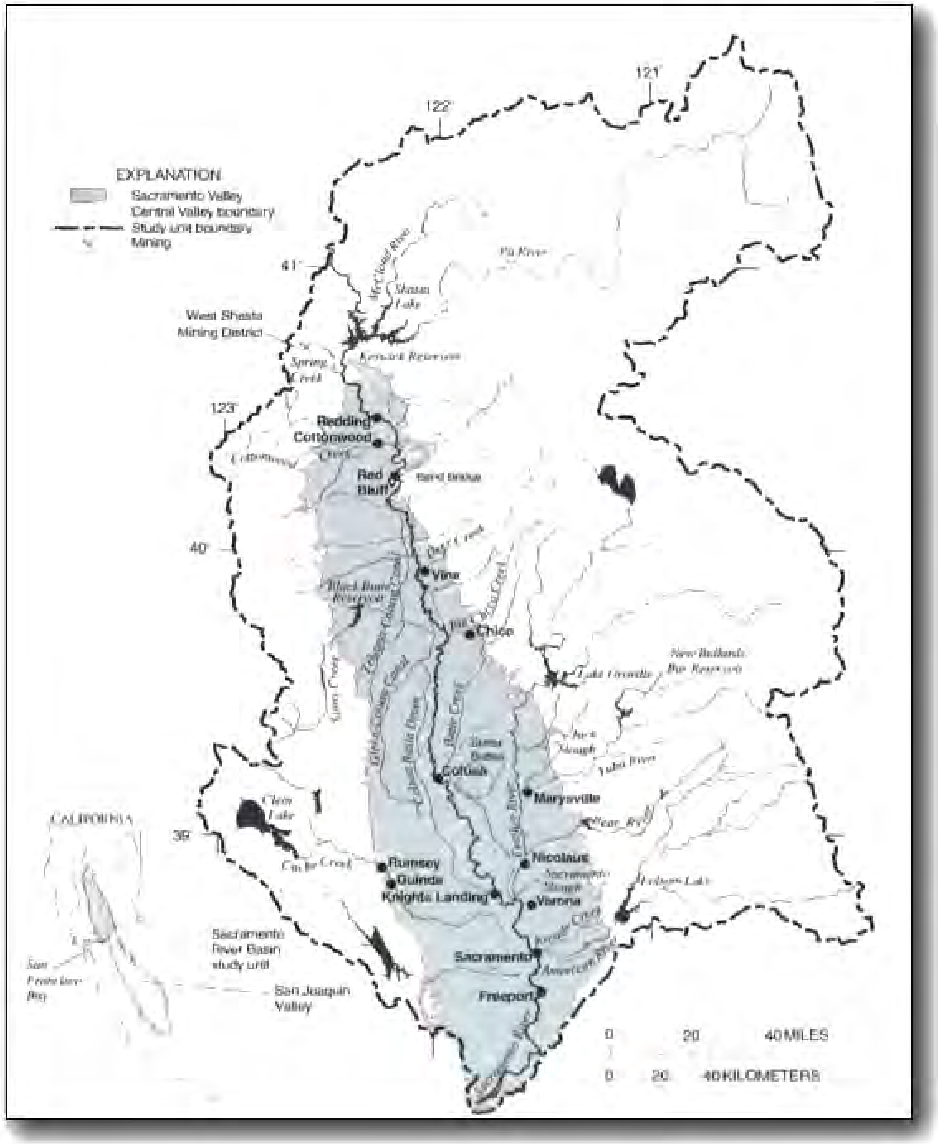

Figure C-2: Location of Sacramento Valley floor in the Sacramento River Basin. Source: Domagalski et al 1998.

Two common measures of water amounts are "acre-feet (AF)" and "cubic feet per second (cfs)." An acre-foot is 325,851 gallons of water, and is a measure of the *volume* of water, or about the amount of water that two families of four in California consume in a year. (There are 7.48052 gallons to a cubic foot, and 43,560 cubic feet in an acre-foot.) Cubic feet per second measures the *rate of flow* of a volume of water: a cubic foot of water that flows past a given point within a second of time passing. Since there are 43,560 square feet to an acre, 3600 seconds in an hour and 24 hours in a day and 365.25 days in an average year, one cubic foot per second flowing yields about 1.98 acre-feet per day in volume, or about 724.46 acre-feet in a year's time. For perspective, the San Joaquin River Basin's "unimpaired flow" has been estimated by the California Department of Water Resources to average about 6.18 million acre-feet per year. The average annual natural or unimpaired flow of the Upper San Joaquin River (above its confluence with the Merced River) is about 1.8 million acre-feet.

"Unimpaired flow" is one of several phrases (such as "full natural flow", "natural flow", and "natural runoff") used by the California Department of Water Resources to approximate "what would have occurred" on California streams "had man not altered the flow of water in the basin." (California Department of Water Resources, 2006: 5). Estimation of unimpaired flow by the Department typically assumes the current configuration of contemporary altered rivers, dams, levees, and the absence of former wetlands, floodplains and other features of rivers that may no longer exist. In some instances, it is possible that "natural flow," other things being equal might be less than "unimpaired flow" in a situation where wetlands and floodplains were reconstructed. These features of rivers tend to absorb water or at a minimum slow the rate of flow. For this report, unimpaired flows are used for the description and analysis of natural Basin hydrology, but the reader should keep in mind that, other things being equal, restoration of more natural conditions in the Basin might yield flows somewhat lower than those characterized by unimpaired conditions.

The State Water Resources Control Board employs a measure of water rights it calls “face amount” or “face value” that it applies to the rights it administers. Typically, descriptions of water rights have three basic components that describe the quantity of the right:

- “Direct diversion rates” (usually measured in cubic feet per second, or older rights may be stated in “miners inches”)
- “Collection to storage” or “contribution to storage” which is the amount of water that may be cumulated in a reservoir.
- “Season” during which the diversions and collections are permitted to occur under the water right. For a season that is “January 1 to December 31 inclusive”

To estimate the face amount, the direct diversion rate is converted to cubic feet per day (that is, 3600 seconds in an hour multiplied by 24 hours in a day), then multiplied by the number of days contained in the diversion season to derive a maximum volume (in cubic feet) for the entire diversion season. That amount is divided by 43,560 square feet per acre, to arrive at the acre-footage volume for the diversion season. If a storage amount (in acre-feet) is included in the water right, it is either substituted because it represents a cap on the entire collection to storage for the year, or is added to the diversion volume to arrive at the total face amount. The water right terms and conditions in state-issued permits and licenses usually say whether the collection to storage is capped or not.

Additional geographic components of water rights are used to pinpoint both where the diversion and/or storage occur and where the water so diverted/stored is to be used. These are the “point of diversion” and the “place of use.” This information is presented frequently in terms of the American “township and range system.” The base map meridian in the San Joaquin River Basin is always the Mount Diablo Base and Meridian (“MDB&M”). For some rights, a familiar water facility is stated.

Finally, the water rights also state what the “purpose of use” for the water is intended: most often in the San Joaquin River Basin the purposes of use are for “irrigation” or “power generation” (meaning the generation of hydroelectricity by running water through power plant turbines). Other uses may include fish and wildlife, recreation, municipal, and industrial uses.

Water Rights and Water Law in California

The use of water is first and foremost a matter of owning rights to its *use*. In our capitalist economy, this means use of water is a form of property right. This kind of property right is known as a *usufruct*. *Black’s Law Dictionary* defines a usufruct as:

> “a right for a certain period to use and enjoy the fruits of another’s property without damaging or diminishing it, but allowing for any natural deterioration in the property over time.” (Garner 2010)

A usufruct, according to the Oxford English Dictionary, “is a right to use another’s property short of the destruction or waste of its substance.” (Pearsall 1999) As water lawyers Arthur Littleworth and Eric Garner wrote, “Water rights are usufructuary, a right to the use of water, not a right to own it.” (Littleworth and Garner 2007: 27) The 20th century California water law authority, Wells Hutchin, wrote: “Water flowing in a natural stream is not the subject of private ownership,” and cites the California Supreme Court’s earliest water rights decision which stated in part, “the right of property in water is *usufructuary*, and consists not so much of the fluid itself as the advantage of its use. (Hutchins 1956: 36; *Eddy v. Simpson* 3 Calif 249 (1853), 252)”

The history of water rights in California has long been contentious. The state legislature beginning at statehood never passed a law that established California's water rights system. Instead, it was cobbled together by the court system on a case-by-case basis. In all cases, water rights in California give their owner a right to use, but not to horde or otherwise possess water; all uses must be reasonable. The question, of course, is "what is reasonable?"

Riparian Rights

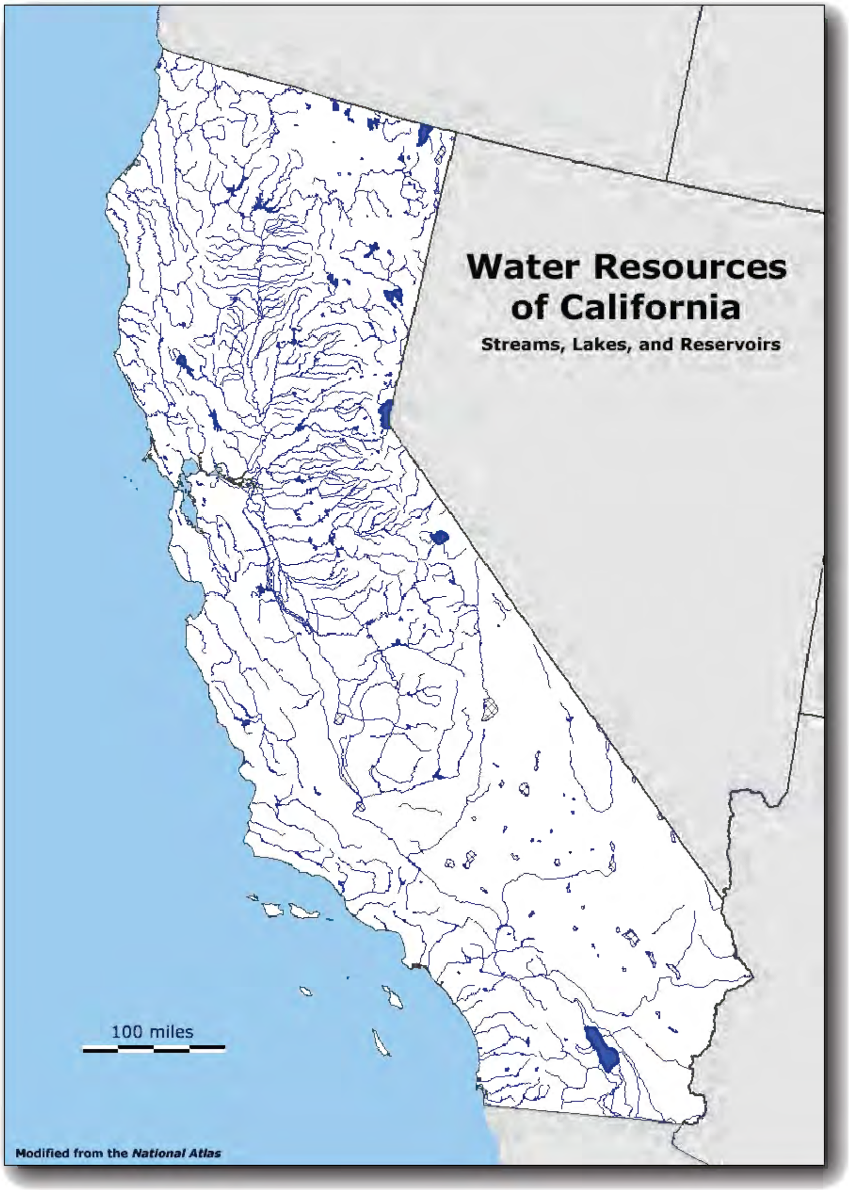
Water Resources of California
Streams, Lakes, and Reservoirs
100 miles
Modified from the *National Atlas*

Figure C-3
Source: U.S. Geological Survey.

Prior to statehood, California's territorial legislature adopted the English Common Law for its legal code. This action implied that landowners had riparian rights to water, consistent with the common law, when they owned property abutting a stream. ***Riparian rights*** are predominant in California and are held by those who own parcels of land that abut a flowing stream or spring. (Analogously, land owners may possess "overlying rights" to pump water from the ground for use on their property.) Riparian water rights are "part and parcel of the land" and are held in common with other riparian land owners along the same stream. A map of the streams of California gives an impression of the large number of potential riparian water right holders there are in California (Figure C-3). Riparian water rights are not quantified. But right holders along a stream share the river in common. They may make explicit agreement with neighbors divert water subject to reasonable use. Riparian water right holders may irrigate their lands immediately adjacent to the river, and their drainage must be returned to the river. They may have small ponds, under California state law, for purposes of managing their irrigation efforts, watering livestock, and incidental domestic uses. Riparian rights are the predominant water right in California and riparian diverters have priority to divert for use before prior appropriators do. Unlike appropriative water rights (see below), riparian water rights cannot be lost to the right holder from disuse. However, in specific circumstances such rights may be severed from land, usually having to do with land subdivision.

Appropriative Water Rights

Appropriative water rights are the other major form of water rights in California. Under the doctrine of prior appropriation, right holders gain the right to use a specific quantity of water from a stream, and no more. They may move that water out of the watershed. In California, this right arose in the Sierra Nevada mining districts in the 1850s, though the right's doctrine was known in the humid eastern United States where it facilitated American accommodation of mill-wheel technology to water law (Steinberg 1991; Horwitz 1977: 34-40). It follows the logic of mining claims: the miner who was first in time had the prior right not only to the mining claim but to the water in the adjacent stream needed to work the claim. "First in time, first in right," is the familiar adage for this right. Appropriators may divert their supplies only in order of the dates of their claims. The earlier the claim in time, the more senior the right. In dry years such a right has a more reliable water supply than rights with later dates of claim. Rights later in time are considered to be more junior, and have lower reliability of actual supply in dry years.

Appropriative rights have another important aspect: the water right must be *diligently exercised* year-in and year-out. The water must be applied to beneficial use under the right or else the right can be lost. "Use it or lose it," is another familiar adage for appropriative water rights. Once someone obtains the right, they must develop the facilities to divert, transport and store the water in a diligent manner, and once those facilities are completed, the water must be demonstrably used to the extent the right allows, or the right to use may be reduced or lost. Generally, long-distance canals, dams, and hydropower plants are the subjects of appropriative water rights. But it is also true that small ditches to parcels non-riparian in their location may rely on appropriative water rights to divert water to a ditch that irrigates some acreage, provides private domestic use, facilitates a mining claim, or runs a small hydroelectric generator.

Prescriptive Rights

Prescriptive rights come into play when one water user uses water adversely to the rights of another. They may divert water for years without discovery or objection by a neighboring user. In California, if that usage continues for five years or longer, that use may be demonstrated in court to have ripened into a legitimate right through the prescriptor's adverse use against the other existing right holder(s). This right has come into play in some instances in the San Joaquin River Basin, most notably involving rights held by San Francisco, and rights that came to be acquired by the US Bureau of Reclamation on the upper San Joaquin River .

State Water Rights Regulation

There are other water rights in California besides these. Groundwater is the subject of overlying rights. These rights are analogous to riparian rights because land owners may drill wells to pump groundwater for use on their properties. And like riparian rights, their overlying rights are held in correlation to the rights of neighbors over the same underground reservoir (or "aquifer") of water. In other words, both riparian and overlying rights holders use water from their sources in common with those of other adjacent land owners. Their rights are not quantified, but receive a percent share of the yield of the river or aquifer. Groundwater rights are not described in this report, but are very important to the history and use of water throughout the San Joaquin Valley. Groundwater has never been formally regulated by a state-level administrative agency. But some groundwater basins are regulated under supervision of court-appointed watermasters.

Until 1914, California water rights were obtained either by purchasing riparian land or by posting a noticed claim at the site of the intended river diversion or dam site, and then recording that claim within a specified time at the local County Recorder's office. Beginning December 19, 1914, the start date for California's formal administrative system of water rights regulation approved by referendum, appropriative water rights may only be obtained by filing an application with the state water rights board. Today, that regulatory authority is vested in the Division of Water Rights of the State Water Resources Control Board. Applications are prioritized by the date on which they are filed with the Division, and have been since December 19, 1914.

However, the Water Commission Act only committed California to regulate appropriative water rights moving forward from December 19, 1914. Riparian and appropriative rights (now known as "pre-1914" water rights) created before this date are unregulated from the new water rights administration. While unregulated, the State Water Resources is empowered to investigate these prior water rights (both riparian and pre-1914). There is disagreement about how far the Board's authority reaches in adjusting rights that might, for example, come into conflict with post-1914 water rights.

Legally speaking, stream flows are first available to riparian diverters, and any surplus determined by the State Water Resources Control Board is then available for appropriation by other water rights applicants. In deciding whether to permit a new water right on a stream, the State Water Resources Control Board performs a water availability analysis that determines whether such a surplus is available for new appropriations.

Exceptional Water Rights: The State Filings

Before taking up analysis of "paper water" in the San Joaquin River Basin in detail, it is necessary to present background and context for where the tremendous quantities of federal Bureau of Reclamation water rights originated.

California, on one hand, has a rather complex water rights system, what some scholars and attorneys call the "California Doctrine" (e.g., Holsinger 1936). Riparian right holders (owners of riparian lands) generally have paramount (but unquantified) claim to a correlative (i.e., "pro rata" fair share) of waters of a stream or lake, followed by appropriators who made their claims prior to 1914 and who perfect their quantified flow and storage rights by diligent completion of their facilities and diversion for use. The next class of water right holders are those who applied for rights to appropriate and use water through California's permit system that began in December 1914. These right holders are regulated by the State Water Resources Control Board today. Riparian and pre-1914 right holders are exempt from the Board's permit process.

Because of the California Doctrine and the state's water rights permit and license system, priority of application of water to use has long been the established system for determining whose rights get served and whose don't during droughts. One of the more difficult problems for state water policy, in the 1920s, became how the state could acquire water rights for a project of statewide scope when claims, permits, and licenses for water rights (especially the system for *acquiring* water rights) cumulated as the state's economy developed through time. How could the state gather the rights it needed to move forward with statewide coordinated water development? The staet was clearly a late-comer to obtain water rights for a state-sponsored system, and its rights were likely to face larger cutbacks during droughts than those with more senior rights on the same river systems.

When the Water Code was adopted by the State Legislature in 1914, it included (and still includes) Sections 104 and 105, which state:

> **Section 104.** It is hereby declared that the people of the State have a paramount interest in the use of all the water of the State and that the State shall determine what water of the State, surface and underground, can be converted to public use or controlled for public protection.
>
> **Section 105.** It is hereby declared that the protection of the public interest in the development of the water resources of the State is of vital concern to the people of the State and that the State shall determine in what way the water of the State, both surface and underground, should be developed for the greatest public benefit.

These provisions provide a policy rationale, if not the tools, for the State to intervene in the cumulating claims of water rights (essentially private rights) on behalf of the public interest in coordinated water development. Provoked by growing perceptions of shortage around the fast-developing state, which were aggravated by drought and litigation in the early 1920s[1], the State of California came up with its first statewide plan to develop and reallocate water to meet the state's water problems. In 1925, state planners realized they had to address how water rights could be obtained without injury to vested rights. The California Water Project Authority describes the problem this way in 1951:

> With respect to the protection of water rights and water requirements in carrying out such a plan of coordinated development, [a 1925 report to the Legislature on California's water resources] contains the following statement...:
>
>> The whole discussion of the diversion of surplus waters from the Sacramento River into the San Joaquin Valley, must be predicated upon the institution of a coordinated development in both valleys that gives full protection against present or future loss to the owners of vested rights and to present users of water as well as to those potential users whose lands lie tributary to streams from which exportations of water are proposed. (California Water Project Authority, 1951: 21-23)

A 1926 California Supreme Court decision once again upholding riparian over appropriative rights made the water rights issue for statewide development even more immediate. In 1927, a Legislative committee studying the "coordinated plan of development" recommended the legislature "*at once* take the necessary steps, either through its proper officials or by legislation, to file on or withdraw from filing by private parties the water rights to be utilized and required for the consummation of the coordinated plan. (California Water Project Authority, 1951: 23; italics added)"

The Legislature passed the Feigenbaum Act, Chapter 286, Statutes of 1927[2] to authorize the California Department of Finance to file applications for water rights "for any water which in its judgment is or may be required in the development and completion of the whole or any part of a general or coordinated plan looking toward the development, utilization, or conservation of the water resources of the State."[3] The Act gave the State the power to literally but fictitiously *stop time* for the purpose of filing applications for water rights on behalf of the state water plan:

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[1] The case of *Town of Antioch v. Williams Irrigation District*, the first Delta water case that attempted to address low Delta inflows and tidal salinity intrusion, was filed during dry conditions in 1920, and decided by the California Supreme Court in 1922.

[2] Today, portions of its provisions live on in Water Code sections 10500 and 10504, while other sections of the Feigenbaum Act were subsequently repealed in 1953. The Feigenbaum Act is also mentioned in Jackson and Mikesell, (1979: 29).

[3] Water Code §10500, quoted in California Water Project Authority (1951: 28).

> Section 10501. Any application filed by the Department of Finance within nine months after July 29, 1927, has priority as of that date and such priority shall be retained over any application made by others subsequent application made by others subsequent to that date in conflict therewith, regardless of any requirements or provisions for water or the use thereof, until October 1, 1955.
>
> Section 10502. Any priority under this part may be maintained and extended by further legislative enactment.[4]

The Feigenbaum Act further empowered the Department of Finance to "release from priority or assign any portion of any appropriation filed by it under this part when the the release or assignment is for the purpose of development not in conflict with such general or coordinated plan." While benefiting from a special state-filed priority date under the Act, assignees would still be obligated to proceed with their water development plans with due diligence. Assignees of these applications could include state agencies, commissions, and departments, as well as the United States of America or any of its departments or agencies.[5]

Subsequent legislation also enables counties and watersheds of origin to benefit from such state filing assignments. State filings provide the State of California with the water rights-equivalent of a "wild card" (within some limits) that can reserve, withdraw or otherwise control the waters of any California river or stream so that they may be incorporated into either the State Water Project or the Central Valley Project, either for export or to benefit areas of origin—until or unless that state filing right is revoked by the State Water Resources Control Board.

State Filings for San Joaquin River Basin Water Rights

According to State Water Resources Control Board records, there have been 26 state filings on rivers and creeks of the San Joaquin River Basin since enactment of the Feigenbaum Act in 1927.[6] They are listed in Appendix J. The filings include claims for creeks and tributaries of the Stanislaus, Merced, and San Joaquin Rivers. No state filings appear to exist for the Tuolumne River.

In the San Joaquin River Basin, state filings were assigned to the US Bureau of Reclamation to develop Friant Dam, its associated Madera and Friant-Kern Canals, and New Melones Dam and Reservoir on the Stanislaus River. State filing Application 5638 was assigned to the Bureau to supplement earlier, insufficient water rights applications for the Friant Dam site filed in 1916 and 1919.

The rest of the state filings are as yet unassigned and therefore technically (if not politically) still in play with regard to coordinated statewide water development and/or area of origin claims. For example, Application 5949 (priority date of July 30, 1927) on the south fork of the Stanislaus River has been the subject of requests for assignment by Pacific Gas & Electric Company (beginning in 1951) and by Tuolumne Regional Water District (1980s). Neither request for assignment was acted on by the State, deferring action until some sort of coordinated plan of development was further along. Meanwhile, 184 other state filings throughout California have similar status as Application 5649.

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[4] These sections were repealed in 1953.

[5] Water Code § 10504, quoted in California Water Project Authority (1951). This provision remains in effect today.

[6] According to eWRIMS, the State Water Board's online water rights application database, there are 185 active state filings. San Joaquin River Basin state filings amount to about 14 percent of all state filings at this time. Excel file accessed and downloaded 12 November 2010 and updated in July 2011. They may be found by searching on both California Department of Finance and State Water Resources Control Board.

Additional file research at the State Water Resources Control Board Records Room would be necessary to determine the current status of these and other state filing applications.

Reasonable Use of Water

Even before Californians amended their constitution in 1928, legal precedents set by California courts required that water use among riparians had to be reasonable, and water use between appropriators had to be reasonable. Appropriators also were accountable to riparians for reasonable use. Major political conflict arose about water rights though because California law contained no requirement that the water use of riparians with respect to appropriators had to be reasonable. Then, in 1928, California voters approved an amendment to the California Constitution that required all water use in California by any water right holder (riparians included) had to be reasonable and not wasteful.[7] The California Constitution stresses that "the right to water...does not and shall not extend to the waste or unreasonable use or unreasonable method of use or unreasonable method of diversion of water." Where riparian rights were once entitled to the "full natural flow" of the stream to which the rights attached, the California Constitution now limits attachment of the riparian right to "no more than so much of the flow thereof as may be required or used consistently with this section, for the purposes for which such lands are, or may be made adaptable, in view of such reasonable and beneficial uses" without "depriving any riparian owner of the reasonable use of water of the stream...or as depriving any appropriator of water to which the appropriator is lawfully entitled."

The question remains under this doctrine: what uses, methods of use, and methods of diversion represent are reasonable, and how does that translate into more efficient allocation and use of water so that waste of water and significant environmental impacts of water development are avoided or at least mitigated? In case law, the answer is a matter of the facts involved.

The new Delta Watermaster, Craig M. Wilson, whose office was created by the water reform legislation of 2009, calls the Reasonable Use Doctrine "the cornerstone of California's complex water rights laws. All water use must be reasonable and beneficial regardless of the type of underlying water right. No one has an enforceable property interest in the unreasonable use of water. (Wilson, 2011: 3)"

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[7] Article X, Section 2 of the California Constitution.

Appendix D

Supporting Data and Analyses

Contents

D.1 Water Availability Analysis Spreadsheet Models

D.2 Unimpaired Flow Hydrology

D.3 Adjudication Decree Quantification

D.4 Consumptive Statements of Diversion and Use

D.5 Other Pre-1914 Consumptive Water Rights

D.6 Post-1914 Consumptive Water Rights

D.7 Sacramento River Post-1914 Water Rights Priorities

Appendix D

Section D.1
Water Availability Analysis Spreadsheet Models

Trinity River Water Rights Yield Analysis

Tributary Inflow Criteria	Diversion Cap	
75%	25%	of unimpaired flow
60%	40%	of unimpaired flow
50%	50%	of unimpaired flow
40%	60%	of unimpaired flow
	94%	average regulated period share of flow during water year

	Water Year Flow Percentile										
75% Inflow Criterion Scenario	10th Percentile	20th Percentile	25th Percentile	30th Percentile	40th Percentile	Median Flow	60th Percentile	70th Percentile	75th Percentile	80th Percentile	90th Percentile
Total Annual Unimpaired Flow (TAF)	679	789	824	866	1,025	1,133	1,424	1,582	1,611	1,683	2,035
November through June Unimpaired Flow (TAF)	624	743	785	838	968	1,064	1,341	1,455	1,529	1,599	1,930
Delta Inflow Criterion (75% of UF, TAF)	468	557	589	629	726	798	1,006	1,091	1,147	1,199	1,448
Diversion Cap (TAF)	156	186	196	210	242	266	335	364	382	400	483
Riparian and Pre-1914 Claimants (134.1 TAF)	126	126	126	126	126	126	126	126	126	126	126
USBR 1927 Trinity Claim (3,349.9 TAF)	30	60	70	84	116	140	209	238	256	274	357
USBR 1959 Trinity Claim (3,030.8 TAF)	0	0	0	0	0	0	0	0	0	0	0
USBR 2002 Trinity Claim (2,203.1 TAF)	0	0	0	0	0	0	0	0	0	0	0
Remaining Flows, July-October	55	46	39	27	57	69	82	127	82	85	105
Riparian and Pre-1914 Claimants (134.1 TAF)	8	8	8	8	8	8	8	8	8	8	8
USBR 1927 Trinity Claim (3,349.9 TAF)	47	37	31	19	49	61	74	119	74	77	97
USBR 1959 Trinity Claim (3,030.8 TAF)	0	0	0	0	0	0	0	0	0	0	0
USBR 2002 Trinity Claim (2,203.1 TAF)	0	0	0	0	0	0	0	0	0	0	0
Total Riparian and Pre-1914 Claimants	134	134	134	134	134	134	134	134	134	134	134
Total USBR Trinity Claims	77	97	101	103	165	201	284	357	330	350	454

Sources: DWR, SWRCB, C-WIN.

Feather River Water Rights Yield Analysis

Tributary Inflow Criteria	Diversion Cap	
75%	25%	of unimpaired flow
60%	40%	of unimpaired flow
50%	50%	of unimpaired flow
40%	60%	of unimpaired flow
	90%	average regulated period share of flow during water year

75% Inflow Criterion	10th Percentile	20th Percentile	25th Percentile	30th Percentile	40th Percentile	Median Flow	60th Percentile	70th Percentile	75th Percentile	80th Percentile	90th Percentile
Total Annual Unimpaired Flow (TAF)	2,007	2,511	2,638	2,932	3,251	3,854	4,596	5,673	5,767	6,268	7,095
November through June Unimpaired Flow (TAF)	1,705	2,150	2,270	2,562	2,893	3,466	4,201	5,160	5,260	5,583	6,470
Delta Inflow Criterion (75% of UF, TAF)	1,278	1,613	1,703	1,921	2,170	2,600	3,151	3,870	3,945	4,187	4,852
Diversion Cap (TAF)	426	538	568	640	723	867	1,050	1,290	1,315	1,396	1,617
Paramount Riparian and Possibly Prior Pre-1914 Water Right Holders (Total 3,493 TAF)	426	538	568	640	723	867	1,050	1,290	1,315	1,396	1,617
South Feather WPA and Thermalito Water & Sewer 1920s Rights (331.8 TAF)	0	0	0	0	0	0	0	0	0	0	0
DWR 1927, 1951, and 1956 Rights (10,447.2 TAF)	0	0	0	0	0	0	0	0	0	0	0
North Yuba Water District 1958 Rights (624 TAF)	0	0	0	0	0	0	0	0	0	0	0
DWR 1967 Right (83 TAF)	0	0	0	0	0	0	0	0	0	0	0
Remaining Flow July-October (TAF)	303	360	368	371	359	388	395	513	507	685	625
Paramount Riparian and Possibly Prior Pre-1914 Water Right Holders (Total 3,493 TAF)	303	355	355	355	355	355	355	355	355	355	355
South Feather WPA and Thermalito Water & Sewer 1920s Rights (331.8 TAF)	0	6	13	16	4	33	34	34	34	34	34
DWR 1927, 1951, and 1956 Rights (10,447.2 TAF)	0	0	0	0	0	0	7	124	118	297	236
North Yuba Water District 1958 Rights (624 TAF)	0	0	0	0	0	0	0	0	0	0	0
DWR 1967 Right (83 TAF)	0	0	0	0	0	0	0	0	0	0	0
Total Riparian and Pre-1914	729	892	922	995	1,078	1,221	1,405	1,645	1,670	1,750	1,972
Total South Feather & Thermalito	0	6	13	16	4	33	34	34	34	34	34
Total DWR	0	0	0	0	0	0	7	124	118	297	236
Total North Yuba Water District	0	0	0	0	0	0	0	0	0	0	0

Source: DWR, SWRCB, C-WIN.

Central Valley Water Rights Yield Model.xls
Feather_River

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Yuba River Water Rights Yield Analysis

Tributary Inflow Criteria	Diversion Cap	
75%	25%	of unimpaired flow
60%	40%	of unimpaired flow
50%	50%	of unimpaired flow
40%	60%	of unimpaired flow
	94%	average regulated period share of flow during water year

75% Inflow Criterion	10th Percentile	20th Percentile	25th Percentile	30th Percentile	40th Percentile	Median Flow	60th Percentile	70th Percentile	75th Percentile	80th Percentile	90th Percentile
Total Annual Unimpaired Flow (TAF)	921	1,231	1,363	1,521	1,826	2,123	2,428	2,949	3,164	3,284	3,765
November through June Unimpaired Flow (TAF)	884	1,151	1,268	1,438	1,746	2,006	2,280	2,780	2,993	3,079	3,681
Delta Inflow Criterion (75% of UF, TAF)	663	863	951	1,078	1,310	1,505	1,710	2,085	2,245	2,310	2,761
Diversion Cap (TAF)	221	288	317	359	437	502	570	695	748	770	920
Paramount Riparian and Possibly Prior Pre-1914 Water Right Holders (1,497 TAF)	221	288	317	359	437	502	570	695	748	770	920
Nevada ID and Yuba County Water District 1920s Rights (212.6 TAF)	-	-	-	-	-	-	-	-	-	-	-
Yuba County Water Agency 1927 Right (1,159 TAF)	-	-	-	-	-	-	-	-	-	-	-
Nevada ID 1930s Rights (212.8 TAF)	-	-	-	-	-	-	-	-	-	-	-
North Yuba Water District 1958 Rights (145.1 TAF)	-	-	-	-	-	-	-	-	-	-	-
Nevada ID 1961 Right (101.2 TAF)	-	-	-	-	-	-	-	-	-	-	-
Yuba County Water Agency 1966 Rights (760 TAF)	-	-	-	-	-	-	-	-	-	-	-
Remaining Flow July-October (TAF)	37	80	95	83	80	117	148	169	171	204	84
Paramount Riparian and Possibly Prior Pre-1914 Water Right Holders (1,497 TAF)	37	80	85	83	80	85	85	85	85	85	84
Nevada ID and Yuba County Water District 1920s Rights (212.6 TAF)	-	-	10	-	-	12	12	12	12	12	-
Yuba County Water Agency 1927 Right (1,159 TAF)	-	-	-	-	-	20	51	66	66	66	-
Nevada ID 1930s Rights (212.8 TAF)	-	-	-	-	-	-	-	6	8	12	-
North Yuba Water District 1958 Rights (145.1 TAF)	-	-	-	-	-	-	-	-	-	8	-
Nevada ID 1961 Right (101.2 TAF)	-	-	-	-	-	-	-	-	-	6	-
Yuba County Water Agency 1966 Rights (760 TAF)	-	-	-	-	-	-	-	-	-	15	-
Total Riparian & Pre-1914	258	368	402	442	516	587	655	780	833	855	1,004
Total Nevada ID and YCWD Yields	0	0	10	0	0	12	12	12	12	12	0
Total Yuba County Water Agency Yields	0	0	0	0	0	20	51	66	66	81	0
Total North Yuba Water District Yield	0	0	0	0	0	0	0	0	0	8	0
Total Nevada ID Yield	0	0	0	0	0	0	0	0	0	6	0

Source: DWR, SWRCB, C-WIN.

Bear River Water Rights Yield Analysis

Tributary Inflow Criteria	Diversion Cap	
75%	25%	of unimpaired flow
60%	40%	of unimpaired flow
50%	50%	of unimpaired flow
40%	60%	of unimpaired flow
	97%	average regulated period share of flow during water year

75% Inflow Criterion	10th Percentile	20th Percentile	25th Percentile	30th Percentile	40th Percentile	Median Flow	60th Percentile	70th Percentile	75th Percentile	80th Percentile	90th Percentile
Total Unimpaired Flow (TAF)	102	137	171	181	247	290	384	434	462	489	567
November through June Unimpaired Flow (TAF)	102	130	165	177	239	278	365	410	453	482	553
Delta Inflow Criterion (75% of UF, TAF)	76	98	124	132	179	209	274	308	340	361	415
Diversion Cap (TAF)	25	33	41	44	60	70	91	103	113	120	138
Paramount Riparian and Possibly Prior Pre-1914 Water Right Holders (92.1 TAF)	25	33	41	44	60	70	89	89	89	89	89
Camp Far West 1918 Right (4.8 TAF)	0	0	0	0	0	0	2	5	5	5	5
Nevada ID 1921 Rights (77.5 TAF)	0	0	0	0	0	0	0	9	20	27	45
Camp Far West 1922 and 1924 Rights (8.6 TAF)	0	0	0	0	0	0	0	0	0	0	0
Nevada ID 1929 Right (50.9 TAF)	0	0	0	0	0	0	0	0	0	0	0
Camp Far West 1941 Right (5 TAF)	0	0	0	0	0	0	0	0	0	0	0
South Sutter Water District 1952 Right (139.5 TAF)	0	0	0	0	0	0	0	0	0	0	0
Lake of the Pines 1966 Right (4.2 TAF)	0	0	0	0	0	0	0	0	0	0	0
South Sutter Water District 1981 Right (130.7 TAF)	0	0	0	0	0	0	0	0	0	0	0
Remaining Flow July-October (TAF)	1	7	6	4	8	12	18	24	9	7	14
Paramount Riparian and Possibly Prior Pre-1914 Water Right Holders (92.1 TAF)	1	3	3	3	3	3	3	3	3	3	3
Camp Far West 1918 Right (4.8 TAF)	0	0	0	0	0	0	0	0	0	0	0
Nevada ID 1921 Rights (77.5 TAF)	0	3	2	1	3	3	3	3	3	3	3
Camp Far West 1922 and 1924 Rights (8.6 TAF)	0	0	0	0	0	0	0	0	0	0	0
Nevada ID 1929 Right (50.9 TAF)	0	0	0	0	2	2	2	2	2	0	2
Camp Far West 1941 Right (5 TAF)	0	0	0	0	0	0	0	0	0	0	0
South Sutter Water District 1952 Right (139.5 TAF)	0	0	0	0	0	4	5	5	1	0	5
Lake of the Pines 1966 Right (4.2 TAF)	0	0	0	0	0	0	0	0	0	0	0
South Sutter Water District 1981 Right (130.7 TAF)	0	0	0	0	0	0	5	5	0	0	1
Total Riparian & Pre-1914 Yield	26	36	44	47	63	73	92	92	92	92	92
Total Camp Far West Yield	0	0	0	0	1	1	3	5	5	5	5
Total Nevada ID Yield	0	3	2	1	4	4	4	13	24	30	49
Total South Sutter Water District Yield	0	0	0	0	0	4	9	9	1	0	6
Total Lake of the Pines Yield	0	0	0	0	0	0	0	0	0	0	0

Sources: DWR, SWRCB, C-WIN

American River Water Rights Yield Analysis

Tributary Inflow Criteria	Diversion Cap	
75%	25%	of unimpaired flow
60%	40%	of unimpaired flow
50%	50%	of unimpaired flow
40%	60%	of unimpaired flow
	95%	average regulated period share of flow during water year

75% Instream Flow Criterion	10th Percentile	20th Percentile	25th Percentile	30th Percentile	40th Percentile	Median Flow	60th Percentile	70th Percentile	75th Percentile	80th Percentile	90th Percentile
Total Annual Unimpaired Flow (TAF)	1,041	1,252	1,416	1,613	2,023	2,521	2,844	3,300	3,554	3,886	4,525
November through June Unimpaired Flow (TAF)	984	1,188	1,363	1,556	1,983	2,422	2,731	3,140	3,311	3,687	4,340
Delta Inflow Criterion (75% of UF, TAF)	738	891	1,022	1,167	1,487	1,817	2,048	2,355	2,483	2,766	3,255
Diversion Cap (TAF)	246	297	341	389	496	606	683	785	828	922	1,085
Paramount Riparian and Possibly Prior Pre-1914 Water Right Holders (286 TAF)	246	273	273	273	273	273	273	273	273	273	273
Nevada ID 1930s Rights (5.0 TAF)	0	5	5	5	5	5	5	5	5	5	5
City of Sacramento 1940s Rights (715.2 TAF)	0	19	63	111	218	328	405	507	550	644	683
Georgetown Divide 1955 Rights (20.4 TAF)	0	0	0	0	0	0	0	0	0	0	19
Placer County Water Agency 1958 Rights (1,291 TAF)	0	0	0	0	0	0	0	0	0	0	105
USBR 1958 Rights (5,347.8 TAF)	0	0	0	0	0	0	0	0	0	0	0
City of Sacramento 1958 Rights (95.1 TAF)	0	0	0	0	0	0	0	0	0	0	0
Foresthill PUD 1964 Rights (24.1 TAF)	0	0	0	0	0	0	0	0	0	0	0
El Dorado ID 1992 Rights (47.9 TAF)	0	0	0	0	0	0	0	0	0	0	0
Remaining Flow July-October (TAF)	57	64	53	57	40	99	113	160	243	198	185
Paramount Riparian and Possibly Prior Pre-1914 Water Right Holders (286 TAF)	13	13	13	13	13	13	13	13	13	13	13
Nevada ID 1930s Rights (5.0 TAF)	0	0	0	0	0	0	0	0	0	0	0
City of Sacramento 1940s Rights (715.2 TAF)	32	32	32	32	26	32	32	32	32	32	32
Georgetown Divide 1955 Rights (20.4 TAF)	1	1	1	1	0	1	1	1	1	1	1
Placer County Water Agency 1958 Rights (1,291 TAF)	11	18	7	11	0	53	58	58	58	58	58
USBR 1958 Rights (5,347.8 TAF)	0	0	0	0	0	0	9	55	139	94	80
City of Sacramento 1958 Rights (95.1 TAF)	0	0	0	0	0	0	0	0	0	0	0
Foresthill PUD 1964 Rights (24.1 TAF)	0	0	0	0	0	0	0	0	0	0	0
El Dorado ID 1992 Rights (47.9 TAF)	0	0	0	0	0	0	0	0	0	0	0
Total Riparian & Pre-1914 Yield	259	286	286	286	286	286	286	286	286	286	286
Total Nevada ID Yield	0	5	5	5	5	5	5	5	5	5	5
Total City of Sacramento Yield	32	51	95	143	244	360	437	539	582	676	715
Total Georgetown Divide PUD Yield	1	1	1	1	0	1	1	1	1	1	20
Total Placer County Water Agency Yield	11	18	7	11	0	53	58	58	58	58	163
Total USBR Yield	0	0	0	0	0	0	9	55	139	94	80
Total Foresthill PUD Yield	0	0	0	0	0	0	0	0	0	0	0
Total El Dorado ID Yield	0	0	0	0	0	0	0	0	0	0	0

Sources: DWR, SWRCB, C-WIN.

Sacramento River at Feather River Confluence Water Rights Yield Analysis

Tributary Inflow Criteria	Diversion Cap	
75%	25%	of unimpaired flow
60%	40%	of unimpaired flow
50%	50%	of unimpaired flow
40%	60%	of unimpaired flow
	87%	average regulated period share of flow during water year

	Water Year Flow Percentile										
75% Inflow Criterion Scenario	10th Percentile	20th Percentile	25th Percentile	30th Percentile	40th Percentile	Median Flow	60th Percentile	70th Percentile	75th Percentile	80th Percentile	90th Percentile
Total Annual Unimpaired Flow (TAF)	5,572	6,984	7,371	7,877	8,860	10,162	13,046	14,151	14,945	15,697	19,369
November through June Unimpaired Flow (TAF)	4,638	5,876	6,170	6,806	7,721	9,163	11,451	12,658	13,688	14,434	17,849
Delta Inflow Criterion (75% of UF, TAF)	3,479	4,407	4,627	5,104	5,791	6,872	8,588	9,494	10,266	10,826	13,386
Diversion Cap (TAF)	1,160	1,469	1,542	1,701	1,930	2,291	2,863	3,165	3,422	3,609	4,462
Paramount Riparian and Prior Pre-1914 Water Right Holders (42,261.8 TAF)	1,160	1,469	1,542	1,701	1,930	2,291	2,863	3,165	3,422	3,609	4,462
Water Right Holders with Priorities 1915 to Early 1927 (1,352.4 TAF)	0	0	0	0	0	0	0	0	0	0	0
Early CVP Sacramento River State Filings, Other Claimants, 1927-1936 (11,263.6 TAF)	0	0	0	0	0	0	0	0	0	0	0
1938 CVP and Post-War Claimants through June 1951 (8,145.4 TAF)	0	0	0	0	0	0	0	0	0	0	0
1951 Feather River Project, CVP State Filings, Other Claimants through 1961 (18,901.4 TAF)	0	0	0	0	0	0	0	0	0	0	0
Remaining Flows, July-October (TAF)	934	1,107	1,201	1,071	1,139	999	1,595	1,493	1,257	1,263	1,520
Paramount Riparian and Prior Pre-1914 Water Right Holders (42,261.8 TAF)	934	1,107	1,201	1,071	1,139	999	1,595	1,493	1,257	1,263	1,520
Water Right Holders with Priorities 1915 to Early 1927 (1,352.4 TAF)	0	0	0	0	0	0	0	0	0	0	0
Early CVP Sacramento River State Filings, Other Claimants, 1927-1936 (11,263.6 TAF)	0	0	0	0	0	0	0	0	0	0	0
1938 CVP and Post-War Claimants through June 1951 (8,145.4 TAF)	0	0	0	0	0	0	0	0	0	0	0
1951 Feather River Project, CVP State Filings, Other Claimants through 1961 (18,901.4 TAF)	0	0	0	0	0	0	0	0	0	0	0
Total Paramount Riparian and Possibly Prior Pre-1914 Water Right Holders (1,433.7 TAF)	2,094	2,576	2,743	2,773	3,069	3,290	4,458	4,657	4,679	4,872	5,983
Total, 1915-Early 1927 Claimants (up to 1,352.4 TAF)	0	0	0	0	0	0	0	0	0	0	0
Total 1927-1936 Claimants (14,613.5 TAF)	0	0	0	0	0	0	0	0	0	0	0
Total 1938-June 1951 Claimants (8,145.4 TAF)	0	0	0	0	0	0	0	0	0	0	0
Total 1951 through 1961 Claimants (18,901.4 TAF)	0	0	0	0	0	0	0	0	0	0	0

Source: DWR, SWRCB, C-WIN.

Central Valley Water Rights Yield Model.xls
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Stanislaus River Water Rights Yield Analysis

Tributary Inflow Criteria	Diversion Cap	
60%	40%	of unimpaired flow
50%	50%	of unimpaired flow
40%	60%	of unimpaired flow
30%	70%	of unimpaired flow
	85%	Average of Regulated Period to Total Flow during Water Year

60% Instream Flow Criterion	10th Percentile	20th Percentile	25th Percentile	30th Percentile	40th Percentile	Median Flow	60th Percentile	70th Percentile	75th Percentile	80th Percentile	90th Percentile
Total Annual Unimpaired Flow (TAF)	457	592	637	680	894	1,107	1,265	1,359	1,460	1,559	1,912
Feb-June Unimpaired Flow Level (TAF)	382	500	551	566	740	822	994	1,077	1,127	1,180	1,459
Delta Inflow Criterion (60% of UF, TAF)	229	300	330	340	444	493	596	646	676	708	875
Diversion Cap (TAF)	153	200	220	226	296	329	398	431	451	472	583
Paramount Riparian and Possibly Prior Pre-1914 Water Right Holders (29.4 TAF)	25	25	25	25	25	25	25	25	25	25	25
Pre-1914 Oakdale ID Claims (1,371.4 TAF)	128	175	195	201	271	304	372	406	425	447	558
Total USBR Post-1914 Claims (3,400 TAF)	0	0	0	0	0	0	0	0	0	0	0
Remaining Flows, July through January	75	92	87	114	154	285	271	282	333	380	454
Paramount Riparian and Possibly Prior Pre-1914 Water Right Holders (29.4 TAF)	4	4	4	4	4	4	4	4	4	4	4
Pre-1914 Oakdale ID Claims (1,371.4 TAF)	70	88	82	110	150	199	199	199	199	199	199
Total USBR Post-1914 Claims (3,400 TAF)	0	0	0	0	0	81	67	79	129	176	250
Total Riparian and Pre-1914 Yield	29	29	29	29	29	29	29	29	29	29	29
Total Oakdale ID Claims	198	262	277	311	421	503	572	605	625	646	758
Total USBR Claims	0	0	0	0	0	81	67	79	129	176	250

Sources: DWR, SWRCB, C-WIN. Totals may not sum due to effects of rounding.

Tuolumne River Water Rights Yield Analysis

Tributary Inflow Criteria	Diversion Cap	
60%	40%	of unimpaired flow
50%	50%	of unimpaired flow
40%	60%	of unimpaired flow
30%	70%	of unimpaired flow
	76%	Average of Regulated Period to Total Flow during Water Year

60% Instream Flow Criterion	10th Percentile	20th Percentile	25th Percentile	30th Percentile	40th Percentile	Median Flow	60th Percentile	70th Percentile	75th Percentile	80th Percentile	90th Percentile
Total Annual Unimpaired Flow (TAF)	836	1,053	1,107	1,183	1,416	1,786	2,030	2,181	2,363	2,483	3,093
Feb-June Unimpaired Flow Level (TAF)	675	898	961	984	1,189	1,299	1,578	1,704	1,755	1,852	2,188
Delta Inflow Criterion (60% of UF, TAF)	405	539	577	591	713	779	947	1,023	1,053	1,111	1,313
Diversion Cap (TAF)	270	359	384	394	475	520	631	682	702	741	875
Gallo Riparian and Tuolumne Utilities District Pre-1914 Claims (22.6 TAF)	17	17	17	17	17	17	17	17	17	17	17
Turlock ID/Modesto ID 1855 and 1871 Claims (3,382.1 TAF)	253	342	367	376	458	502	614	665	685	724	858
San Francisco 1901, 1902, and 1908 Claims (1,840.1 TAF)	0	0	0	0	0	0	0	0	0	0	0
Modesto ID 1908 Claim (40 TAF)	0	0	0	0	0	0	0	0	0	0	0
San Francisco 1908 through 1911 Claims (4,114.9 TAF)	0	0	0	0	0	0	0	0	0	0	0
Turlock ID 1911 Claim (100 TAF)	0	0	0	0	0	0	0	0	0	0	0
Remaining Flow, July-January	161	154	146	199	228	487	451	477	609	631	904
Gallo Riparian and Tuolumne Utilities District Pre-1914 Claims (22.6 TAF)	5	5	5	5	5	5	5	5	5	5	5
Turlock ID/Modesto ID 1855 and 1871 Claims (3,382.1 TAF)	155	149	141	193	222	482	446	471	603	626	804
San Francisco 1901, 1902, and 1908 Claims (1,840.1 TAF)	0	0	0	0	0	0	0	0	0	0	95
Modesto ID 1908 Claim (40 TAF)	0	0	0	0	0	0	0	0	0	0	0
San Francisco 1908 through 1911 Claims (4,114.9 TAF)	0	0	0	0	0	0	0	0	0	0	0
Turlock ID 1911 Claim (100 TAF)	0	0	0	0	0	0	0	0	0	0	0
Total Riparian and Senior Pre-1914 Claims	23	23	23	23	23	23	23	23	23	23	23
Total Turlock ID/Modesto ID Claims	408	491	508	570	680	984	1,060	1,136	1,288	1,349	1,662
Total San Francisco Claims	0	0	0	0	0	0	0	0	0	0	95

Sources: DWR, SWRCB, C-WIN. Totals may not sume due to effects of rounding.

Merced River Water Rights Yield Analysis

Tributary Inflow Criteria	Diversion Cap	
60%	40%	of unimpaired flow
50%	50%	of unimpaired flow
40%	60%	of unimpaired flow
30%	70%	of unimpaired flow
	81%	Average of Regulated Period to Total Flow during Water Year

60% Instream Flow Criterion	10th Percentile	20th Percentile	25th Percentile	30th Percentile	40th Percentile	Median Flow	60th Percentile	70th Percentile	75th Percentile	80th Percentile	90th Percentile
Total Annual Unimpaired Flow (TAF)	409	492	527	562	669	906	1,077	1,160	1,220	1,389	1,708
Jan-June Unimpaired Flow Level (TAF)	326	432	459	471	568	648	805	924	977	1,030	1,223
Delta Inflow Criterion (60% of UF, TAF)	196	259	275	283	341	389	483	554	586	618	734
Diversion Cap (TAF)	130	173	183	189	227	259	322	370	391	412	489
Decrees + Riparian Claims (282.7 TAF)	130	173	183	189	227	228	228	228	228	228	228
Merced ID Pre-1914 Claims + SDUs (4,193.3 TAF)	0	0	0	0	0	31	94	142	163	184	261
Remaining Flow, July-January	82	60	69	91	101	258	272	236	243	359	485
Decrees + Riparian Claims (282.7 TAF)	55	55	55	55	55	55	55	55	55	55	55
Merced ID Pre-1914 Claims + SDUs (4,193.3 TAF)	27	5	14	36	46	203	217	181	188	304	430
Total Riparian and Pre-1914 Yield	185	228	238	244	282	283	283	283	283	283	283
Total Merced ID Pre-1914 Yield	27	5	14	36	46	235	311	323	351	489	692

Sources: DWR, SWRCB, C-WIN. Totals may not sum due to effects of rounding.

San Joaquin River Water Rights Yield Analysis

Tributary Inflow Criteria	Diversion Cap	
60%	40%	of unimpaired flow
50%	50%	of unimpaired flow
40%	60%	of unimpaired flow
30%	70%	of unimpaired flow
	77%	Average of Regulated Period to Total Flow during Water Year

60% Instream Flow Criterion	10th Percentile	20th Percentile	25th Percentile	30th Percentile	40th Percentile	Median Flow	60th Percentile	70th Percentile	75th Percentile	80th Percentile	90th Percentile
Total Annual Unimpaired Flow (TAF)	813	928	1,052	1,128	1,257	1,449	1,854	2,047	2,195	2,322	3,018
Feb-June Unimpaired Flow Level (TAF)	656	749	839	881	1,007	1,137	1,458	1,572	1,623	1,779	2,075
Delta Inflow Criterion (60% of UF, TAF)	394	450	503	529	604	682	875	943	974	1,068	1,245
Diversion Cap (TAF)	262	300	335	353	403	455	583	629	649	712	830
Paramount Riparian Claims (171.7 TAF)	131	131	131	131	131	131	131	131	131	131	131
Pre-1914 San Joaquin River Exchange Contractors Claims (816.6 TAF)	131	168	204	221	271	323	452	497	518	580	625
Pre-1914 Chowchilla, Tranquillity & James Claims (111.1 TAF)	0	0	0	0	0	0	0	0	0	0	74
Patterson ID 1910 Claims (60.2 TAF)	0	0	0	0	0	0	0	0	0	0	0
Post-1914 USBR Claims (623.2 TAF)	0	0	0	0	0	0	0	0	0	0	0
Remaining Flow, July-December	157	179	214	246	250	312	396	475	572	542	942
Paramount Riparian Claims (171.7 TAF)	40	40	40	40	40	40	40	40	40	40	40
Pre-1914 San Joaquin River Exchange Contractors Claims (816.6 TAF)	117	139	173	191	191	191	191	191	191	191	191
Pre-1914 Chowchilla, Tranquillity & James Claims (111.1 TAF)	0	0	0	15	19	26	26	26	26	26	26
Patterson ID 1910 Claims (60.2 TAF)	0	0	0	0	0	14	14	14	14	14	14
Post-1914 USBR Claims (623.2 TAF)	0	0	0	0	0	40	124	146	146	146	146
Total Riparian Claims Yield	172	172	172	172	172	172	172	172	172	172	172
Total SJREC Claims Yield	248	307	377	413	463	515	643	689	709	772	817
Total Chowchilla, et al, Yield	0	0	0	15	19	26	26	26	26	26	100
Total Patterson ID Yield	0	0	0	0	0	14	14	14	14	14	14
Total USBR Yield	0	0	0	0	0	40	124	146	146	146	146

Sources: DWR, SWRCB, C-WIN. Totals May not sum due to effects of rounding.

Appendix D

Section D.2
Unimpaired Flow Hydrology

Unimpaired Flow Hydrology for Trinity, Sacramento, and San Joaquin River Basins
(Thousands of Acre-Feet)

Indicator	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL	Regulated Period Total	Regulated Period as % of Total Flow
Trinity River at Lewiston														November Through June	
Minimum Flow	0	4	7	10	14	19	37	27	7	2	0	0	200	176	85.9%
Maximum Flow	134	413	544	552	648	515	380	662	514	248	77	35	2,990	2,587	98.9%
Average Flow	17	52	102	130	153	181	209	249	129	40	13	8	1,283	1,205	94.0%
10th Percentile	3	10	18	26	46	80	111	111	42	11	4	1	679	624	90.7%
20th Percentile	7	13	24	34	59	100	141	150	59	17	6	3	789	743	92.4%
25th Percentile	8	15	28	43	76	114	147	160	63	19	7	4	824	785	92.9%
30th Percentile	9	17	36	47	83	134	160	178	77	20	7	4	866	838	93.3%
40th Percentile	10	22	43	69	111	147	185	201	86	24	9	6	1,025	968	93.9%
Median Flow	12	33	59	93	130	165	207	223	97	27	10	7	1,133	1,064	94.5%
60th Percentile	14	42	86	120	153	179	234	262	110	35	12	8	1,424	1,341	94.9%
70th Percentile	16	54	119	149	167	199	252	282	156	42	15	10	1,582	1,455	95.3%
75th Percentile	17	66	149	173	195	214	260	307	178	48	16	10	1,611	1,529	95.6%
80th Percentile	19	76	163	209	234	230	270	339	204	55	18	12	1,683	1,599	95.8%
90th Percentile	29	128	240	295	286	312	316	411	254	73	23	16	2,035	1,930	96.7%
Sacramento River to Feather Confluence (including Pit River,														November Through June	
Minimum Flow	201	223	259	284	321	352	290	284	238	203	177	184	3,825	2,633	68.8%
Maximum Flow	1,377	2,897	4,792	6,915	6,817	7,171	3,556	2,481	1,851	771	477	442	25,936	23,892	93.3%
Average Flow	356	594	1,210	1,778	1,944	1,838	1,380	955	564	363	302	299	11,583	10,263	86.9%
10th Percentile	243	265	322	449	554	728	610	459	327	265	220	219	5,572	4,638	81.4%
20th Percentile	258	313	421	576	758	983	786	578	386	283	241	242	6,984	5,876	83.3%
25th Percentile	271	324	480	653	911	1,079	808	605	403	295	254	250	7,371	6,170	84.3%
30th Percentile	287	341	509	693	1,017	1,186	835	646	418	302	266	266	7,877	6,806	85.3%
40th Percentile	308	379	624	931	1,221	1,360	985	752	456	319	280	274	8,860	7,721	86.5%
Median Flow	325	430	876	1,321	1,589	1,518	1,123	812	481	334	296	300	10,162	9,163	87.8%
60th Percentile	351	486	1,039	1,645	2,044	1,714	1,326	955	546	375	318	320	13,046	11,451	88.8%
70th Percentile	381	622	1,274	2,156	2,351	2,134	1,656	1,121	612	400	341	335	14,151	12,658	89.9%
75th Percentile	405	651	1,474	2,445	2,585	2,293	1,830	1,255	661	408	352	340	14,945	13,688	90.6%
80th Percentile	420	758	2,062	2,858	2,795	2,456	2,073	1,343	706	431	358	346	15,697	14,434	91.1%
90th Percentile	451	1,132	2,690	3,890	3,921	3,292	2,531	1,568	917	493	378	376	19,369	17,849	92.1%

Sources: California Department of Water Resources, 2007;
California Water Impact Network.

Unimpaired Flow Hydrology for Trinity, Sacramento, and San Joaquin River Basins
(Thousands of Acre-Feet)

Indicator	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL	Regulated Period Total	Regulated Period as % of Total Flow
Feather River														November Through June	
Minimum Flow	53	57	62	69	89	92	100	101	64	63	58	46	995	733	73.7%
Maximum Flow	855	1,240	1,997	2,539	2,678	2,283	1,830	1,700	1,122	370	197	154	9,418	8,608	91.4%
Average Flow	106	191	376	497	555	663	682	638	324	151	100	87	4,370	3,926	89.8%
10th Percentile	63	73	96	132	181	279	307	216	109	86	67	59	2,007	1,705	84.9%
20th Percentile	70	92	119	155	220	369	379	316	159	98	74	65	2,511	2,150	85.6%
25th Percentile	73	100	126	160	247	396	416	361	176	106	81	72	2,638	2,270	86.1%
30th Percentile	77	107	139	184	303	415	471	402	186	113	84	73	2,932	2,562	87.4%
40th Percentile	82	121	168	263	366	465	528	444	220	119	91	78	3,251	2,893	89.0%
Median Flow	93	132	205	320	467	540	611	537	241	134	96	86	3,854	3,466	89.9%
60th Percentile	103	144	270	402	565	646	686	631	294	142	103	89	4,596	4,201	91.4%
70th Percentile	110	178	349	554	674	743	837	784	342	164	108	97	5,673	5,160	91.0%
75th Percentile	114	194	405	668	748	782	885	838	401	173	112	99	5,767	5,260	91.2%
80th Percentile	120	219	550	724	781	870	932	939	453	198	118	104	6,268	5,583	89.1%
90th Percentile	143	337	859	1,131	1,103	1,216	1,134	1,168	662	253	143	120	7,095	6,470	91.2%
Yuba River														November Through June	
Minimum Flow	0	13	17	20	29	35	58	78	17	6	0	0	370	324	87.6%
Maximum Flow	451	677	1,341	1,482	1,351	993	885	929	713	275	66	45	4,925	4,729	96.0%
Average Flow	32	90	200	266	293	330	362	411	206	56	23	19	2,287	2,157	94.3%
10th Percentile	13	21	33	47	84	148	189	161	44	15	9	10	921	884	96.0%
20th Percentile	17	29	43	63	127	199	231	229	75	21	12	13	1,231	1,151	93.5%
25th Percentile	17	31	48	82	143	213	249	265	89	25	13	13	1,363	1,268	93.0%
30th Percentile	19	35	57	100	155	218	263	282	107	27	14	15	1,521	1,438	94.5%
40th Percentile	22	39	74	133	186	244	307	330	127	34	18	17	1,826	1,746	95.6%
Median Flow	25	48	108	156	240	281	336	397	162	38	19	19	2,123	2,006	94.5%
60th Percentile	29	59	134	224	292	320	403	461	203	46	24	20	2,428	2,280	93.9%
70th Percentile	33	72	189	309	344	373	429	506	246	63	27	22	2,949	2,780	94.3%
75th Percentile	34	91	248	354	411	394	454	539	284	67	29	23	3,164	2,993	94.6%
80th Percentile	36	107	286	400	452	421	491	564	309	84	32	25	3,284	3,079	93.8%
90th Percentile	43	174	414	573	566	578	539	708	428	108	42	30	3,765	3,681	97.8%

Sources: California Department of Water Resources, 2007;
California Water Impact Network.

Unimpaired Flow Hydrology for Trinity, Sacramento, and San Joaquin River Basins
(Thousands of Acre-Feet)

Indicator	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL	Regulated Period Total	Regulated Period as % of Total Flow
Bear River														November Through June	
Minimum Flow	0	0	0	0	2	1	0	0	0	0	0	0	13	9	69.2%
Maximum Flow	85	108	225	244	313	208	175	60	52	36	33	18	740	736	99.5%
Average Flow	4	14	41	62	69	61	38	17	7	3	2	2	320	309	96.6%
10th Percentile	0	1	6	9	14	16	7	4	0	0	0	0	102	102	99.2%
20th Percentile	0	3	10	13	21	26	13	6	2	0	0	0	137	130	95.2%
25th Percentile	1	4	12	15	25	31	14	8	3	0	0	0	171	165	96.8%
30th Percentile	1	5	14	19	27	35	18	10	3	1	0	0	181	177	97.7%
40th Percentile	2	6	18	30	35	41	22	12	4	2	0	1	247	239	96.7%
Median Flow	3	8	23	43	52	50	25	15	5	2	1	1	290	278	95.9%
60th Percentile	4	10	31	52	67	61	34	18	7	3	1	2	384	365	95.3%
70th Percentile	5	14	38	70	88	71	49	20	8	3	2	2	434	410	94.5%
75th Percentile	5	16	54	93	104	76	56	22	10	4	2	3	462	453	98.1%
80th Percentile	6	18	65	111	113	88	62	25	11	5	3	3	489	482	98.6%
90th Percentile	7	32	112	152	146	121	74	40	14	7	3	4	567	553	97.5%
American River														November Through June	
Minimum Flow	0	6	3	11	24	42	75	92	17	0	0	0	349	334	95.7%
Maximum Flow	335	985	1,509	1,988	1,866	1,172	1,254	1,136	942	382	90	61	6,380	5,842	91.6%
Average Flow	25	85	200	298	325	387	441	501	265	66	16	12	2,621	2,503	95.5%
10th Percentile	9	15	25	44	95	153	212	180	48	5	0	2	1,041	984	94.5%
20th Percentile	11	21	35	58	119	212	264	260	86	13	3	4	1,252	1,188	94.9%
25th Percentile	12	26	42	70	138	228	292	283	107	16	4	5	1,416	1,363	96.3%
30th Percentile	13	30	48	98	153	239	309	326	131	20	6	6	1,613	1,556	96.5%
40th Percentile	15	34	81	124	205	293	372	401	169	33	10	8	2,023	1,983	98.0%
Median Flow	17	44	99	159	257	341	417	487	222	42	13	10	2,521	2,422	96.1%
60th Percentile	19	53	128	255	317	382	462	553	282	62	17	12	2,844	2,731	96.0%
70th Percentile	22	63	164	353	361	440	528	627	352	84	19	14	3,300	3,140	95.2%
75th Percentile	26	77	184	421	425	449	554	653	375	88	21	15	3,554	3,311	93.2%
80th Percentile	29	90	276	486	513	528	589	692	422	96	25	17	3,886	3,687	94.9%
90th Percentile	36	161	458	635	696	665	657	901	516	134	34	21	4,525	4,340	95.9%

Sources: California Department of Water Resources, 2007;
California Water Impact Network.

Unimpaired Flow Hydrology for Trinity, Sacramento, and San Joaquin River Basins
(Thousands of Acre-Feet)

Indicator	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL	Regulated Period Total	Regulated Period as % of Total Flow
Sacramento Valley Total														November Through June	
Minimum Flow	302	324	353	386	482	548	527	582	398	287	244	259	5,584	4,065	72.8%
Maximum Flow	3,185	5,129	9,730	12,592	13,050	11,922	7,687	5,762	4,257	1,701	794	670	48,368	44,187	91.4%
Average Flow	527	998	2,076	3,013	3,299	3,343	2,939	2,526	1,387	646	444	420	21,619	19,581	90.6%
10th Percentile	344	399	487	682	972	1,409	1,326	1,072	526	389	303	305	10,049	8,779	87.4%
20th Percentile	373	453	636	870	1,350	1,848	1,716	1,415	756	431	345	336	12,363	10,624	85.9%
25th Percentile	390	504	710	979	1,620	2,019	1,783	1,558	870	460	368	345	13,599	11,909	87.6%
30th Percentile	403	521	791	1,076	1,691	2,154	1,989	1,686	886	484	380	366	14,670	13,051	89.0%
40th Percentile	419	585	1,014	1,571	2,074	2,503	2,281	2,092	1,018	517	400	388	16,461	14,710	89.4%
Median Flow	462	660	1,303	2,094	2,705	2,639	2,737	2,258	1,143	569	419	414	19,436	17,687	91.0%
60th Percentile	510	820	1,609	2,722	3,387	3,163	3,000	2,550	1,312	610	463	442	23,670	21,209	89.6%
70th Percentile	539	954	2,059	3,671	3,882	3,796	3,397	2,986	1,471	715	488	475	27,725	25,397	91.6%
75th Percentile	573	1,052	2,456	4,160	4,512	4,069	3,653	3,287	1,776	750	508	485	28,202	26,048	92.4%
80th Percentile	594	1,236	3,492	4,803	5,008	4,442	4,216	3,640	1,921	798	552	510	30,108	27,965	92.9%
90th Percentile	681	1,977	4,271	6,604	6,460	5,715	5,008	4,537	2,519	1,025	590	534	35,614	33,016	92.7%
Stanislaus River														February Through June	
Minimum Flow	0	2	3	3	1	13	35	44	11	0	0	0	155	107	69.0%
Maximum Flow	88	366	412	659	532	415	433	595	632	286	77	38	2,950	3,266	110.7%
Average Flow	10	28	53	82	96	128	192	283	176	53	13	7	1,120	957	85.5%
10th Percentile	3	6	9	13	23	51	100	101	41	7	2	1	457	382	83.7%
20th Percentile	4	7	12	18	33	71	123	163	59	13	4	2	592	500	84.4%
25th Percentile	5	8	13	23	40	78	136	175	71	16	5	3	637	551	86.4%
30th Percentile	6	9	14	25	45	82	152	188	96	20	6	3	680	566	83.3%
40th Percentile	7	10	19	34	55	97	173	238	127	27	7	4	894	740	82.7%
Median Flow	8	14	25	42	72	105	192	281	167	36	9	5	1,107	822	74.3%
60th Percentile	10	17	32	59	98	124	207	322	193	51	11	5	1,265	994	78.6%
70th Percentile	11	23	45	88	108	143	227	355	223	63	14	7	1,359	1,077	79.2%
75th Percentile	12	27	50	104	115	154	246	375	240	72	17	8	1,460	1,127	77.2%
80th Percentile	12	31	58	117	130	161	254	390	248	83	19	10	1,559	1,180	75.7%
90th Percentile	16	48	124	179	195	233	275	439	331	111	26	13	1,912	1,459	76.3%

Sources: California Department of Water Resources, 2007;
California Water Impact Network.

Unimpaired Flow Hydrology for Trinity, Sacramento, and San Joaquin River Basins
(Thousands of Acre-Feet)

Indicator	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL	Regulated Period Total	Regulated Period as % of Total Flow
Tuolumne River														February Through June	
Minimum Flow	0	1	4	5	8	23	79	106	17	10	0	0	384	330	85.9%
Maximum Flow	153	522	650	1,033	616	579	660	960	1,016	652	205	104	4,632	2,904	62.7%
Average Flow	17	48	88	125	147	191	274	446	353	123	26	12	1,851	1,411	76.2%
10th Percentile	4	8	13	22	42	86	162	214	90	17	3	1	836	675	80.8%
20th Percentile	5	9	20	33	60	117	186	294	137	22	6	3	1,053	898	85.3%
25th Percentile	6	12	24	40	64	125	195	326	158	28	8	3	1,107	961	86.8%
30th Percentile	7	14	27	43	70	129	221	347	222	36	10	4	1,183	984	83.2%
40th Percentile	9	17	35	56	88	146	248	380	291	57	14	5	1,416	1,189	83.9%
Median Flow	11	24	48	78	119	160	266	449	336	70	18	7	1,786	1,299	72.7%
60th Percentile	12	35	58	107	145	178	290	495	401	109	21	10	2,030	1,578	77.8%
70th Percentile	16	48	81	133	166	216	319	537	451	142	27	13	2,181	1,704	78.1%
75th Percentile	18	55	93	150	193	232	328	551	476	161	30	16	2,363	1,755	74.2%
80th Percentile	21	68	106	178	231	255	344	574	529	189	34	18	2,483	1,852	74.6%
90th Percentile	39	96	218	258	308	338	385	658	598	302	55	22	3,093	2,188	70.8%
Merced River														February Through June	
Minimum Flow	0	1	1	3	3	8	31	39	13	4	0	0	151	128	44.5%
Maximum Flow	51	259	373	634	362	370	429	565	656	352	97	47	2,786	1,837	93.6%
Average Flow	7	20	43	66	85	101	147	241	171	56	13	6	956	746	80.6%
10th Percentile	1	4	5	10	19	37	80	102	43	8	2	0	409	326	79.8%
20th Percentile	2	5	8	13	26	52	93	135	53	11	3	0	492	432	87.8%
25th Percentile	2	6	10	16	30	56	101	163	69	15	4	1	527	459	87.0%
30th Percentile	3	6	10	20	34	60	113	175	83	18	4	1	562	471	83.8%
40th Percentile	4	8	16	23	47	69	129	205	114	26	6	2	669	568	84.9%
Median Flow	5	9	22	37	55	82	142	246	147	33	8	4	906	648	71.5%
60th Percentile	6	14	28	48	73	96	158	268	171	45	11	5	1,077	805	74.8%
70th Percentile	7	18	34	66	104	115	171	290	208	52	13	6	1,160	924	79.7%
75th Percentile	9	21	42	82	118	131	181	309	227	62	15	7	1,220	977	80.1%
80th Percentile	11	22	52	95	148	152	192	321	261	79	17	8	1,389	1,030	74.1%
90th Percentile	16	41	100	159	201	167	216	387	335	122	31	12	1,708	1,223	71.6%

Sources: California Department of Water Resources, 2007;
California Water Impact Network.

Unimpaired Flow Hydrology for Trinity, Sacramento, and San Joaquin River Basins
(Thousands of Acre-Feet)

Indicator	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL	Regulated Period Total	Regulated Period as % of Total Flow
San Joaquin River														February Through June	
Minimum Flow	5	6	7	10	11	19	57	75	35	16	9	4	361	277	54.7%
Maximum Flow	126	247	461	735	472	485	613	1,096	1,166	752	280	170	4,642	2,896	88.3%
Average Flow	19	33	59	83	103	144	236	432	374	168	52	24	1,728	1,289	76.6%
10th Percentile	7	10	15	18	30	67	127	209	121	41	14	8	813	656	80.7%
20th Percentile	10	13	16	24	42	83	155	240	148	46	18	10	928	749	80.7%
25th Percentile	10	15	19	28	49	89	166	273	172	51	21	11	1,052	839	79.7%
30th Percentile	11	16	21	33	55	95	173	314	212	58	23	12	1,128	881	78.2%
40th Percentile	13	17	31	40	63	108	203	372	278	91	28	14	1,257	1,007	80.1%
Median Flow	16	22	36	48	76	119	234	419	325	115	34	15	1,449	1,137	78.5%
60th Percentile	19	26	43	67	99	134	249	464	373	145	42	18	1,854	1,458	78.7%
70th Percentile	21	33	54	82	113	162	279	509	476	181	51	22	2,047	1,572	76.8%
75th Percentile	24	37	62	95	134	174	289	543	500	213	63	27	2,195	1,623	73.9%
80th Percentile	25	42	73	112	163	201	308	594	581	266	73	33	2,322	1,779	76.6%
90th Percentile	34	66	114	168	208	232	350	704	642	364	125	42	3,018	2,075	68.8%
San Joaquin Valley Total														February Through June	
Minimum Flow	9	13	17	23	25	65	204	266	76	36	11	7	1,061	879	45.8%
Maximum Flow	426	1,535	2,213	3,813	2,315	2,603	2,578	3,563	3,792	2,151	731	346	18,977	12,250	90.8%
Average Flow	55	140	280	425	529	668	929	1,467	1,117	413	107	50	6,181	4,711	78.7%
10th Percentile	16	29	47	67	124	266	501	629	304	78	24	13	2,535	2,033	80.2%
20th Percentile	25	40	60	101	180	366	559	836	401	95	34	18	3,273	2,732	83.5%
25th Percentile	28	43	67	124	200	381	631	982	475	107	40	20	3,381	2,921	86.4%
30th Percentile	30	48	75	134	226	403	685	1,044	612	135	43	21	3,626	2,966	81.8%
40th Percentile	35	52	105	174	281	448	785	1,225	839	213	52	27	4,385	3,623	82.6%
Median Flow	39	69	140	222	370	520	901	1,404	970	251	68	31	5,896	4,187	71.0%
60th Percentile	47	98	198	357	488	625	954	1,639	1,157	346	92	38	6,559	5,069	77.3%
70th Percentile	56	130	244	419	614	726	1,084	1,732	1,394	447	106	44	7,393	5,752	77.8%
75th Percentile	63	147	268	481	763	826	1,135	1,880	1,496	489	121	58	7,934	5,947	74.9%
80th Percentile	72	187	330	616	875	971	1,154	1,925	1,653	623	132	67	8,667	6,347	73.2%
90th Percentile	95	271	615	977	1,224	1,147	1,462	2,451	2,070	948	243	84	11,004	7,891	71.7%

Sources: California Department of Water Resources, 2007;
California Water Impact Network.

Appendix D

Section D.3
Adjudication Decree Quantifications

Butte Creek Decree
Butte County Decree No. 18917
Seasons of Use

Continuous, regardless of season	365.25	days
April 1 through October 15	198.00	days
March 1 through October 15	229.00	days

				Allotments									
Claimants	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority (cfs)	Fourth Priority Face Value (AF)	Total, cfs	Total, AF
Schedule 3, Foreign Water Rediversion Group													
Dayton Mutual Water Company	1,796.30	50	Parrott Ditch and Crouch Lateral	3.33	2,414.63							3.33	2,414.63
M & T Incorporated	3,620.00	50	Parrott Ditch and Edgar Slough	3.33	2,414.63	50.00	36,223.14					53.33	38,637.78
Parrott Investment Company	17,427.00	50	Parrott Ditch and Edgar Slough	3.33	2,414.63	50.00	36,223.14					53.33	38,637.78
Subtotal, Schedule 3, Foreign Water Rediversion Group	22,843.30			10.00	7,243.90	100.00	72,446.28	0.00	0.00	0.00	0.00	110.00	79,690.18
Schedule 4, Nonconsumptive Claimants on Butte Creek and Tributaries													
Harold B Rathwell	Power	27	Unnamed Spring	0.20	144.89							0.20	144.89
Almon E Smith	Mining	26	Ethel	1.90	1,376.48							1.90	1,376.48
David S Webb and Mary D Webb	Mining	13	Webb	0.15	108.67							0.15	108.67
Herbert W Whitten, Marjorie C Whitten, Olive M Young, George Mead, Anna Mead, T H Polk, and Lucia V Polk	Mining	26A, 26B, 28A	Eureka Middle, Eureka Pump, Eureka Little	3.45	2,499.40							3.45	2,499.40
Jack L Post	Mining	28	La Monte	12.90	9,345.57							12.90	9,345.57
Jack L Post	Mining	28B	Post Pump	0.85	615.79							0.85	615.79
W J McGann and Elizabeth T Cussick	Potable Domestic	36	Davis	0.50	362.23							0.50	362.23
Grace D Taylor	Potable Domestic	37	Thomas	0.50	362.23							0.50	362.23
L H McLain and C J McLain	Mining	45A, 45B	Butte Bell, McLain Sluice	0.90	652.02							0.90	652.02
Margaret A Smith	Mining	46	Smith	2.50	1,811.16							2.50	1,811.16
Pacific Gas & Electric Company	Power	45	Butte Creek	88.50	64,114.96							88.50	64,114.96
Pacific Gas & Electric Company	Power	47	Centerville Canal	179.50	130,041.07							179.50	130,041.07
Electric Mining Company	Power	49	Electric Mining Co	305.00	220,961.16							305.00	220,961.16
Subtotal, Schedule 4, Nonconsumptive Claimants on Butte Creek and Tributaries				596.85	432,395.63							596.85	432,395.63
Schedule 5, Little Butte Creek and Tributaries Claimants Group													
David S Webb and Mary D Webb	Domestic	13	Webb	0.10	72.45							0.10	72.45
Anna Spangler	1.00	13A	Spangler Pipe	0.20	144.89							0.20	144.89
Estate of Ernest Duensing	11.80	14	Duensing	0.25	181.12	0.25	98.18					0.50	279.30
Vandegrift Trust	87.00	20, 20A	Richardson, Richardson	3.00	2,173.39							3.00	2,173.39

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				Allotments									
Claimants	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority (cfs)	Fourth Priority Face Value (AF)	Total, cfs	Total, AF
Paradise Irrigation District	11,100.00	22, 23	Paradise ID, Nickerson		0.00	8.00	3,141.82					8.00	3,141.82
Harold B Rathwell	Domestic	27	Ripley Spring	0.20	144.89							0.20	144.89
S A Vandegrift	Domestic	23A	Vandegrift	0.50	362.23							0.50	362.23
Jack L Post	Domestic	28, 28B	La Monte, Post Pump	0.15	108.67							0.15	108.67
D A Hook, W S Hook, and Lillian M Hook	3.00	24A	Hook	0.10	72.45	0.10	39.27					0.20	111.72
S A Vandegrift	Domestic	24B	Hook	1.00	724.46							1.00	724.46
S A Vandegrift	Domestic	24D	Hook	1.00	724.46							1.00	724.46
Almon E Smith	Domestic	26	Ethel	0.10	72.45							0.10	72.45
Herbert W Whitten, Marjorie C Whitten, Olive M Young, George Mead, Anna Mead, T H Polk, and Lucia V Polk	Domestic	26A, 26B, 28A	Eureka Middle, Eureka Pump, Eureka Little	0.05	36.22							0.05	36.22
Ella G Evers	13.60	30	Todd (Evers)	1.00	724.46	1.00	392.73					2.00	1,117.19
H W Skillin and Alice Skillin	9.40	31	Burke		0.00	0.67	263.13	0.66	259.20			1.33	522.33
H D March and Henrietta March	14.40	31	Burke		0.00	0.67	263.13	0.66	259.20			1.33	522.33
Thurman and Wright	6.00	31	Burke		0.00	0.67	263.13	0.66	259.20			1.33	522.33
George E McLain and C J McLain	17.10	32	McLain	0.10	72.45	0.50	196.36			2.50	981.82	3.10	1,250.63
Subtotal, Schedule 5, Little Butte Creek and Tributaries Group	11,263.30			7.75	5,614.59	11.86	4,657.75	1.98	777.60	2.50	981.82	24.09	12,031.75
Schedule 6, Upper Butte Creek and Tributaries Claimants (above Little Butte Creek)													
John J Mahan and Wm J Doyle	21.30	6	Cirby	0.20	144.89	0.30	117.82					0.50	262.71
E L Franks and Ida May Franks	103.40	7, 8	Stephenson Upper, Stephenson Lower	0.20	144.89	1.80	706.91					2.00	851.80
L B Stephenson	25.00	8A, 8B, 8C	Abietene	0.50	362.23	0.50	196.36					1.00	558.60
USDA Lassen Nat'l Forest	10.20	1, 3	Jonesville Bl 1 Pipes, Jones	0.25	181.12	0.25	98.18					0.50	279.30
F K Mickey and J H Minderman	112.00	3, 4	Jones, Mickey-Minderman	1.50	1,086.69	1.50	589.09					3.00	1,675.79
Edwin B Copeland	33.00	3	Jones	0.50	362.23	0.50	196.36					1.00	558.60
J H Lucas and Estate of Wm Johnson	38.30	5	Lucas-Jones	0.20	144.89	0.50	196.36					0.70	341.26
J H Lucas and Estate of Wm Johnson	150.00	5B	Colby Creek	0.50	362.23	1.50	589.09					2.00	951.32
J H Lucas and Estate of Wm Johnson	70.00	5A	Willow Creek	0.25	181.12	0.35	137.45					0.60	318.57
Anne Kennedy Anderson, Donald Mathewson, and Winifred M Kennedy	10.00	5A	Willow Creek	0.05	36.22	0.20	78.55					0.25	114.77
W J McGann and Elizabeth T Cussick	57.90	9A	McGann Springs, Davis	0.20	144.89	0.80	314.18					1.00	459.07

Butte Creek Decree
Butte County Decree No. 18917
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April 1 through October 15	198.00	days
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				Allotments									
Claimants	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority (cfs)	Fourth Priority Face Value (AF)	Total, cfs	Total, AF
W J McGann and Elizabeth T Cussick	200.00	36	Davis	0.25	181.12	0.10	39.27					0.35	220.39
J H Lucas, G W Lucas, and C F Lucas	32.90	9, 9A	Lucas Springs, McGann Springs	0.20	144.89	0.60	235.64					0.80	380.53
J H Lucas, G W Lucas, and C F Lucas	30.00	36A	Lucas	0.20	144.89	0.50	196.36					0.70	341.26
Grace D Taylor	5.00	37	Thomas	0.25	181.12	0.25	98.18					0.50	279.30
Eleanor Propfe Welch	Domestic	39	Welch Pipe	0.01	7.24							0.01	7.24
USDA Lassen Nat'l Forest	Domestic	44	Butte Meadows Pipes	0.10	72.45							0.10	72.45
Pacific Gas & Electric Company	Public Service	45	Butte Creek Canal	1.18	851.24							1.18	851.24
Pacific Gas & Electric Company	Domestic	45	Butte Creek Canal	0.33	235.45							0.33	235.45
Pacific Gas & Electric Company	Domestic	47	Centerville Canal	0.50	362.23							0.50	362.23
L H McLain and C J McLain	Domestic	45A, 45B	Butte Bell, McLain Sluice	0.10	72.45							0.10	72.45
Margaret A Smith	Domestic	46	Smith	0.03	21.73							0.03	21.73
Electric Mining Company	Domestic	49	Electric Mining Co	0.10	72.45							0.10	72.45
Subtotal Schedule 6, Upper Butte Creek and Tributaries Group	899.00			7.59	5,498.67	9.65	3,789.82	0.00	0.00	0.00	0.00	17.24	9,288.49

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Seasons of Use

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				Allotments									
Claimants	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority (cfs)	Fourth Priority Face Value (AF)	Total, cfs	Total, AF
Schedule 7, Lower Butte Creek and Tributaries Claimants (Below Little Butte Creek)				First Priority, All Year (cfs)	First Priority, All Year (AF)	First Priority, Apr 1 - Oct 15 (cfs)	First Priority, Apr 1 - Oct 15 (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)		
Dayton Mutual Water Company		50	Parrott and Crouch Lateral	4.80	3,477.42	11.20	4,398.55					16.00	7,875.97
Donald Hale and Alice Hilby Hale	160.20	51	Hale	0.90	652.02	2.10	824.73					3.00	1,476.74
USDA Bureau of Plant Industry	154.50	53	Plant Garden Pump	0.60	434.68	1.40	549.82					2.00	984.50
Clarence S Entler	81.00	54	Compton-Entler	0.33	239.07	0.78	306.33					1.11	545.40
Mary E Roth	75.00	54	Compton-Entler	0.17	123.16	0.39	153.16					0.56	276.32
Bee P Compton	689.00	54	Compton-Entler	0.50	362.23	1.17	457.53					1.67	819.76
Bee P Compton	241.00	54	Compton-Entler	0.50	362.23	1.17	457.53					1.67	819.76
A F Lieurance and Lenore E Lieurance	527.10	55	Marybill	1.20	869.36	3.80	1,492.36					5.00	2,361.72
Parrott Investment Company	211.00	56	Colony Upper	0.60	434.68	1.40	549.82					2.00	984.50
Edwin A Carlson and Gladys Carlson	36.70	56	Colony Upper	0.14	101.42	0.34	133.53					0.48	234.95
D A Hook, W S Hook	30.00	56	Colony Upper	0.12	86.94	0.27	106.04					0.39	192.97
Elmo Jacks and Louise Jacks	24.90	56	Colony Upper	0.09	65.20	0.22	86.40					0.31	151.60
Samuel A Atkins and Barbara Ina Atkins	30.00	56	Colony Upper	0.11	79.69	0.26	102.11					0.37	181.80
Samuel A Atkins and Barbara Ina Atkins	34.00	58	Wakefield Pump	0.13	94.18	0.30	117.82					0.43	212.00
Durham Mutual Water Company, Ltd.	3,566.20	56, 59	Colony Upper, Colony Lower	12.00	8,693.55	32.70	12,842.18					44.70	21,535.74
The Federal Land Bank of Berkeley	156.50	57	Ollinger Pump	0.60	434.68	1.40	549.82					2.00	984.50
Varney F Wakefield	14.00	58	Wakefield Pump	0.05	36.22	0.13	51.05					0.18	87.28
Ralph J Baxter, C W Baxter, and F T Woell, and M B Woell	178.00	56	Colony Upper	0.60	434.68	1.40	549.82					2.00	984.50
Stephen Vernoga	47.30	56	Colony Upper	0.30	217.34	0.70	274.91					1.00	492.25
Corporation of America	20.00	56	Colony Upper	0.12	86.94	0.28	109.96					0.40	196.90
George Setka, Anna Setka, Joe Bebich, Same Bebich, and Steve Vlatkovich	96.70	56	Colony Upper	0.40	289.79	0.94	369.16					1.34	658.95
L E Wheelock and Nellie Wheelock	13.00	56	Colony Upper	0.08	57.96	0.18	70.69					0.26	128.65
George Brandt and Edna May Brandt	50.00	59B	Brandt Pump	0.12	86.94	0.27	106.04					0.39	192.97
Roy White	53.00	60A	Roy White Pump	0.20	144.89	0.46	180.65					0.66	325.55
E L Adams and Lou R Adams	1,191.20	56	Colony Upper					1.48	1,072.20			1.48	1,072.20
E L Adams and Lou R Adams	2,533.20	60	Adams					4.52	3,274.57			4.52	3,274.57
Ralph C Gorrill	2,282.00	61	Gorrill							1.00	724.46	1.00	724.46

Butte Creek Decree
Butte County Decree No. 18917
Seasons of Use

Continuous, regardless of season	365.25	days
April 1 through October 15	198.00	days
March 1 through October 15	229.00	days

Allotments

Claimants	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority (cfs)	Fourth Priority Face Value (AF)	Total, cfs	Total, AF
Herbert W Whitten and Marjorie C Whitten	665.30	56, 60	Colony Upper, Adams							0.75	543.35	0.75	543.35
E E White	541.60	62	White Pumps							1.00	724.46	1.00	724.46
Subtotal, Schedule 7, Lower Butte Creek and Tributaries Claimants Group	13,702.40			24.66	17,865.25	63.25	24,840.00	6.00	4,346.78	2.75	1,992.27	96.66	49,044.30
Additional Continuous Year-Round Usage Claimants - Special Class													
Lovie L Downs	Domestic, Stockwater, Irrigation	17	Downs Spring	0.03	21.73								
Frances B Mahilton, A C Musselman, George P Morse	Domestic, Stockwater, Irrigation	16A, 18	Hamilton Ditches	0.50	362.23								
Joe A Sagi	Domestic, Stockwater, Irrigation	24	Sagi Pipelines	0.15	108.67								
Merritt Musselman and Florence V Musselman	Domestic, Stockwater, Irrigation	18A	Musselman Springs Pipe Line	0.10	72.45								
Elsie Hume Mann	Domestic, Stockwater, Irrigation	35	Mann Spring Pipeline	0.02	14.49								
Fannie M McEnespy	Domestic, Stockwater, Irrigation	33, 34	McEnespy North, McEnespy Main Ditches	1.00	724.46								
Fannie M McEnespy	Domestic, Stockwater, Irrigation	34A	McEnespy Pipe Line and McEnespy Spring Channel	0.10	72.45								
S A Vandegrift	Domestic, Stockwater, Irrigation	240	Vandegrift Spring Ditch	0.50	362.23								
S A Vandegrift	Domestic, Stockwater, Irrigation	24E	Michaels Ditch	0.15	108.67								
Anna Spangler	Domestic, Stockwater	13A	Spangler Pipe	0.05	36.22								
Estate of Ernest Duensing	Domestic, Stockwater, Irrigation	14A	Duensing Spring Ditch	0.15	108.67								
Vandegrift Trust	Domestic, Stockwater, Irrigation	21	Meadowbrook Ditch	1.00	724.46								
F E Whitlock	Domestic, Stockwater	24F, 25	Hupp Canal	0.20	144.89								

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				Allotments									
Claimants	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority (cfs)	Fourth Priority Face Value (AF)	Total, cfs	Total, AF
Roy L Pearson, Orval Pearson, Eunice A Cartwright, and Mildred Laughlin	Domestic, Stockwater	24F, 25	Hupp Canal	0.05	36.22								
A P Kundert	Domestic, Stockwater	24F, 25	Hupp Canal	0.05	36.22								
Subtotal, Additional Continuous Usage Claimants				4.05	2,934.07								
Additional Irrigation Season Usage Claimants - Special Class													
F E Whitlock	Irrigation	24F, 25	Hupp Canal	0.40	289.79								
Roy L Pearson, Orval Pearson, Eunice A Cartwright, and Mildred Laughlin	Irrigation	24F, 26	Hupp Canal	0.05	36.22								
A P Kundert	Irrigation	24F, 27	Hupp Canal	0.05	36.22								
The Diamond Match Company	Domestic, Stockwater, Industrial	10, 10A, 10B, 10C	Diamond Match System	2.00	1,448.93	Continuous							
Richard A Colgan Jr	Domestic, Commercial	40	Colgan Pipe Line	0.14	101.42	Continuous							
F K Mickey and J H Minderman	Domestic, Stockwater	2	Mickey-Minderman Pipe Line	0.07	50.71	Continuous							
Edwin B Copeland	Domestic, Stockwater	Riparian		0.20	144.89	Continuous							
J H Lucas	Domestic, Stockwater, Irrigation	Riparian		0.40	289.79	Continuous							
Carl Nelson Swartz and Esther M Swartz	Domestic, Stockwater, Irrigation	Riparian		0.15	108.67	Continuous							
E L Adams and Lou R Adams	Domestic, Stockwater	64, 65	Adams Hamlin Slough Ditch, Adams Hamlin Pump	0.82	594.06	Continuous	Riparian						
E L Adams and Lou R Adams	Irrigation	64, 65	Adams Hamlin Slough Ditch, Adams Hamlin Pump	3.00	916.36	May 1 - Oct 1							
E L Adams and Lou R Adams	Domestic, Stockwater	64, 65	Adams Hamlin Slough Ditch, Adams Hamlin Pump	1.00	724.46	Continuous	Riparian						

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				Allotments									
Claimants	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority (cfs)	Fourth Priority Face Value (AF)	Total, cfs	Total, AF
E L Adams and Lou R Adams	Irrigation	64, 65	Adams Hamlin Slough Ditch, Adams Hamlin Pump	3.58	1,093.53	May 1 - Oct 1							
Herbert W Whitten and Marjorie C Whitten	Domestic	64, 65	Adams Hamlin Slough Ditch, Adams Hamlin Pump	0.60	434.68	Continuous	Riparian						
Herbert W Whitten and Marjorie C Whitten	Irrigation	64, 65	Adams Hamlin Slough Ditch, Adams Hamlin Pump	3.00	916.36	May 1 - Oct 1							
Ralph C Gorrill	Domestic, Stockwater	66	Gorrill-Hamlin Ditch	1.00	724.46	Continuous	Riparian						
Ralph C Gorrill	Irrigation	66	Gorrill-Hamlin Ditch	14.00	2,138.18	Apr 15 - Jun 30							
E L Adams and Lou R Adams	Irrigation	64, 65	Adams Hamlin Slough Ditch, Adams Hamlin Pump	3.22	1,168.78	Apr 1 - Sep 30							
Herbert W Whitten and Marjorie C Whitten	Irrigation	64, 65	Adams Hamlin Slough Ditch, Adams Hamlin Pump	1.38	459.85	Apr 1 - Sep 15							
Ralph C Gorrill	Irrigation	66	Gorrill-Hamlin Ditch	6.70	1,209.32	Apr 1 - Jun 30							
Ralph C Gorrill	Irrig	66	Gorrill-Hamlin Ditch	21.70	3,314.18	Jul 1 - Sep 15							
Subtotal, Additional Irrigation Season Usage Claimants				63.46	16,200.87								
Surplus Class Rights Claimants													
Paradise Irrigation District	Irrigation	22	Magalia Reservoir	Little Butte Creek	9,500.00	Subject to completion of Permit 271							
Paradise Irrigation District	Domestic, Stockwater	22	Magalia Reservoir	Little Butte Creek	0.00	Continuous							
Ralph C Gorrill	Irrigation	61	Gorrill Ditch	14.00	2,526.94	Jul 1 - Sep 30							
E L Adams and Lou R Adams	Irrigation	56, 60	Colony Upper, Adams	9.80	3,557.16	Apr 1 - Sep 30							
Herbert W Whitten and Marjorie C Whitten	Irrigation	56, 60	Colony Upper, Adams	3.45	1,252.26	Apr 1 - Sep 30							

Butte Creek Decree
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Seasons of Use

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April 1 through October 15	198.00	days
March 1 through October 15	229.00	days

Claimants	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotments First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority (cfs)	Fourth Priority Face Value (AF)	Total, cfs	Total, AF
E L Adams and Lou R Adams	Irrigation	56, 60	Colony Upper, Adams	4.60	693.42	Apr 1 - Jun 15							
E L Adams and Lou R Adams	Irrigation	56, 60	Colony Upper, Adams	1.00	150.74	Apr 1 - Jun 15							
Herbert W Whitten and Marjorie C Whitten	Irrigation	56, 60	Colony Upper, Adams	2.40	361.79	Apr 1 - Jun 15							
Ralph C Gorrill	Irrigation	61	Gorrill Ditch	15.00	5,444.63	Apr 1 - Sep 30							
Ralph C Gorrill	Irrigation	61	Gorrill Ditch	6.70	2,431.93	Jul 1 - Sep 30							
E E White	Irrig	62	White Pumps	9.50	3,448.26	Apr 1 - Sep 30							
Parrott Investment Company	Domestic	50	Parrott Ditch	5.00	1,668.60	Oct 16 - Mar 31							
M & T Incorporated	Domestic	50	Parrott Ditch	5.00	1,668.60	Oct 16 - Mar 31							
Parrott Investment Company	Domestic, Stockwater, Irrigation	50	Parrott Ditch	25.00	9,818.18	Apr 1 - Oct 15							
M & T Incorporated	Domestic, Stockwater, Irrigation	50	Parrott Ditch	25.00	9,818.18	Apr 1 - Oct 15							
California Lands, Inc			Butte Creek	2.50	1,811.16	Continuous							
Yuba Consolidated Gold Fields			Butte Creek	2.50	1,811.16	Continuous							
Western Canal Company	Irrigation	63	Western Canal	33.33	5,024.29	Apr 1 - Jun 15							
Subtotal, Additional Surplus Class Claimants				164.78	60,987.30								

Butte Creek Decree
Butte County Decree No. 18917
Seasons of Use

Continuous, regardless of season	365.25	days
April 1 through October 15	198.00	days
March 1 through October 15	229.00	days

				Allotments									
Claimants	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority (cfs)	Fourth Priority Face Value (AF)	Total, cfs	Total, AF
Summary	Total, cfs	Total, AF											
Schedule 3, Foreign Water Rediversion Group	110.00	79,690.18											
Schedule 4, Nonconsumptive Claimants on Butte Creek and Tributaries	596.85	432,395.63											
Schedule 5, Little Butte Creek and Tributaries Claimants Group	24.09	12,031.75											
Schedule 6, Upper Butte Creek and Tributaries Claimants (above Little Butte Creek)	17.24	9,288.49											
Schedule 7, Lower Butte Creek and Tributaries Claimants (Below Little Butte Creek)	96.66	49,044.30											
Additional Continuous Year-Round Usage Claimants - Special Class	4.05	2,934.07											
Additional Irrigation Season Usage Claimants - Special Class	63.46	16,200.87											
Subtotal, Consumptive Use Claimants in Butte Creek System	315.50	169,189.68											
Subtotal, Basic Claimants to Butte Creek System Flows	912.35	601,585.30											
Subtotal, Additional Surplus Class Claimants	164.78	60,987.30											
Total, All Consumptive Use Claimants to Butte Creek System	480.28	230,176.97											
Total, All Claimants to Butte Creek System	1,077.13	662,572.60											

							Allotments			
Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Total Allotments, Face Value (AF)
Schedule 3, Claimants from Wolf Creek and its Tributaries										
David J. Anderson	16.40	130C	Haun Creek Camp	0.30	217.34				0.00	217.34
David J. Anderson	24.00	130D	Haun Creek Springs	0.40	289.79				0.00	289.79
Setzer Forest Products, Inc.	Domestic	59A	Setzer Camp Pipeline	0.05	36.22					36.22
Bidwell Water Company	Municipal	64	Round Valley Reservoir	2.00	1,448.93					1,448.93
Bidwell Water Company	7.10	65	Kauffman	0.10	72.45	0.10	48.60			121.04
Alford S. Calais & Nellie E. Calais	10.00	66	Short and Morel	0.07	50.71	0.11	53.45			104.17
John Rilea	4.00	66	Short and Morel	0.03	21.73	0.04	19.44			41.17
H.A. Morel & Mabel Francis Morel	24.50	66	Short and Morel	0.10	72.45	0.15	72.89			145.34
Albert E. McKeen & Randall H Smith	30.30	76	Pecks Valley	0.50	362.23					362.23
Reese L Jones	1.50	76A	Jones	0.15	108.67					108.67
Delfina Taddei	12.60	77	Taddei	0.25	181.12					181.12
A P Pedretti	12.60	77	Taddei	0.25	181.12					181.12
Wolf Creek Timber Co., Inc.	Industrial	61	Cedar Mill Lower Pump	0.10	72.45					72.45
Setzer Forest Products, Inc.	Industrial	62	Clark	0.28	136.07					136.07
Setzer Forest Products, Inc.	Industrial	63	Setzer Standby Pump							0.00
Setzer Forest Products, Inc.	15.00	63A	Setzer Standby Pump							0.00
Helen J. Shiell	145.50	62	Clark	0.70	340.17					340.17
E T Kunzler & Edna M Kunzler	125.40	62	Clark	0.70	507.12					507.12
E T Kunzler & Edna M Kunzler		78	Williams Creek	0.50	362.23	0.20	97.19			459.42
H G McCune	82.70	67, 79	Schieser Gott Williams Creek	0.10	72.45	0.75	364.46			436.91
A.O. Lewis	249.00	67	Schieser	0.45	326.01	2.25	1,093.39			1,419.40
Wesley T Wheeler & Idell C Wheeler	94.30	67	Schieser	0.10	72.45	0.45	218.68	0.50	242.98	534.10
United States of America	66.60	67	Schieser	0.05	36.22	0.30	145.79	0.35	170.08	352.09
C G Frederickson & Helen V Frederickson	193.60	68	Frederickson & Forgay Hamblin Spring	0.38	271.67	1.88	911.16			1,182.83
Dan Guidici and James Guidici	334.00	68	Frederickson & Forgay	0.38	271.67	1.88	911.16			1,182.83
Dan Guidici and James Guidici		70, 72	Forgay	0.20	144.89	1.40	680.33			825.22
R Avery Sheehan and Sarah Sheehan	167.10	69, 71	McIntosh	0.15	108.67	0.87	422.78	0.73	354.74	886.19

							Allotments			
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L E Wheelock & C H Wheelock	95.60	69, 73	McIntosh, Wheelock	0.05	36.22	0.53	257.55	0.42	204.10	497.88
W B Ferry R L Perry, Ivy Mae Heald and Susie Perry (Rogers)	126.90	69, 73, 74	McIntosh, Wheelock, Perry	0.05	36.22			1.35	656.03	692.26
Subtotals, Schedule 3 - Wolf Creek Group	1,838.70			8.38	5,837.26	10.90	5,296.86	3.35	1,627.93	12,762.05
Schedule 4: Claimants from Lights Creek and Its Tributaries										
United States of America	3.00	85B	Morton Creek	0.15	108.67					108.67
William M Hosken	219.00	80, 80A	Hosken Cooks Creek; Proposed Hosken Pump		0.00	1.50	728.93			728.93
Fred Ratcliffe-Smith & Mildred Ratcliffe-Smith	62.00	81	Smiths Cooks Creek	0.50	362.23	0.50	242.98			605.21
Martin A Maier & Cleo B Maier	35.00	82	Burns Cooks Creek	0.20	144.89	0.25	121.49			266.38
W S Quigley & Icie A Quigley	20.90	83	Quigley Pasture	0.20	144.89	0.10	48.60			193.49
W S Quigley & Icie A Quigley	37.00	84	Quigley Meadow		0.00	0.45	218.68			218.68
Walter E Cliff & Ruth M Cliff	66.60	85	Cliff Cooks Creek	0.10	72.45	0.38	182.23			254.68
J B Peter	157.70	96	Peter Creek	1.00	724.46	1.00	485.95			1,210.41
J B Peter		97	Peter Creek Barn							0.00
J B Peter		98	Peter Creek Upper Field							0.00
J B Peter		99	Peter Creek Lower Field							0.00
Arthur Peter and Emma A Peter	14.30	100	A. Peter			0.20	97.19			97.19
Dora Johnson	69.10	103	Road Dam	0.10	72.45	0.75	364.46			436.91
A J Downey and D W Downey	Power	86, 87	Downey Upper, Downey Lower	1.50	1,086.69					1,086.69
California-Engles Mining Company	Domestic & Industrial	87A	Engels	0.10	72.45		0.00			72.45
Hattie Potts	10.00	87B	Potts	0.10	72.45	0.10	48.60			121.04
James T Freeman & Elma L Freeman	87.70	88	Freeman & Bates	0.40	289.79	1.05	510.25			800.03
E B Bates and Minnie Bates	87.80	88	Freeman & Bates	0.40	289.79	1.05	510.25			800.03
Ralph Defanti & Elvezia Defanti	195.40	89	Defanti & Smith	0.60	434.68	1.58	765.37	0.68	328.02	1,528.07

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Allotments Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Total Allotments, Face Value (AF)
Fred Ratcliffe-Smith & Mildred Ratcliffe-Smith	65.00	89	Defanti & Smith	0.20	144.89	0.53	255.12	0.23	109.34	509.36
Martin A Maier & Cleo B Maier	93.00	90	Burns	0.20	144.89	1.00	485.95			630.84
W S Quigley & Icie A Quigley	247.40	91	Quigley Upper	0.20	144.89	2.90	1,409.26			1,554.15
W S Quigley & Icie A Quigley	152.20	92	Quigley Middle	0.20	144.89	1.70	826.12			971.01
J B Peter	44.30	93	Peter Upper	0.10	72.45	0.45	218.68			291.12
Arthur Peter and Emma A Peter	100.00	93	Peter Upper	0.10	72.45	1.25	607.44			679.88
Arthur Peter and Emma A Peter	126.90	95	Peter Lower	0.10	72.45	0.75	364.46	0.33	157.93	594.84
W S Quigley & Icie A Quigley	69.00	94	Quigley & Cliff	0.10	72.45	0.75	364.46			436.91
Walter E Cliff & Ruth M Cliff	168.40	94	Quigley & Cliff	0.10	72.45	0.75	364.46	0.63	303.72	740.63
S S Openshaw, Gerald Openshaw, & Gene Openshaw	Stockwater	95A	Lights Creek	0.05	36.22					36.22
C H Taresh & H W Awbrey Lumber Company	Industrial	104	Taresh Mill	0.20	144.89					144.89
Subtotals, Schedule 4 - Lights Creek Group	2,131.70			6.90	4,998.79	18.98	9,220.91	1.85	899.01	15,118.71
Schedule 5: Claimants from Streams in Upper Tributary Area										
Clover Valley Lumber Company	40.00	2A	Lowe	0.20	144.89	0.25	106.12			251.01
Clover Valley Lumber Company	50.00	2B	Hallet	0.20	144.89	0.30	127.34			272.23
United States of America	12.00	2	Boulder Creek	0.20	144.89	0.05	21.22			166.12
Clover Valley Lumber Company	42.60	3, 4	Antelope North, Antelope East	0.10	72.45	0.35	148.56			221.01
F W Flux and Alma A Flux	45.70	5	Flux Antelope	0.10	72.45	0.28	116.73			189.17
W S Quigley & Icie A Quigley	39.60	6, 7	Quigley Upper Antelope, Quigley Antelope Springs	0.10	72.45	0.28	116.73			189.17
Jack W Humphrey	32.80	8, 9	Humphrey West, Humphrey East	0.10	72.45	0.18	74.28			146.73
Claude Harwood and LaViena Harwood	43.70	7E	Fitch Canyon	0.10	72.45	0.30	127.34			199.79
Elbert R Spraker & Roy E Harwood	8.60	7A	S & H Cabin	0.10	72.45	0.05	21.22			93.67
Elbert R Spraker & Roy E Harwood	35.60	7B	Thompson Creek	0.10	72.45	0.20	84.89			157.34
Clover Valley Lumber Company	13.50	7C	Doyle Upper	0.10	72.45	0.05	21.22			93.67
Clover Valley Lumber Company	13.70	7D	Doyle Lower	0.10	72.45	0.05	21.22			93.67

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Clover Valley Lumber Company	63.40	9B	Doyle Last Chance	0.20	144.89	0.35	148.56			293.45
Howard Bass, Warren Bass, Dudley Bass, Claude Bass, deceased	26.50	9C	Bass	0.10	72.45	0.15	63.67			136.12
Howard Bass, Warren Bass, Dudley Bass, Claude Bass, deceased	9.80	9D	Bass Cabin	0.10	72.45	0.05	21.22			93.67
Howard Bass, Warren Bass, Dudley Bass, Claude Bass, deceased	11.00	9E	Upper Poison	0.10	72.45	0.05	21.22			93.67
Howard Bass, Warren Bass, Dudley Bass, Claude Bass, deceased	24.50	9F	Lower Poison	0.10	72.45	0.15	63.67			136.12
Clark C Rowland	38.60	10, 10A	Rowland Dixie Creek, Rowland Power	0.20	144.89	0.18	74.28			219.17
Westover Company	617.00	11, 12, 13, 14, and 15	Dixie Upper West, Dixie upper East, Dixie Upper Meadow Dam, Dixie Middle Mdw Dam	0.50	362.23	4.25	1,803.97			2,166.20
Westover Company	58.50	28	Clover Overflow	0.30	217.34	0.25	106.12			323.45
Westover Company	24.50	105	Clover Valley Ranch Spring	0.20	144.89					144.89
George Humphrey	560.00	17 through 27	Upper Dotta Neck, North Spring Clover Upper, Clover Middle, Clover North Meadow, Clover South Meadow, Clover Lower, Spring Ch Upper Spring Ch Lower, Crocker Creek Crocker Old Channel	1.00	724.46	3.50	1,485.62			2,210.08
R H Conklin	270.00	16, 29	Guidici Dixie, Guidici Clover	0.50	362.23	2.00	848.93			1,211.16

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Allotments Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Total Allotments, Face Value (AF)
Clover Valley Lumber Company	Industrial	-	Upper Tributary of Stream System	1.00	724.46					724.46
Subtotals, Schedule 5 - Upper Tributary Area Group	2,081.60			5.80	4,201.88	13.25	5,624.13	0.00	0.00	9,826.02
Schedule 6, Indian Creek in Genesee and Indian Valleys Group										
J LaRue Robinson & Elizabeth Evans Robinson	362.90	36	Robinson	0.78	565.08	4.50	2,186.78			2,751.86
P R Evans	14.10	36, 37	Robinson, Evans	0.02	14.49	0.20	97.19			111.68
Joseph C Kaitner	8.80	30, 31, 32	Pratt Upper, Pratt Lower, Pratt House	0.10	72.45	0.20	97.19			169.64
Department of Veteran Affairs & Edward D Riehl & Helen Riehl	116.60	33, 34, 35	Curnow Upper, Curnow Pasture, Curnow	0.50	362.23	1.35	656.03			1,018.26
J W Goodhue	Domestic & Power	38	Goodhue	0.50	362.23	9.50	4,616.53			4,978.76
John B Sobrero & Lena M Sobrero	0.50	38A, 38B	Sobrero Field, Sobrero House	0.10	72.45					72.45
Mary Sobrero, Heirs	5.30	39, 40	Sobrero East, Sobrero West	0.10	72.45	0.20	97.19			169.64
Willoughby T Grace and Helen M Grace	291.70	41, 42, 43, 44	Ward Upper West, Ward Middle West, Ward East, Ward Pipeline	1.00	724.46	4.50	2,186.78			2,911.24
Plumas Land Company	Mining	46, 47	Walker Flume, Walker Pipe	2.00	1,448.93					1,448.93
Willoughby T Grace and Helen M Grace	96.80	48, 49	Grizzly Upper, Grizzly Lower	1.00	724.46	1.40	680.33			1,404.79
Willoughby T Grace and Helen M Grace	46.80	45	Hosselkus	0.45	326.01					326.01
W J Beacom	18.00	50	Beacom	0.40	289.79	0.35	170.08			459.87
W J Beacom	Fish Culture	50	Beacom	0.50	362.23					
William F Masters	66.30	51, 52	Barnes East, Barnes West	0.50	362.23	0.83	403.34			765.57

							Allotments			
Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Total Allotments, Face Value (AF)
James G Young, William G Young, George W Young, and Hazel Dolphin	Municipal	53	Taylorsville	1.00	724.46					724.46
Claude E Young & Ivy M Young	28.10	54	Mill Race	0.50	362.23	1.00	485.95			848.18
W H Dolphin	153.40	54	Mill Race	0.73	528.86	1.47	714.35			1,243.20
H C Neer and Eva M Neer	110.00	54	Mill Race	1.00	724.46	0.60	291.57			1,016.03
Lloyd E Hardgrave & John A Hardgrave	233.70	54	Mill Race	1.52	1,101.18	1.03	500.53			1,601.71
Lloyd E Hardgrave & John A Hardgrave	24.30	54	Mill Race	0.15	108.67	0.30	145.79			254.45
Colburn J Smith and Wilma T Smith	167.90	54	Mill Race	0.75	543.35	1.65	801.82			1,345.17
Samuel F Brown, Hazel Brown and Fletcher L Brown	298.10	54	Mill Race	1.00	724.46	2.70	1,312.07			2,036.53
Lee G Johnson	370.80	54	Mill Race	1.00	724.46	3.60	1,749.42			2,473.88
S S Openshaw, Gerald Openshaw and Gene Openshaw	693.40	54	Mill Race	1.00	724.46	7.60	3,693.22			4,417.69
Paul Sobrero & Helen Sobrero	144.50	54	Mill Race	0.67	485.39	1.13	549.12			1,034.51
Samuel F Brown and Hazel Brown	230.60	54	Mill Race	0.50	362.23	2.40	1,166.28			1,528.51
Samuel F Brown and Hazel Brown	249.20	54	Mill Race	1.00	724.46	2.10	1,020.50			1,744.96
T L Hannon & H S Hannon	78.80	54	Mill Race	0.32	231.83	0.70	340.17			571.99
George F Osmeyer & Jane Osmeyer	6.20	54	Mill Race	0.01	7.24	0.07	34.02			41.26
L E Wheelock & Nellie Wheelock	123.50	54	Mill Race	0.50	362.23	1.00	485.95			848.18
Albert A Toscani, Ernest J Toscani, Chester M Toscani, and Arthur F Toscani	345.60	54	Mill Race	1.00	724.46	2.70	1,312.07	0.60	291.57	2,328.10
A J Sheehan & C J Sheehan	68.70	54	Mill Race			0.20	144.89	0.65	315.87	460.76
David R Strong	57.40	54	Mill Race			0.20	144.89	0.55	267.27	412.17
B B Gregory & Estella E Gregory	32.40	54	Mill Race			0.20	144.89	0.20	97.19	242.08
J E Cardoza & Marion Cardoza	72.40	54	Mill Race					2.15	1,044.79	1,044.79
S S Openshaw, Gerald Openshaw and Gene Openshaw	238.50	55	Snyder			0.40	289.79	3.00	1,457.85	1,747.64
H C Neer and F C Neer	200.00	57A	Neer Pump					2.50	1,811.16	1,811.16
Mrs. A L Gorbet	46.50	58A	Gorbet Pump					0.60	434.68	434.68
A J Sheehan & C J Sheehan	32.00	58B	Sheehan Pump					0.40	289.79	289.79
Subtotal, Schedule 6 - Indian Creek in Genesee and Indian Valleys Group	5,033.80			20.60	14,923.93	54.08	26,518.71	10.65	6,010.17	47,452.81
Schedule 7, "Special Class" Rights on Indian Creek Stream System										
Marian A Flood Norma A Flood	Domestic and resort	125	Hamblin Springs	0.06	43.47					43.47
Fred Prasun & Medie Prasun	6.00	125A	Hamblin Springs Collecting	0.15	108.67					108.67
Alford S Calais & Nellie A Calais	See Schedule 3	127	Short Spring	0.10	72.45					72.45
Bidwell Water Company	Municipal	129	Buckeye Ravine Pipeline	Entire Flow						0.00
Forest Lodge Resort	Domestic and resort	130	Clark Ravine	0.50	362.23					362.23

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Allotments Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Total Allotments, Face Value (AF)
Wolf Creek Timber Company, Inc.	Domestic	130A, 130B	Western Pacific Pipeline	0.08	54.33					54.33
A O Lewis	Domestic	131	Schieser Spring Pipeline	0.02	14.49					14.49
Wesley T Wheeler & Idella C Wheeler	Domestic	131	Schieser Spring Pipeline	0.01	7.24					7.24
W B Perry, R L Perry, Ivy Mae Heald, and Susie Perry	48.80	132	Perry Springs	0.55	398.45					398.45
L E Wheelock & Eva Neer	5.40	132	Perry Springs	0.05	36.22					36.22
United States of America in Trust	20.00	133	Hickerson West Springs	0.65	470.90					470.90
T L Hannon & H S Hannon	58.40	134, 134A	Hickerson East Springs, Hickerson Lower Spring	0.95	688.24					688.24
W B Perry, R L Perry, Ivy Mae Heald, and Susie Perry	Domestic	133	Hickerson West Springs	0.05	36.22					36.22
United States of America in Trust	22.30	135	Chico Springs	0.62	449.17					449.17
John F Davidson & Lena Davidson	12.90	136	Leggett Springs	0.10	72.45					72.45
James T Freeman & Elma L Freeman	Domestic	139A	Remick Pipeline	0.02	14.49					14.49
J B Peter	Domestic	96A	Peter Pipeline	Entire Flow						0.00
J LaRue Robinson & Elizabeth Evans Robinson	Domestic	143	School Spring Pipeline	0.001	0.72					0.72
John Davis & Evelyn Cunningham	2.00	106	Davis Spring	0.15	108.67					108.67
Willoughby T Grace & Helen M Grace	Domestic	48A	Hosselkus Spring Pipeline	Entire Flow						0.00
S S Openshaw, Gerald Openshaw, and Gene Openshaw	66.70	137	Snyder Spring	0.45	326.01					326.01
United States of America	Domestic	107A	Taylorsville Suppression Camp Pipeline	0.01	7.24					7.24
Burr J Sherick & Edith R Sherick	0.90	108	Hotel Pipe	0.025	18.11					18.11
G R Clark	Domestic	109	Clark Pipe	0.02	14.49					14.49
Mabel Taresh	0.20	109	Clark Pipe	0.02	14.49					14.49

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A E Viacava	34.60	110, 111, 112	Viacava Upper, Viacava Middle, Viacava Lower	0.50	362.23					362.23
United States of America in Trust	6.00	112A	Smith & Jenkins	0.23	166.63					166.63
S S Openshaw, Gerald Openshaw, and Gene Openshaw	269.70	113, 114	Hough Creek Upper, Hough Creek Lower	3.40	2,463.17					2,463.17
Plumas Unified School District	Domestic	108	Hotel Pipe	0.025	18.11					18.11
J E Cardoza and Marion Cardoza	42.50	114A, 114B	Cardoza	0.55	398.45					398.45
J E Cardoza and Marion Cardoza	99.10	115 & 115A	Cardoza Springs	1.00	724.46					724.46
August C Frohlich	8.90	123	Crescent	0.15	108.67					108.67
H C Neer	1.00	123	Crescent	0.02	14.49					14.49
Sorsoli Water Company	Municipal	123	Crescent	0.13	94.18					94.18
B B Gregory & Estella E Gregory	2.00	123A	Domestic Spring Pipeline	0.05	36.22					36.22
Margaret Frizzie, Frances Frizzie, and Theresa Frizzie	Domestic & Industrial	118	Frizzie	1.50	1,086.69					1,086.69
Dawn Institute of Science & Art	Domestic	119	Indian Falls	0.01	8.69					8.69
Subtotal, Schedule 7 - "Special Class" Rights Group	707.40			12.148	8,800.77					8,800.77
Schedule 8, "Surplus Class" Rights on Indian Creek Stream System										
Jack W Humphrey	90.00	9A	Humphrey					0.65	275.90	275.90
George Humphrey	245.00	23, 25, 26, 27	Last Chance Clover Lower, Spring Channel Lower, Crocker Creek, Crocker Old Channel					1.75	742.81	742.81
Westover Company	320.00	11, 12, 27 1/2	Dixie Upper West, Dixie Upper East, Crocker Lower					2.30	976.26	976.26
R H Conklin	398.00	16, 29	Guidici Dixie, Guidici Clover					3.00	1,273.39	1,273.39

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Allotments Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Total Allotments, Face Value (AF)
W E Cooper, Ed Cooper & J A Ritchy	Mining	85C	Proposed Cooper					0.50	212.23	212.23
S S Openshaw, Gerald Openshaw, and Gene Openshaw	15.60	95A	Proposed Lights Creek					0.125	53.06	53.06
C H Taresh and H W Awbrey Lumber Company	17.00	104	Taresh Mill Pump					0.125	53.06	53.06
William F Masters	76.20	51, 52A	Barnes East, Proposed Barnes Pump					0.76	322.59	322.59
E T Kunzler & Edna M Kunzler	36.00	--	Proposed					0.24	101.87	101.87
Almanor Lumber Company	8.40	--	Proposed					0.06	25.47	25.47
Subtotal, Schedule 8 - "Surplus Class" Rights	1,206.20							9.51	4,036.64	4,036.64
Special Class Claimants										
Bidwell Water Company	Municipal	64	Round Valley Reservoir		4,800.00	Winter season				
K R Doyle and Murray Doyle	Domestic, Stockwater, Irrigation	7F	Doyle Reservoir		45.00	Winter Season				
Subtotal, Special Class Claimants					4,845.00					
Surplus Class Claimants										
J LaRue Robinson & Elizabeth Evans Robinson	Domestic, Stockwater	1	Taylor Lake		200.00					
Charles H Bryson Sr and Estate of Kathryn Bryson	Domestic, Resort	117	Avrit Pipe Line	0.02	11.59	Continuous, Year-long				
Dawn Institute of Science & Art	Domestic, Resort	120	Jackson Springs Pipe Line	1.25	905.58	Continuous, Year-long				
Subtotal, Surplus Class Claimants				1.27	1,117.17					

Summary of Indian Creek Adjudication	Acreage to be supplied	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Total Allotments, Face Value (AF)
Schedule 3 - Wolf Creek Group	1,838.70	8.38	5,837.26	10.90	5,296.86	3.35	1,627.93	12,762.05
Schedule 4 - Lights Creek Group	2,131.70	6.90	4,998.79	18.98	9,220.91	1.85	899.01	15,118.71
Schedule 5 - Upper Tributaries Group	2,081.60	5.80	4,201.88	13.25	5,624.13	0.00	0.00	9,826.02
Schedule 6 - Indian Creek in Genesee & Indian Valleys Group	5,033.80	20.60	14,923.93	54.08	26,518.71	10.65	6,010.17	47,452.81
Schedule 7 - Special Class Group	707.40	12.148	8,800.774	0.000	0.000	0.000	0.000	8,800.774
Schedule 8 - Surplus Class Group	1,206.20	0.00	0.00	0.00	0.00	9.51	4,036.64	4,036.64
Subtotal, Special Class Claimants								4,845.00
Subtotal, Surplus Class Claimants								1,117.17
Total Face Value (AF), Indian Creek Decree	12,999.40	53.83	38,762.64	97.21	46,660.61	25.36	12,573.75	103,959.17

Middle Fork Feather River (and Its Tributaries Above Beckwith) Decree
County of Plumas, Case No. 3095

Seasons of Use		
Continuous, regardless of season	365.25	days
March 1 through October 31	245.00	days
March 15 through September 30	200.00	days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotments First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Fifth Priority Class (cfs)	Fifth Priority Face Value (AF)	Total Allotments, Face Value (AF)	Check, total CFS
Schedule 3, Claimants from Last Chance Creek and Its Tributaries above Adams Neck															
C C Rowland & Ida May Rowland	180.40	1, 2, 3	Rowland Upper North and South, Rowland Lower South, Rowland Lower North	2.30	912.40									912.40	2.30
C C Rowland & Ida May Rowland	57.70	4	Rowland South Creek	0.70	277.69									277.69	0.70
Alessio Ramelli & Adelina Ramelli	151.40	5, 6, 7	Ramelli, Hall & Ramelli, Ramelli Spring Channel	1.90	753.72									753.72	1.90
Marietta Hall	15.40	6, 7	Hall & Ramelli, Ramelli Spring Channel	0.25	99.17									99.17	0.25
Elsie Herz Golden	16.00	8	Trosi Last Chance	0.28	111.07									111.07	0.28
Elsie Herz Golden	7.00	8A	Trosi Dooley Canyon	0.12	47.60									47.60	0.12
Elsie Herz Golden	11.50	9	Trosi Dixie Creek	0.20	79.34									79.34	0.20
Elsie Herz Golden	57.60	11, 11A	Trosi Grigsby Creek, Trosi Cabin	0.45	178.51	0.50	198.35							376.86	0.95
Charles A Galeppi, Fred E Galeppi, Leo B Galeppi, and Rosa Galeppi	257.80	10, 12	Galeppi Upper Last Chance, Galeppi Lower Last Chance	3.25	1,289.26									1,289.26	3.25
Charles A Galeppi, Fred E Galeppi, Leo B Galeppi, and Rosa Galeppi	78.70	11A, 248, 249	Galeppi Grigsby Creek & Trosi Cabin, Galeppi North Springs, Galeppi South Springs	1.00	396.69									396.69	1.00
Elsie Herz Golden	111.10	13, 18	Trosi Camp, Trosi Spring Creek	1.60	634.71									634.71	1.60
Elsie Herz Golden	41.00	20	Trosi Frenchman Creek	0.70	277.69									277.69	0.70
Fred P Giudici and Myrtle W Giudici	103.30	14, 15	Giudici Upper Spring Creek, Giudici Lower Spring Creek	1.30	515.70									515.70	1.30
Charles A Galeppi, Fred E Galeppi, Leo B Galeppi, and Rosa Galeppi	161.10	15, 17	Galeppi Spring Creek, Galeppi Creek	2.00	793.39									793.39	2.00
Emilio Ramelli	76.20	19	Ramelli and Dotta Frenchman Creek	1.00	396.69									396.69	1.00

Middle Fork Feather River (and Its Tributaries Above Beckwith) Decree
County of Plumas, Case No. 3095

Seasons of Use		
Continuous, regardless of season	365.25	days
March 1 through October 31	245.00	days
March 15 through September 30	200.00	days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotments First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Fifth Priority Class (cfs)	Fifth Priority Face Value (AF)	Total Allotments, Face Value (AF)	Check, total CFS
Frank Dotta	64.90	19	Ramelli and Dotta Frenchman Creek	0.80	317.36									317.36	0.80
Frank Dotta	10.00	250, 251	Dotta Frenchman Creek Spring, Galeppi and Dotta Spring	0.15	59.50									59.50	0.15
Subtotal, Schedule 3 - Last Chance Creek Group	1,401.10			18.00	7,140.50	0.50	198.35	0.00	0.00	0.00	0.00	0.00	0.00	7,338.84	18.50
Schedule 4, Claimants from Last Chance Creek and Its Tributaries below Frenchman Creek															
Fred P Giudici and Myrtle W Giudici	285.40	21, 22	F P Giudici Upper, F P Giudici Lower	4.80	1,904.13		0.00		0.00		0.00		0.00	1,904.13	4.80
Mauricilio Giudici & Julie Giudici	62.30	21,22	F P Giudici Upper, F P Giudici Lower	0.95	376.86							0.60		376.86	1.55
Alex E Giudici	180.00	23	A E Giudici Dams	2.00	793.39	1.00	396.69							1,190.08	3.00
Guy Sobrio & Carmelinia Sobrio	187.10	24, 25	Sobrio Upper Dam, Sobrio Lower Dam	1.00	396.69	1.40	555.37					0.60		952.07	3.00
Elsie Herz Golden	146.80	23, 26, 27, 28	A E Giudici Dams, Trosi Upper, Trosi Middle, Trosi Lower			1.70	674.38	0.15	59.50					733.88	1.85
Frank Dotta	370.00	28, 29, 30, 31	Trosi Lower, F V Dotta Upper, F V Dotta Middle, F V Dotta Lower			2.70	1,071.07			0.85	337.19	0.85		1,408.26	4.40
Emilio Ramelli	81.20	31, 32	F V Dotta Lower, Ramelli North Channel			1.05	416.53							416.53	1.05
Emilio Ramelli	21.50	32, 57	Ramelli North Channel, M B Humphrey West Side			0.25	99.17							99.17	0.25
Philip E Ede & Sophia L Ede	220.20	31, 33, 34	F V Dotta Lower, Ede Schoolhouse, Ede Lower					2.75	1,090.91					1,090.91	2.75
Edmond J Goble & Ida C Goble	251.00	35, 36, 37	Goble Upper North Channel, Goble Middle North Channel, Goble Lower North Channel					2.65	1,051.24	0.50	198.35			1,249.59	3.15
Daniel M Scott & Gemma Solari Scott	126.60	37, 38	Goble Lower North Channel, Solari North Channel					1.65	654.55					654.55	1.65
C D Laffranchini & Marie C Laffranchini	132.70	39	Laffranchini North Channel					0.60	238.02	1.20	476.03			714.05	1.80

Middle Fork Feather River (and Its Tributaries Above Beckwith) Decree
County of Plumas, Case No. 3095

Seasons of Use

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March 15 through September 30	200.00	days

				Allotments											
Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Fifth Priority Class (cfs)	Fifth Priority Face Value (AF)	Total Allotments, Face Value (AF)	Check, total CFS
Jennie F Huntley	410.90	39, 40, 41, 42	Laffranchini North Channel, Huntley Upper North Channel, Huntley Middle North Channel, Huntley Lower North Channel							3.05	1,209.92	1.80	714.05	1,923.97	4.85
Josephine Roberti	200.90	43, 44, 45	Wherity North, Wherity South, Wherity Upper Dam							1.65	654.55	0.35	138.84	793.39	2.00
C D Laffranchini & L A Laffranchini	259.70	43 ,44, 46	Wherity North, Wherity South, Wherity Lower Dam							1.65	654.55	0.95	376.86	1,031.40	2.60
J A Bonta & S A Bonta	260.10	47, 48, 49	Bonta North, Bonta South, Bonta Meadow							1.00	396.69	1.60	634.71	1,031.40	2.60
C D Laffranchini & L A Laffranchini	171.00	50, 51	Dedmon North, Dedmon South									1.70	674.38	674.38	1.70
L D Maddalena	70.90	52, 53	Maddalena South, Maddalena North									0.70	277.69	277.69	0.70
M B Humphrey	68.40	56, 57	M B Humphrey East Side, M B Humphrey West Side			4.60	1,824.79	0.40	158.68			0.85	337.19	2,320.66	5.85
Emilio Ramelli	72.30	58	Ramelli Vinton			1.10	436.36					0.05	19.83	456.20	1.15
Emilio Ramelli	42.00	59, 60	Ramelli Railroad Dam, Ramelli Lower Dam					0.45	178.51			0.10	39.67	218.18	0.55
Alessio Ramelli & Adelina Ramelli	166.40	57, 58	M B Humphrey West Side, Ramelli Vinton					1.70	674.38			0.40	158.68	833.06	2.10
Alessio Ramelli & Adelina Ramelli	142.50	59, 60	Ramelli Railroad Dam, Ramelli Lower Dam					1.80	714.05					714.05	1.80
Edmond J Goble & Ida C Goble	21.00	57, 58	M B Humphrey West Side, Ramelli Vinton					0.25	99.17					99.17	0.25

Middle Fork Feather River (and Its Tributaries Above Beckwith) Decree
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March 15 through September 30	200.00	days

				Allotments											
Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Fifth Priority Class (cfs)	Fifth Priority Face Value (AF)	Total Allotments, Face Value (AF)	Check, total CFS
Daniel M Scott & Gemma Solari Scott	188.10	61, 62, 63	Solari Upper East Channel, Solari Middle East Channel, Solari Lower East Channel					1.85	733.88			0.50	198.35	932.23	2.35
C D Laffranchini & Marie C Laffranchini	305.00	64, 65, 66	Laffranchini Upper East Channel, Laffrancini Middle East Channel, Laffranchini East Channel Division					1.35	535.54	1.95	773.55	0.50	198.35	1,507.44	3.80
Jennie F Huntley	288.80	65, 66, 68, 71, 72	Laffranchini Middle East Channel, Laffranchini East Channel Division, Roberti Upper, Huntley Upper East Channel Huntley Lower East Channel							2.55	1,011.57	1.10	436.36	1,447.93	3.65
M B Humphrey	288.30	67, 70, 72	Dicen Division, Roberti Lower Channel, Huntley Lower East Channel							2.50	991.74	1.10	436.36	1,428.10	3.60
Josephine Roberti	311.70	67, 68, 69, 70	Dicen Division, Roberti Upper, Roberti Lower, Roberti Lower Channel							2.90	1,150.41	1.00	396.69	1,547.11	3.90
Bernard E Giudici & Rudolph E Giudici	141.30	73, 98	Dicen Dam, Giudici East Dam									2.35	932.23	932.23	2.35
Subtotal, Last Chance Creek below Frenchman Creek Group	5,474.10			8.75	3,471.07	13.80	5,474.38	15.60	6,188.43	19.80	7,854.55	17.10	5,970.25	28,958.68	75.05
Schedule 5, Claimants from Last Chance Creek Below Adams Neck															
Philip E Ede & Sophia L Ede	212.00	31, 33	F V Dotta Lower, Ede Schoolhouse			0.45	178.51	0.45	178.51					357.02	0.90
Edmond J Goble & Ida C Goble	650.70	35	Goble Upper North Channel			0.70	277.69	1.40	555.37					833.06	2.10
Daniel M Scott & Gemma Solari Scott	120.30	38	Solari North Channel			0.50	198.35							198.35	0.50

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Seasons of Use		
Continuous, regardless of season	365.25	days
March 1 through October 31	245.00	days
March 15 through September 30	200.00	days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotments First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Fifth Priority Class (cfs)	Fifth Priority Face Value (AF)	Total Allotments, Face Value (AF)	Check, total CFS
C D Laffranchini & Marie C Laffranchini	447.90	39, 64, 67	Laffranchini North Channel, Laffranchini Upper East Channel, Dicen Division			0.35	138.84	1.20	476.03					614.88	1.55
Jennie F Huntley	123.50	39, 65	Laffranchini North Channel, Laffranchini Middle East Channel			0.45	178.51							178.51	0.45
J A Bonta & S A Bonta	203.30	47, 48, 49	Bonta North, Bonta South, Bonta Meadow	1.75	694.21	0.10	39.67							733.88	1.85
C D Laffranchini & L A Laffranchini	60.00	50, 51	Dedmon North, Dedmon South	0.60	238.02									238.02	0.60
L D Maddalena	69.00	52, 53	Maddalena South, Maddalena North	0.40	158.68	0.10	39.67							198.35	0.50
Westover Company	45.00	54, 55	Noble North, Noble South	0.45	178.51									178.51	0.45
Alessio Ramelli & Adelina Ramelli	31.50	60	Ramelli Lower Dam					0.15	59.50					59.50	0.15
M B Humphrey	380.00	67, 70, 72	Dicen Division, Roberti Lower Channel, Huntley Lower East Channel			1.60	634.71							634.71	1.60
Smithneck Creek**		67, 73	Dicen Division, Dicen Dam					3.50						0.00	3.50
Antone E Dotta	45.10	67, 108	Dicen Division, A E Dotta East Channel			0.20	79.34							79.34	0.20
Amelia Ramelli	135.80	70	Roberti Lower Channel			0.55	218.18							218.18	0.55
Louisa Scolari, Ida A Scolari, Celia D Fallon, P R Scolari, R A Scolari, Olivia R Roberti, Lydia H Westover	51.50	70	Roberti Lower Channel			0.20	79.34							79.34	0.20
James L Humphrey	16.40	70	Roberti Lower Channel			0.10	39.67							39.67	0.10
Josephine Roberti	11.00	70	Roberti Lower Channel			0.05	19.83							19.83	0.05
Bernard E Giudici & Rudolph E Giudici	113.00	73	Dicen Dam			0.35	138.84	0.25	99.17					238.02	0.60
Subtotal, Last Chance Creek Group Below Adams Neck	2,716.00			3.20	1,269.42	5.70	2,261.16	6.95	1,368.60	0.00	0.00	0.00	0.00	4,899.17	15.85
Schedule 6, Claimants from Smithneck Creek and Tributaries															
Eddie John Trosi & Dolly Conradt	73.00	77A	Trosi Mountain	1.20	869.36									869.36	1.20
Clover Valley Lumber Company	70.30	77, 78	Mountain Ranch West Side, Mountain Ranch East Side	1.20	869.36									869.36	1.20

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March 15 through September 30	200.00	days

				Allotments											
Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Fifth Priority Class (cfs)	Fifth Priority Face Value (AF)	Total Allotments, Face Value (AF)	Check, total CFS
Clover Valley Lumber Company	180.70	88, 89	Cobb, Mill Pond Dam	1.40	1,014.25							0.25	99.17	1,113.42	1.65
Mary C Laffranchini	46.40	79, 80	Lombardi West, Lombardi East	0.70	507.12									507.12	0.70
Mary C Laffranchini	154.70	84, 85, 252	Turner South, Turner North, Lombardi Canyon	2.20	1,593.82									1,593.82	2.20
Caesar P Lombardi	Domestic	81	Upper Concrete Dam	0.04	28.98									28.98	0.04
Clover Valley Lumber Company	164.70	81, 82, 83	Upper Concrete Dam, Middle East, Turner Channel	1.30	941.80	1.00	724.46			0.45	178.51			1,844.78	2.75
First National Bank of Nevada	151.80	82, 87	Middle East, Lewis Bros. East	0.20	144.89	1.05	760.69					0.35	138.84	1,044.42	1.60
J S Rees	30.40	86, 253	Lewis Bros. West, Loyalton Pipe	0.50	362.23									362.23	0.50
J S Rees	182.20	87, 89	Lewis Bros. East, Mill Pond Dam	1.30	941.80	0.40	158.68					0.45	178.51	1,278.99	2.15
J S Rees	Municipal	253	Loyalton Pipe	0.60	434.68									434.68	0.60
Max Dory & May Dory	60.40	90, 91	Division Dams, Dory East Channel			0.95	376.86							376.86	0.95
Max Dory & May Dory	46.90	110	Dory West	0.30	217.34	0.15	59.50							276.84	0.45
Ode Grandi	18.00	90	Division Dams									0.10	39.67	39.67	0.10
Louis S Lombardi	34.70	110	Dory West									0.20	79.34	79.34	0.20
Sierra Valley Bank	58.20	110	Dory West									0.25	99.17	99.17	0.25
Alice Giudici, Frances Giudici, & Stephen Giudici	83.30	92	Giudici East Channel			1.05	760.69							760.69	1.05
Leon F Dotta	87.80	92	Giudici East Channel			0.50	362.23	0.60	238.02					600.25	1.10
Raffaele Dotta	120.00	92	Giudici East Channel			0.65	470.90	0.70	277.69					748.59	1.35
Raffaele Dotta	118.00	94, 95	R Dotta West, R Dotta Main Dam			1.30	515.70							515.70	1.30
May Dory & Cora V Keyes	66.00	93	Keyes East			0.85	337.19							337.19	0.85
Albert C Dotta & Caesar Dotta	160.00	94, 95	R Dotta West, R Dotta main Dam			1.80	714.05							714.05	1.80
Albert C Dotta & Caesar Dotta	299.80	96, 97	A & C Dotta East, A & C Dotta East Dam			3.40	1,348.76							1,348.76	3.40
Bernard E Giudici & Rudolph E Giudici	140.30	98,99,106	Giudici East Dam, Junction Dam, Lower Middle Channel			1.60	634.71							634.71	1.60
Alice Giudici, Frances Giudici, & Stephen Giudici	62.00	100	Giudici Middle			0.85	337.19							337.19	0.85
May Dory & Cora V Keyes	94.00	100, 101	Giudici Middle, Keyes Middle			1.15	456.20							456.20	1.15

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March 15 through September 30	200.00	days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotments First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Fifth Priority Class (cfs)	Fifth Priority Face Value (AF)	Total Allotments, Face Value (AF)	Check, total CFS
Julio Genasci & Angie Genasci	410.60	102, 103	upper Dotta Genasci, Lower Dotta Genasci			3.70	1,467.77	0.60	238.02			0.15	59.50	1,765.29	4.45
Albert C Dotta & Caesar Dotta	345.50	102, 103, 104, 105	upper Dotta Genasci, Lower Dotta Genasci, A & C Dotta Middle, A & C Dotta			3.25	1,289.26	1.05	416.53					1,705.79	4.30
Bernard E Giudici & Rudolph E Giudici	86.40	99, 106	Home Ranch Junction Dam, Lower Middle Channel			0.75	297.52	0.25	99.17					396.69	1.00
Attilio R Genasci & Louis Genasci	298.60	111, 112	Genasci Upper Field, Genasci Lower Field			2.95	2,137.17	0.80	317.36					2,454.52	3.75
Perpetum Genasci	60.00	110	Dory West									0.24	95.21	95.21	0.24
Perpetum Genasci	5.10	111	Genasci Upper Field			0.06	43.47							43.47	0.06
Amelia D Ramelli	579.30	110, 113, 114	Dory West, Ramelli Flood, Ramelli Division			2.85	1,130.58	1.30	515.70			0.65	257.85	1,904.13	4.80
Albert C Dotta & Caesar Dotta	254.50	115	A & C Dotta West Channel			2.05	813.22	0.80	317.36					1,130.58	2.85
Antone E Dotta	78.70	115, 116	A & C Dotta West Channel, A E Dotta Upper West Channel			0.80	317.36							317.36	0.80
The Federal Land Bank of Berkeley	198.20	114, 116, 117	Ramelli Division, A E Dotta pper West Channel, A E Dotta Lower Channel					2.20	872.73					872.73	2.20
Albert C Dotta & Caesar Dotta	85.90	104	Last Chance Dam					1.05	416.53					416.53	1.05
Antone E Dotta	59.60	108	A E Dotta East Channel					0.70	277.69					277.69	0.70
Charles W Ede	38.00	108	A E Dotta East Channel					0.45	178.51					178.51	0.45
The Federal Land Bank of Berkeley	74.00	108, 109	A E Dotta East Channel, A E Dotta Lower					0.80	317.36					317.36	0.80
M B Humphrey	94.20	114	Ramelli Division					0.30	119.01			0.25	99.17	218.18	0.55
M B Humphrey	355.00	118	Ede Lake					1.60	634.71	2.40	952.07				4.00
Charles W Ede	157.90	108, 118	A E Dotta East Channel, Ede Lake							1.75	694.21			694.21	1.75
Francis A Bradley, Jr.	130.60	119	Ede Lake Cut							1.50	595.04			595.04	1.50
Antone E Dotta	70.90	119	Ede Lake Cut							0.90	357.02			357.02	0.90
Subtotal, Claimants from Smithneck Creek and Its Tributaries Group	5,886.60			10.94	7,925.62	33.11	15,514.15	13.20	5,236.36	7.00	2,776.86	2.89	1,146.45	31,012.66	67.14

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Schedule 7, Claimants from West Side Canal and its Tributaries (Hamlin, Miller and Turner Creeks)															
Henry Dotta	431.80	158, 159, 161, 162, 261	H Dotta Upper South, H Dotta Lower South, H Dotta North Channel, H Dotta South Channel, H Dotta Springs	2.00	1,448.93	3.05	1,209.92	0.90	357.02	0.20	79.34			3,095.21	6.15
A E Strang	555.60	160, 161, 163, 164	H Dotta Old Power, H Dotta North Channel, Strang Upper, Strang Lower	1.00	724.46	4.60	1,824.79	1.20	476.03	0.20	79.34			3,104.63	7.00
Delia R Martinetti	29.60	165	Martinetti & Miller			0.40	158.68							158.68	0.40
Delia R Martinetti	238.00	165, 166	Martinetti & Miller, Miller Hamlin	0.10	72.45	0.90	357.02	0.75	297.52	0.85	337.19			1,064.18	2.60
A E Strang	86.50	167	Miller - Strang	0.40	289.79	0.80	317.36							726.99	2.60
A E Strang	24.00	170, 167	Miller - Strang, Strang & Martinetti Lower Field			0.35	138.84							138.84	0.35
Delia R Martinetti	60.00	167	Miller - Strang			0.80	317.36							317.36	0.80
Delia R Martinetti	274.10	168, 169, 170	Martinetti Upper East Channel, Martinetti Middle East Channel, Strang & Martinetti Lower Field	0.50	362.23	3.00	1,190.08							1,552.31	3.50
Delia R Martinetti	74.40	171, 173	Martinetti Upper West Channel, Martinetti Middle West Channel			0.95	376.86							376.86	0.95
Delia R Martinetti	20.00	174	Martinetti Lower West Channel					0.25	99.17					99.17	0.25
Delia R Martinetti	199.20	172	Cavitt Miller Creek	0.30	217.34	2.20	872.73							1,090.07	2.50
B F Myers and C B Myers	20.00	174	Martinetti Lower West Channel					0.25	99.17					99.17	0.25
B F Myers and C B Myers	147.20	202	Turner Mounds	0.10	72.45	0.40	289.79	1.35	535.54					897.77	1.85
Kate L Devine	74.90	174, 175	Martinetti Lower West Channel Miller Creek Mounds Channel	0.10	72.45			0.40	158.68					231.12	0.50
Albert B Church	105.00	175	Miller Creek Mounds Channel	0.10	72.45			1.20	476.03					548.48	1.30

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M O Binninger, J M Binninger, & Ardis L Binninger	117.00	175	Miller Creek Mounds Channel	0.10	72.45			1.35	535.54					607.98	1.45
Frank R Turner, Earl Turner, and Gene Turner	42.20	175, 187	Miller Creek Mounds Channel, Church Lower Turner Creek Meadow	0.10	72.45			0.40	158.68					231.12	0.50
Frank R Turner, Earl Turner, and Gene Turner	80.00	175, 202	Miller Creek Mounds Channel, Turner Mounds	0.10	72.45			0.90	357.02					429.47	1.00
Horace G Adams	120.00	176	Adams Mounds	0.10	72.45	0.40	158.68	1.00	396.69					627.82	1.50
Delia R Martinetti	29.40	177	Martinetti Spring Brook	0.43	311.52									311.52	0.43
Delia R Martinetti	64.00	177	Martinetti Spring Brook, Cavitt Spring Brook	0.20	144.89	0.90	357.02							501.92	1.10
Delia R Martinetti	30.00	262	Cavitt Foothill Springs		0.00	0.45	178.51							178.51	0.45
Delia R Martinetti	37.70	184, 185	Church, Cavitt Turner Creek	0.20	144.89	0.45	178.51							323.40	0.65
Frank W Freeman	117.50	180	Freeman	0.60	434.68	1.20	476.03							910.71	1.80
Frank W Freeman	88.90	188	Freeman Lower Meadow	0.10	72.45			1.00	396.69					469.14	1.10
T K Turner, Earl Turner, Frank R Turner, & Gene Turner	0.20	180	Freeman	0.02	14.49									14.49	0.02
Frank R Turner, Earl Turner, and Gene Turner	78.60	181, 182	Turner West, Turner East	0.60	434.68	0.65	257.85							692.53	1.25
Frank R Turner, Earl Turner, and Gene Turner	25.00	183	Turner Canyon			0.40	158.68							158.68	0.40
Frank R Turner, Earl Turner, and Gene Turner	21.90	184, 185	Church, Cavitt Turner Creek			0.35	138.84							138.84	0.35
Frank R Turner, Earl Turner, and Gene Turner	109.40	187	Church Lower Turner Creek Meadow			0.15	59.50	0.25	99.17	1.00				158.68	1.40
Albert B Church	58.30	184	Church			0.80	317.36							317.36	0.80
Albert B Church	148.90	186	Church Upper Turner Creek	0.20	144.89	1.60	634.71							779.60	1.80
Albert B Church	134.10	187	Church Lower Turner Creek Meadow	0.20	144.89			1.50	595.04					739.93	1.70
Samuel Devine, Kate L Devine, Same H Devine, Allen B Devine, and Bradley & Wooding Trustees, Royal Union Fund	200.80	189	Clark Turner Creek Meadow	0.20	144.89			1.30	515.70	1.00	396.69			1,057.29	2.50
Estate of C W Toomey & Estate of Virginia McLean	200.00	189, 190	Clark Turner Creek meadow, Toomey Meadow	0.20	144.89					1.80	714.05	0.50	198.35	1,057.29	2.50
Isolina Pasquetti	184.70	189, 191, 202	Clark Turner Creek Meadow, Pasquetti Turner, Turner Mounds	0.20	144.89					0.80	317.36	1.30	515.70	977.95	2.30

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Isolina Pasquetti	302.20	204, 205	Pasquetti Upper Westside, Pasquetti Lower Westside			0.50	362.23	2.10	833.06	1.15	456.20			1,651.49	3.75
Frank R Turner, Earl Turner, and Gene Turner	109.90	202	Turner Mounds	0.20	144.89	0.30	217.34	0.90	357.02						
George A Henderson	120.00	176, 203	Adams Mounds, Henderson Westside			0.50	362.23	1.00	396.69					758.93	1.50
Battista Pasquetti	189.00	176, 204	Adams Mounds, Pasquetti Upper West Side			0.50	362.23	1.50	595.04	0.40	158.68			1,115.95	2.40
F E Humphrey, Jr.	742.30	205, 206, 207, 208, 209	Pasquetti Lower West Side, Humphrey O'Hara, Humphrey Upper, Humphrey Lower, Humphrey Home			1.50	1,086.69	5.30	2,102.48	1.60	634.71			3,823.88	8.40
F E Humphrey, Jr.	411.50	210, 214	Humphrey Division, Humphrey Freeman			0.75	543.35	2.50	991.74	1.35	535.54			2,070.62	4.60
F E Humphrey, Jr.	160.00	212, 214	Humphrey-Newman, Humphrey Division			0.50	362.23	1.10	436.36	0.30	119.01			917.60	1.90
F E Humphrey, Jr.	270.60	219, 220	Humphrey Mercer, Albini & Humphrey							3.00	1,190.08			1,190.08	3.00
John B Matley & Annie M Matley	134.30	211, 214	Matley, Humphrey Division			0.50	362.23	0.60	238.02	0.60	238.02			838.26	1.70
Fred Berry & Lillian Berry	121.20	213, 215	Berry West Side, Berry Meadow Dams			0.25	181.12			1.25	495.87			676.98	1.50
Fred Berry & Lillian Berry	110.80	214	Humphrey Division							0.90	357.02	0.50	198.35	555.37	1.40
E F Ghidossi	349.40	213, 216	Berry West Side, Ghidossi Upper Field Dams			0.25	181.12			2.55	1,011.57	1.60	634.71	1,827.40	4.40
E F Ghidossi	114.10	218	Ghidossi Lower West Side Dams			0.25	181.12			1.00	396.69	0.15	59.50	637.31	1.40
A A Viscia	158.90	216, 217	Ghidossi upper Field Dams, Casey Westside Dams			0.25	181.12			0.95	376.86	0.80	317.36	875.33	2.00
Henry Albini	61.80	220	Albini & Humphrey							0.80	317.36			317.36	0.80
James L Humphrey	127.50	220 239	Albini & Humphrey							0.80	317.36	0.60	238.02	555.37	1.40
Subtotal Schedule 7 - Claimants from West Side Canal and its Tributaries (Hamlin, Miller and Turner Creeks)	7,712.40			8.35	6,049.26	30.85	14,352.12	29.00	11,504.13	22.50	8,528.93	5.45	2,161.98	41,997.02	96.15

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Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotments First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Fifth Priority Class (cfs)	Fifth Priority Face Value (AF)	Total Allotments, Face Value (AF)	Check, total CFS
Schedule 8, Claimants from Fletcher Creek and Spring Channels															
Davies-Joihnson Lumber Company	134.80	192, 193, 197	Davies-Johnson House, Davies-Johnson Spring Challen	0.85	615.79	0.85	337.19							952.98	1.70
Davies-Joihnson Lumber Company	Industrial	196	Davies-Johnson Meadow Calpine Pipe											0.00	0.00
Estate of William Freeman, Frank W Freeman, Administrator	53.80	194, 198	Freeman Spring Channel, Freeman Fletcher Creek Meadow	0.10	72.45	0.60	238.02							310.46	0.70
Samuel Devine & Kate L Devine	195.10	195, 199	Devine Spring Channel, Devine Meadow	0.40	289.79	1.00	396.69	0.35	138.84					825.32	1.75
Samuel Devine, Kate L Devine, Sam H Devine Allen B Devine, and Bradley & Wooding, Trustees Royal Union Fund	200.10	199, 200	Devine Meadow Clarke Fletcher Creek Meadow	0.20	144.89	1.45	575.21	0.28	111.07					831.17	1.93
Subtotal Schedule 8, Claimants from Fletcher Creek and Spring Channels	583.80			1.55	1,122.92	3.90	1,547.11	0.63	249.92	0.00	0.00	0.00	0.00	2,919.94	6.08

Schedule 9, Allocations to Shareholders in Sierra Valley Water Company for Rediversion From Little Truckee River Water Conveyed Into Middle Fork of Feather River Stream System	No. of Shares	Allotment, cfs	Face Value Amount
Anna B Miller	700.00	7	2,697.52
G Maddalena	200.00	2	769.59
Dell L Johnson	200.00	2	769.59
Francesca G Bony & Marcel J Bony	200.00	2	769.59
Fred P Alpers	200.00	2	769.59
Ken Torri	300.00	3	1,158.35
Wilson	200.00	2	769.59
Small	125.00	1	483.97
Mabel Eur	200.00	2	769.59
Russel	750.00	7	2,887.93
Van Vleck	200.00	2	769.59
Van Vleck	100.00	1	388.76
Mello	100.00	1	388.76
Alice Vanetti	200.00	2	769.59
A Hillio	200.00	2	769.59
Russel	200.00	2	769.59
George Filippini	300.00	3	1,158.35
Russel	500.00	6	2,407.93
Russel	200.00	2	769.59
Francis A Bradley, Jr	125.00	1	483.97
S J Carmichael	525.00	4	1,527.27
Wiley (97), Howes (3)	100.00	1	404.63
Bryce Euer	150.00	1	579.17
Paul Noble	200.00	2	769.59
Subtotal, Schedule 9	6,175.00	60	23,801.65

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March 15 through September 30	200.00	days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotments First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Fifth Priority Class (cfs)	Fifth Priority Face Value (AF)	Total Allotments, Face Value (AF)	Check, total CFS		
Schedule 10, Claimants from Middle Fork of Feather River, and Tributaries Cold, Webber, Town and Perry Creeks	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Fifth Priority Class (cfs)	Fifth Priority Face Value (AF)	Sixth Priority Class (cfs)	Sixth Priority Face Value (AF)	Total Allotments, Face Value (AF)	Check, total CFS
S C Linebaugh	6.00	127	Treasure and Camp Springs	0.04	28.98	0.08	31.74									60.71	0.12
S C Linebaugh	1.30	134	Town Pumps	0.02	14.49											14.49	0.02
John Amodei & Anna Amodei	144.60	155	Amodei	1.50	1,086.69	1.00	396.69									1,483.39	2.50
James W Morgan	67.70	156, 157	Morgan East Channel, Morgan West Channel	1.10	796.91											796.91	1.10
James W Morgan	16.90	133	Morgan, Johnson & Adams	0.10	72.45			0.18	71.40							143.85	0.28
Dell L Johnson	50.50	128, 128A	, Hohnson Cold Creek, Cook	0.20	144.89			0.80	317.36							462.25	1.00
Dell L Johnson	146.70	131, 132, 145, 258	Johnson Webber Creek, Johnson Town Creek, Webber, Diltz & Johnson, Hobo Springs	0.20	144.89	2.00	793.39	0.25	99.17							1,037.45	2.45
Dell L Johnson	60.70	133	Morgan, Johnson & Adams	0.20	144.89			0.80	317.36							462.25	1.00
Kelso N Dellera & Columbine Dellera	181.60	129	Miller-Dillera	0.50	362.23	1.35	535.54			0.45	178.51					1,076.28	2.30
Anna B Miller	129.60	129, 258A	Miller-Dellera, Miller Spring	0.50	362.23	1.35	535.54									897.77	1.85
Anna B Miller	20.00	133	Morgan, Johnson & Adams	0.27	195.60											195.60	0.27
Randolph Water Company	12.80	130	Randolph	0.50	362.23											362.23	0.50
Annie Dora Adams	2.90	133	Morgan, Johnson & Adams	0.04	28.98											28.98	0.04
Thomas E Miller	9.90	134	Town Pumps	0.04	28.98			0.15	59.50							88.48	0.19
C D Johnson	13.40	134	Town Pumps	0.05	36.22			0.20	79.34							115.56	0.25
John A McIntosh	1.00	134	Town Pumps	0.02	14.49											14.49	0.02
Fred Dolley	0.50	134	Town Pumps	0.01	7.24											7.24	0.01
Carmichael	5.40	135	Wilson Dam	0.10	72.45			0.50	198.35							270.79	0.60
Francesca G Bony & Marcel J Bony	388.70	136, 137, 138, 139	Bony Upper Dam, Bony Division Dam, Bony Middle Concrete Cam, Bony Lower Dam	0.50	362.23			5.05	2,003.31							2,365.54	5.55
Fred P Alpers & Christina Alpers	173.80	140	Alpers Lower Field	0.20	144.89			2.00	793.39							938.28	2.20
Fred P Alpers & Christina Alpers	80.00	256	Alpers Springs	0.20	144.89	0.80	317.36									462.25	1.00
Giulio Torri	321.90	142, 143, 255	Torri Upper, Torri Lower, Henderson Springs	0.20	144.89			3.80	1,507.44							1,652.33	4.00
Anna B Miller	236.00	137	Bony Division Dam	0.20	144.89					1.90	753.72	0.90	357.02			1,255.64	3.00
Anna B Miller	251.80	146	Miller Upper	0.50	362.23			2.60	1,031.40					1.00	396.69	1,790.33	4.10
Anna B Miller	132.50	147	Miller Schoolhouse					1.90	753.72							753.72	1.90

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Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotments													
				First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Fifth Priority Class (cfs)	Fifth Priority Face Value (AF)			Total Allotments, Face Value (AF)	Check, total CFS
Anna B Miller	326.00	149, 152	Perry Creek Division, Miller Lower							2.00	793.39	2.00	793.39			1,586.78	4.00
William A Diltz	8.00	145	Perry Creek Webber & Diltz & Johnson	0.05	36.22			0.10	39.67							75.89	0.15
Mary Ella Webber	7.00	145	Webber & Diltz & Johnson	0.05	36.22			0.10	39.67							75.89	0.15
Francesca G Bony & Marcel J Bony	91.60	147, 148A	Miller Schoolhouse, Bony Perry Dam							1.30	515.70					515.70	1.30
Horace G Adams	157.80	148	Adams	0.50	362.23			1.19	472.07	0.31	122.98					957.27	2.00
Seth Law & Florence M Law	150.00	148	Adams	0.50	362.23			1.19	472.07	0.21	83.31					917.60	1.90
Seth Law & Florence M Law	123.00	149	Perry Creek Division							1.55	614.88					614.88	1.55
Seth Law & Florence M Law	119.40	150, 151	Webber Upper, Webber Lower							1.45	575.21					575.21	1.45
George A Henderson	156.80	144, 154	Henderson Town Creek, Henderson Perry Creek	0.20	144.89					1.80	714.05					858.94	2.00
Battista Pasquetti	232.20	221	Pasquetti Dam	0.20	144.89					2.15	852.89			0.25	99.17	1,096.96	2.60
Robert L Henderson	134.70	222	East Side Slough	0.20	144.89					1.30	515.70					660.60	1.50
Alice Vanetti	227.40	222, 223	East Side Slough, Vanetti Slough	0.20	144.89					2.05	813.22					958.12	2.25
F E Humphrey Jr	1,309.70	224, 225, 226, 227, 228, 229	Humphrey Upper River, Humphrey North River, East Side, Humphrey Lower Concrete Dam, Humphrey Lower River Dam, Robbins Dam	0.70	507.12	0.80	579.57			5.20	2,062.81	3.70	1,467.77	2.70	1,071.07	5,688.35	13.10
Perpetua Genasci & Raffaele Dotta	143.10	226, 229	East Side, Robbins Dam							0.85	337.19	0.60	238.02			575.21	1.45
Cesare C Dotta	184.70	225	Humphrey North River											2.40	952.07	952.07	2.40
Cesare C Dotta	122.80	226, 230, 231	East Side, Dotta Meadow Dams, Dotta Pump			0.40	289.79			1.40	555.37					845.16	1.80
Julius Filippini	158.40	226	East Side									1.05	416.53	0.95	376.86	793.39	2.00
Julius Filippini	364.80	232, 233	Filippini Upper Meadow Dams, Filippini Lower Meadow Dams			0.50	362.23			2.30	912.40			0.85	337.19	1,611.82	3.65
M B Humphrey	222.90	226	East Side									2.20	872.73			872.73	2.20
M B Humphrey	698.70	235, 236	Mickey Meadow, Mickey East Side Dam							3.20	1,269.42	2.30	912.40	1.50	595.04	2,776.86	7.00

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Amelia D Ramelli	102.30	226	East Side									1.05	416.53			416.53	1.05
A A Viscia	40.00	234	Filippini Middle							0.40	158.68					158.68	0.40
F E Humphrey Jr	78.50	234	Filippini Middle									0.75	297.52			297.52	0.75
Francis A Bradley, Jr.	65.00	237	Ede River Dam							0.30	119.01	0.35	138.84			257.85	0.65
James L Humphrey	1,052.40	238, 239, 240	Humphrey Dam East, Humphrey Dam West, Humphrey Lower Field Dams							1.30	515.70	7.60	3,014.88	1.60	634.71	4,165.29	10.50
Louisa Scolari, Ida A Scolari, Celia D Fallon, P R Scolari, R A Scolari, Olivia R Riberti, Lydia H Westover	124.40	238	Humphrey Dam East									1.25	495.87			495.87	1.25
Antone E Dotta	109.80	238, 119	Humphrey Dam East, Ede Lake Cut									1.10	436.36	0.30	119.01	555.37	1.40
Henry Albani	80.00	239	Humphrey Dam West									0.80	317.36			317.36	0.80
M B Humphrey	302.60	241, 242	M B Humphrey Tognazini Ranch									1.90	753.72	1.10	436.36	1,190.08	3.00
L D Maddalena	32.50	242, 52	L D Maddalena River, Maddalena South									0.20	79.34	0.15	59.50	138.84	0.35
Westover Company	432.70	243,244,245, 263, 54, 55	Noble East, Noble West, Noble Dam, Noble Reservoir, Noble North, Noble South									2.50	991.74	2.00	793.39	1,785.12	4.50
Giacomo Falchi	144.40	246	Decker Dam									0.40	158.68	1.05	416.53	575.21	1.45
C Roy Carmichael	85.90	246, 247	Decker Dam, Carmichael Dam											0.85	337.19	337.19	0.85
Subtotal, Schedule 10, Claimants from Middle Fork of Feather River and Tributaries Cold, Webber, Town, and Perry Creeks	10,045.70			9.79	7,092.49	8.28	3,841.83	20.81	8,255.21	31.42	12,464.13	30.65	12,158.68	16.70	6,624.79	50,437.14	117.65

Additional Special Class Claimants, Last Chance Creek Group				cfs	AF	Season
Sam Bonta	Domestic, Stockwater, Irrigation	270	Bonta Creek Ditches	3.15	2,282.06	Continuous
Sam Bonta	Stockwater, Irrigation	271	Bonta East Ditch	0.37	8.07	Apr 10 - Apr 20
A D Maddalena	Domestic, Stockwater, Irrigation	269	Maddalena Pasture Ditches	0.52	376.72	Continuous
L D Maddalena	Domestic, Stockwater		Maddalena Spring Pipe Line	0.02	10.87	Continuous
L D Maddalena	Stockwater, Irrigation	272	L D Maddalena Pasture Ditch	0.47	330.24	Apr 21 - Apr 9
Louis A LaFranchini	Domestic, Stockwater, Irrigation	273	LaFranchini Creek Ditches	3.20	2,318.28	Continuous

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				Allotments											
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Elsie Herz Golden	Domestic, Stockwater, Irrigation	274, 275	Trosi West Canyon, Trosi Middle Canyon, Trosi East Canyon Ditches	2.25	1,630.04	Continuous									
Fred P Giudici and Myrtle W Giudici	Storage	21, 22	F P Giudici Upper and F P Giudici Lower Ditches	3.50	1,388.43	Irrigation Season									
Mauricilio Giudici & Julie Giudici	Stockwater, Irrigation	Drainage from F P Giudici and M W Giudici	Drainage from F P Giudici and M W Giudici	unspecified	unspecified	Continuous									
Subtotal, Additional Special Class Claimants - Last Chance Creek Group				13.48	8,344.71										
Additional Surplus Class Claimants - Last Chance Creek Group															
Amelia D Ramelli	Domestic, Stockwater, Irrigation	70	Roberti Lower Channel, Last Chance Lake		220.00										
Louisa Scolari, Ida A Scolari, Celia D Fallon, P R Scolari, R A Scolari, Olivia R Riberti, Lydia H Westover	Domestic, Stockwater, Irrigation	70	Roberti Lower Channel, Last Chance Lake		84.00										
James L Humphrey	Domestic, Stockwater, Irrigation	70	Roberti Lower Channel, Last Chance Lake		27.00										
Subtotal, Additional Surplus Class Claimants, Last Chance Creek Group					331.00										
Additional Special Class Claimants, Smithneck Creek Group															
J S Rees and John Caccini	Domestic, Stockwater, Irrigation	74	Parker (Grey) Ditch	0.50	362.23	Continuous									
John Caccini	Domestic, Stockwater, Irrigation	75	Caccini Ditches	1.15	833.13	Continuous									
Leon F Dotta and Raffaele Dotta	Domestic, Stockwater, Irrigation	76	Lower Staverville Channel	0.80	317.36	Irrigation Season									
Odo Grandi	Domestic, Stockwater, Irrigation		Graveyard Creek through the Grandi Ditch	0.50	198.35	Irrigation Season									
Subtotal, Additional Special Class Claimants - Smithneck Creek Group				2.95	1,711.07										
Additional Surplus Class Claimants - Smithneck Creek Group															
Charles W Ede	Domestic, Stockwater, Irrigation	118	Ede Lake		70.00										
M B Humphrey	Domestic, Stockwater, Irrigation	118			70.00										
Clover Valley Lumber Company	Industrial	89	Mill Pond		50.00										
J S Rees	Domestic, Stockwater, Irrigation	87	Lewis (Rees) Reservoir		50.00										
Subtotal, Additional Surplus Class Claimants - Smithneck Creek Group					240.00										
Additional Special Class Claimants, West Side Canal Group															

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F E Humphrey Jr	Domestic, Stockwater, Irrigation	201	Lower Craycroft Creek Diversion	0.22	87.27	Irrigation Season									
Henry Albini	Domestic, Stockwater, Irrigation	201	Lower Craycroft Creek Diversion	0.18	71.40	Irrigation Season									
James L Humphrey	Domestic, Stockwater, Irrigation	201	Lower Craycroft Creek Diversion	0.60	238.02	Irrigation Season									
James L Humphrey	Domestic, Stockwater, Irrigation	201	Lower Craycroft Creek Diversion	0.20	79.34	Irrigation Season									
F E Humphrey Jr	Domestic, Stockwater, Irrigation	201A	Upper Craycroft Creek Diversion	0.75	297.52	Irrigation Season									
Subtotal, Additional Special Class Claimants, West Side Canal Group				1.95	773.55										
Additional Surplus Class Claimants - Fletcher Creek Group															
Isolina Pasquetti	Domestic, Stockwater, Irrigation		Fletcher Creek and Spring Channels	0.25	99.17	Irrigation Season									
Subtotal, Additional Surplus Class Claimants, Fletcher Creek Group				0.25	99.17										
Additional Special Class Claimants - Middle Fork Feather River Group															
Caesar P Lombardi	Domestic, Stockwater, Irrigation	120, 121, 122	Antelope Upper, Antelope East Channel, Antelope West Channel Ditches	4.00	1,586.78	Irrigation Season									
Julius Filippini and Perpetua Genasci	Domestic, Stockwater, Irrigation		Antelope Creek	2.00	793.39	Irrigation Season									
Anna B Miller	Domestic, Stockwater, Irrigation	123 to 126	Blinman Spring Channel, Lemon East, Lemon West, Lemon Lower Ditches	5.00	3,622.31	Continuous									
Fred P Alpers & Christina Alpers	Domestic, Stockwater, Irrigation		Lemon Creek	2.70	1,956.05	Continuous									
Marie Mattarola and B V Mattarolo	Domestic, Stockwater, Irrigation	257, 258	Campbell Springs, Echo Springs Ditches	0.80	579.57	Continuous									
Frank Carmichael	Domestic, Stockwater, Irrigation	267, 268	Mapes West Meadow, Mapes East Meadow Ditches	5.00	3,622.31	Continuous									
Veste Nelson	Domestic, Stockwater, Irrigation	265	Nelson Ditches	1.30	941.80	Continuous									
Giacomo Falchi and M Falchi	Domestic, Stockwater, Irrigation	266		1.70	1,231.59	Continuous									

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				Allotments												
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Westover Company	Domestic, Stockwater, Irrigation	266		1.80	1,304.03	Continuous									
Westover Company	Domestic, Stockwater	Unnamed Spring	Unnamed Spring	0.01	3.62	Continuous									
John Amodei & Anna Amodei	Domestic, Stockwater, Irrigation	259, 260	Amodei Upper Spring, Amodei Meadow Spring Ditches	1.20	869.36	Continuous									
A E Strang	Domestic, Stockwater, Irrigation	259, 260	Amodei Upper Spring, Amodei Meadow Spring Ditches	0.20	144.89	Continuous									
A E Strang	Irrigation	Amodei Springs	Amodei Meadow Springs	0.80	579.57	Continuous									
Subtotal, Additional Special Class Claimants - Middle Fork Feather River				26.51	17,235.28										
Additional Surplus Class Claimants - Middle Fork Feather River															
Anna B Miller	Domestic, Stockwater, Irrigation	155	Amodei Ditch	3.00	1,190.08	Irrigation Season									
Westover Company	Domestic, Stockwater, Irrigation	243, 244, 245	Noble East, Noble West Ditches	3.30	1,309.09	Irrigation Season									
Westover Company	Domestic, Stockwater, Irrigation	263	Noble Reservoir		200.00										
Frank Carmichael	Domestic, Stockwater, Irrigation	Mapes Creek & Tributaries	Mapes Reservoir		80.00										
Subtotal, Additional Surplus Class Claimants - Middle Fork Feather River Group				6.30	2,779.17										

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Summary of Middle Fork of Feather River Adjudication Decree	Total cfs	Total AF													
Subtotal, Schedule 3 - Last Chance Creek Group	18.50	7,338.84													
Subtotal, Schedule 4	75.05	28,958.68													
Schedule 5, Claimants from Last Chance Creek Below Adams Neck	15.85	4,899.17													
Schedule 6, Claimants from Smithneck Creek and Tributaries	67.14	31,012.66													
Schedule 7, Claimants from West Side Canal and its Tributaries (Hamlin, Miller and Turner Creeks)	96.15	41,997.02													
Schedule 8, Claimants from Fletcher Creek and Spring Channels	6.08	2,919.94													
Schedule 9, Allocations to Shareholders in Sierra Valley Water Company for Rediversion From Little Truckee River Water Conveyed Into Middle Fork of Feather River Stream System	60.00	23,801.65													
Schedule 10, Claimants from Middle Fork of Feather River, and Tributaries Cold, Webber, Town and Perry Creeks	117.65	50,437.14													
Subtotal, Schedules 3-10	456.42	191,365.11													
Subtotal, Additional Special Class Claimants - Last Chance Creek Group	13.48	8,344.71													
Subtotal, Additional Special Class Claimants - Smithneck Creek Group	0.00	240.00													
Subtotal, Additional Special Class Claimants, West Side Canal Group	1.95	773.55													
Subtotal, Additional Special Class Claimants - Middle Fork Feather River	26.51	17,235.28													
Subtotal Schedules 3-10 and Special Class Claimants	498.35	217,958.65													
Subtotal, Additional Surplus Class Claimants, Last Chance Creek Group	0.00	331.00													
Subtotal, Additional Surplus Class Claimants - Smithneck Creek Group	0.00	240.00													
Subtotal, Additional Surplus Class Claimants, Fletcher Creek Group	0.25	99.17													
Subtotal, Additional Surplus Class Claimants - Middle Fork Feather River Group	6.30	2,779.17													
Subtotal, All Surplus Class Claimants	6.55	3,449.35													
Grand Total, All Schedules and Classes of Claimants	504.90	221,408.00													

Summary of Pit River Decrees

Pit River Decrees	Face Amount
Ash Creek	66,518.40
Burney Creek	11,308.76
Big Valley of Pit River	102,467.90
Franklin Creek	4,230.48
Hat Creek	93,210.83
Rattlesnake Creek	37,023.47
North Fork Pit River	46,856.17
South Fork Pit River	68,097.30
Roaring Creek	5,289.43
Willow Creek	552.02
Total Pit River Decrees	435,554.75

Ash Creek Decree Water Rights

Modoc County Judgment and Decree No. 3670

Seasons of Use

Continuous, regardless of season	365.25	days
April 1 through October 15	198.00	days
March 1 through October 15	229.00	days

				Allotments											
Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority (cfs)	Fourth Priority Face Value (AF)	Fifth Priority (cfs)	Fifth Priority (AF)	Total (cfs)	Total (AF)
Rush Creek Group (Schedule 3)															
Joe F Walker and Elsie D Walker	7.00	61, 62	Walker Upper, Walker Lower	0.18	70.69									0.18	70.69
Thomas J McClure	5.00	63	Higgins	0.12	47.13									0.12	47.13
C L Harper and Neta Harper	35.80	63	Higgins	0.60	235.64									0.60	235.64
Audrey Rice	62.80	64, 65	Audrey Rice, T J Rice	1.05	412.36									1.05	412.36
Erma Harrigan, Lillian Rice, May West, Red Rice, Clarence Rice, Mary Ash, and Rose Bartle	14.00	65	T J Rice	0.25	98.18									0.25	98.18
N S Kresge and Laura Kresge	49.50	66, 67	Kresge-Holbrook, Kresge East	0.85	333.82									0.85	333.82
Joseph H Holbrook, Ervin E Triplett, Henry O Triplett, and Grace Gordon	131.60	66, 68, 69, 70, 71	Kresge-Holbrook, Holbrook-Barrows, Holbrook-East Dams, Holbrook West, Holbrook Lower	2.20	864.00									2.20	864.00
Subtotal, Rush Creek Group	305.70			5.25	2,061.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.25	2,061.82
Butte Creek Group (Schedule 4)															
Herbert S Bath and Anne Bath	53.50	72, 73	H S Bath Upper, H S Bath Lower	0.40	157.09									0.40	157.09
S J Niles and Myrtle Niles	106.50	74, 75, 76, 79 to 83	Niles Upper Meadow, Niles and Auble, Niles Middle Meadow, Niles Lower Meadow Dams	1.60	628.36									1.60	628.36
E M Auble and Ivy Auble	56.40	75, 77, 78	Niles and Auble, Auble Upper, Auble Lower	0.40	157.09									0.40	157.09
E J Schmidt and Emma B Schmidt	75.20	84	Elzea	0.10	39.27	0.90	353.45							1.00	392.73
Subtotal, Butte Creek Group	291.60			2.50	981.82	0.90	353.45	0.00	0.00	0.00	0.00	0.00	0.00	3.40	1,335.27
Willow Creek Group (Schedule 5)															
Alton, P. Avilla, Lloyd Avilla, Irene Totten, Ida D Copper	15.00	85	Avilla Upper Springs							0.15	58.91			0.15	58.91
E V Wing	105.30	88, 89	Avilla West Side, Avilla East Side							0.85	333.82			0.85	333.82
Alice Gray	94.50	90A	Gray							0.80	314.18			0.80	314.18
E B Armstrong and Wilhelmina R Armstrong	70.00	91	Armstrong							0.50	196.36			0.50	196.36
Floyd E Walker	71.20	92	Knight	0.07	50.71	0.63	247.42							0.70	298.13
J E Albaugh	356.90	92	Knight	0.32	231.83	2.88	1,131.05							3.20	1,362.88
Frank Studley and Hattie Studley	355.80	93	Studley Johnson	0.32	231.83	2.88	1,131.05							3.20	1,362.88
R L Holmes and May L Holmes	210.90	93	Studley Johnson	0.16	115.91	1.44	565.53							1.60	681.44
Kasper Weigand and Etta Weigand	153.10	94, 95	Weigand Upper Dams, Weigand Lower Dams	0.10	72.45			1.50	589.09					1.60	661.54
Subtotal, Willow Creek Group	1,432.70			0.97	702.73	7.83	3,075.05	1.50	589.09	2.30	903.27	0.00	0.00	12.60	5,270.15
Ash Creek Group (Schedule 6)															
John T Bath, Alice B Walker, Carrie F Stone	126.60	7, 8	Bath Dam, Bath North Springs	1.95	765.82									1.95	765.82
Robert Fleming and Ora Lee Fleming	131.20	9	Fulstone Springs	2.00	785.45									2.00	785.45
John T Bath, Alice B Walker, Carrie F Stone	219.10	10	Bath (West Ranch)	3.30	1,296.00									3.30	1,296.00
John T Bath, Alice B Walker, Carrie F Stone	13.50	10	Bath	0.20	78.55									0.20	78.55
John T Bath, Alice B Walker, Carrie F Stone, Robert Fleming, Mary Fleming, and Ora Lee Fleming	142.20	10, 10A	Bath, Bath North	2.20	864.00									2.20	864.00
G H Perkins and Eltha A Perkins	263.30	11, 12	Perkins Springs, Perkins	3.90	1,531.64									3.90	1,531.64
T A Barrows and Lulu M Barrows	305.10	13, 13A, 14, 14A	Barrows Upper, Barrows Dam #2, Barrows Slough, Barrows Lower Dams	4.70	1,845.82									4.70	1,845.82
John A Kresge and May E Kresge	28.00	15	John A Kresge Dam	0.45	176.73									0.45	176.73
R E Clark and Donnie Clark	23.90	None	Subirrigation	0.35	158.98									0.35	158.98

Modoc County Judgment and
Decree No. 3670

Seasons of Use

Continuous, regardless of season	365.25	days
April 1 through October 15	198.00	days
March 1 through October 15	229.00	days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotments First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority (cfs)	Fourth Priority Face Value (AF)	Fifth Priority (cfs)	Fifth Priority (AF)	Total (cfs)	Total (AF)
J E Yowell, Addie Yowell, F E Yowell and Dorothy Yowell	24.50	17	Vogt	0.35	158.98									0.35	158.98
Louise Vogt and John Vogt	353.50	17, 18	Vogt, Vogt Lower Dam	5.45	2,475.47									5.45	2,475.47
W H Hunt Estate Co.	739.10	19	Clarke Co Upper Support Dams, New Canal Swamp Head	8.80	3,997.09							0.95	431.50	9.75	4,428.60
A J Weeks and Mary A Weeks	93.20	19	Clarke Co Upper Support Dams							1.45	658.61			1.45	658.61
J C Lane and Nora Lane	278.20	20, 21, 22, 48	North Slough, New Canal Swamp Head, Cannon Box, Lane Death Slough Dam					1.00	454.21			1.10	499.64	2.10	953.85
A L Cannon	110.00	22	Cannon Box					1.40	635.90					1.40	635.90
Indian Allotment	61.80	22	Cannon Box					0.80	363.37					0.80	363.37
W H Hunt Estate Co.	1,997.90	21, 22, 23, 24, 46, 47, 48, 49, 50, 51	New Canal Swamp Head, Cannon Box, Jenkins-Cannon, Death Slough Head Box, North Branch South Channel Lower, Island Taps, Lane Death Slough Dams, Death Slough, Death Slough South Bypass, Death Slough North					25.00	11,355.37			0.10	45.42	25.10	11,400.79
W H Hunt Estate Co.	88.00	23	Jenkins-Cannon			0.50	362.23	0.60	272.53					1.10	634.76
A L Cannon	88.00	22, 23	Cannon Box, Jenkins-Cannon			0.50	362.23	0.60	272.53					1.10	634.76
Wm Kramer and Rachel R Kramer	25.00	22, 23	Cannon Box, Jenkins-Cannon							0.30	136.26			0.30	136.26
W H Hunt Estate Co.	1,855.00	25, 26, 27, 28, 29, 32., 36, 37, 38, 42, 43, 44, 45	South Channel Head Box, Big Valley Drainage Canal, North Branch South Channel, Middle Branch South Channel, Chisholm Upper Dam, Wayman Support Dam, C W Clarke Co Upper South Channel Dam, C W Clarke Co Middle South Channel Dam, C W Clarke Co Lower South Channel Dam, Weigand-Gerig Dam, Gerig Swamp Dam, South Branch South Channel Dam, Middle Branch South Channel Dam					23.20	10,537.79					23.20	10,537.79
Wm H Bean	38.90	25, 29, 30	South Channel Head Box, Chisholm Upper Dam, Chisholm Lower Dam					0.50	227.11					0.50	227.11
M D Wayman and Alice M Wayman	232.90	25, 26, 31, 32, 33	South Channel Head Box, Big Valley Drainage Canal, Wayman Upper Dam, Wayman Support Dam, Wayman Lower Dam					2.90	1,317.22					2.90	1,317.22
R L Holmes and May L Holmes	94.00	25, 34, 35	South Channel Head Box, Holmes Upper Dam, Holmes Lower Dam					1.20	545.06					1.20	545.06
J P Miller and Clara Miller	172.40	25, 39, 40, 41	South Channel Head Box, Miller Upper Dam, Miller Middle Dam, Miller Lower Dam					2.15	976.56					2.15	976.56
Kasper Weigand and Etta Weigand	141.10	25, 42	South Channel Head Box, Weigand-Gerig Dam					1.75	794.88					1.75	794.88
Charles A Gerig	200.70	25, 42, 43	South Channel Head Box, Weigand-Gerig Dam, Gerig Swamp Dam					2.50	1,135.54					2.50	1,135.54
W H Hunt Estate Co.	97.90	26	Big Valley Drainage Canal							1.25	567.77			1.25	567.77
W H Hunt Estate Co.	38.00	52, 53	Gerig, Mouth of Ash Creek							0.20	90.84			0.20	90.84
James A Hollenbeak and Lela Hollenbeak	207.00	52, 54, 55	Gerig, Watson, Hollenbeak Swale							1.15	522.35			1.15	522.35
Ardella Babcock and Estate of Andrew Babcock	12.00	52, 54	Gerig, Watson							0.07	31.80			0.07	31.80
Arad Babcock	91.00	52, 54	Gerig, Watson							0.50	227.11			0.50	227.11

Modoc County Judgment and Decree No. 3670

Seasons of Use		
Continuous, regardless of season	365.25	days
April 1 through October 15	198.00	days
March 1 through October 15	229.00	days

				Allotments											
Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority (cfs)	Fourth Priority Face Value (AF)	Fifth Priority (cfs)	Fifth Priority (AF)	Total (cfs)	Total (AF)
Lester A Babcock and Frances B Babcock	259.00	52, 54	Gerig, Watson							1.45	658.61			1.45	658.61
Oral Lester Babcock	4.00	52, 54	Gerig, Watson							0.03	13.63			0.03	13.63
Marjorie M Merritt and McElroy Brown	32.40	52, 54	Gerig, Watson							0.20	90.84			0.20	90.84
Subtotal Ash Creek Group	8,588.40			33.65	14,134.51	1.00	724.46	63.60	28,888.07	6.60	2,997.82	2.15	976.56	107.00	47,721.42
Special Class Claimants on Ash Creek (Schedule 7)															
Robert McGarva and Rhoda McGarva	28.60	56, 57	Steele Upper, Steele Lower	0.60	235.64									0.60	235.64
Robert McGarva and Rhoda McGarva	21.20	58, 59, 60	Johnson Upper, Johnson Middle, Johnson, Lower	0.40	157.09									0.40	157.09
Audrey Rice	4.00	96	Rice Spring Channel	0.05	36.22									0.05	36.22
Alice Gray	94.50	90	Gray Springs	0.80	579.57									0.80	579.57
Robert Fleming and Ora Lee Fleming	818.80	1, 2, 3	Fleming West Springs, Fleming East Springs, Fleming Spreading Dams	9.15	3,593.45									9.15	3,593.45
John T Bath, Alice B Walker, Carrie F Stone	599.90	4, 5, 6, 8	Bath West Springs, Bath Middle Springs, Bath East Springs, Bath North Springs	6.95	2,729.45									6.95	2,729.45
John T Bath, Alice B Walker, Carrie F Stone	36.70	None	Bath Seeps	Entire Flow										0.00	0.00
T A Barrows and Lulu M Barrows	37.20	106, 107	Unnamed, Shane Gulch	0.50	362.23									0.50	362.23
T A Barrows and Lulu M Barrows	Domestic	108	Unnamed	0.50	362.23									0.50	362.23
T A Barrows and Lulu M Barrows	6.00	98	Barrows Spring	0.10	39.27									0.10	39.27
Alta J Wallace and Daisy H Smith	75.00	97	Wallace	1.00	454.21									1.00	454.21
John A Kresge and May E Kresge	134.50	99, 100, 101	Kresge South Springs, Kresge North Springs, Kresge House Spring	1.40	549.82									1.40	549.82
John A Kresge and May E Kresge	7.00	102	Kresge Lower Spring	0.15	108.67									0.15	108.67
J E Yowell, Addie Yowell, F E Yowell and Dorothy Yowell	68.00	103	Clark Springs	1.05	412.36									1.05	412.36
J A Clark, W E Clark, and Donnie Clark	70.80	105	Clark Upper Springs	0.38	147.27									0.38	147.27
W H Hunt Estate Co.	1,263.50	None	Tule Swamp	Entire Flow										0.00	0.00
R L Holmes and May L Holmes	162.50	None	Holmes Pond	Entire Flow										0.00	0.00
R L Holmes and May L Holmes, M D Wayman and Alice M Wayman	125.40	104	Hot Spring Channel	0.50	362.23									0.50	362.23
J C Lane and Nora Lane	92.00	109	Lane-Fleming	Entire Flow										0.00	0.00
Subtotal, Special Class (Schedule 7)	3,645.60			23.53	10,129.74									23.53	10,129.74

Summary of Ash Creek Decree	First Priority Face Value (AF)	Second Priority Face Value (AF)	Third Priority Face Value (AF)	Fourth Priority Face Value (AF)	Fifth Priority Face Value (AF)	Total Face Amount (AF)
Rush Creek Group	2,061.82	0.00	0.00	0.00	0.00	2,061.82
Butte Creek Group	981.82	353.45	0.00	0.00	0.00	1,335.27
Willow Creek Group	702.73	3,075.05	589.09	903.27	0.00	5,270.15
Ash Creek Group	14,134.51	724.46	28,888.07	2,997.82	976.56	47,721.42
Special Class Rights Holders	10,129.74	0.00	0.00	0.00	0.00	10,129.74
Total	28,010.61	4,152.97	29,477.16	3,901.09	976.56	66,518.40

Big Valley Pit River Decree - Between Canby Bridge to Muck Valley
Modoc County Decree No. 6395

Seasons of Use

Continuous, regardless of season	365.25	days
April 1 through September 30	183.00	days
		days

				Allotments									
Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Total (cfs)	Total (AF)
Tributary Group													
R M Bushey	Domestic	4a	Unnamed Spring	0.05	18.15							0.05	18.15
Merlin Kennedy and Erma Kennedy	50.00	5, 6	Upper Turner Creek	0.72	261.34							0.72	261.34
E W Caldwell and Rose Marie Caldwell	60.00	6a	Hulbert Creek	0.86	312.16							0.86	312.16
Robert Sherer and A F Gerig	80.00	12a	Stone Coal Creek	1.15	417.42							1.15	417.42
W O Gravier	Domestic	11	Stone Coal Creek	--								0.00	0.00
Robert Sherer and A F Gerig	96.00	10a	Tom Deakins Creek	1.36	493.65							1.36	493.65
Gladys Troy	Domestic	14b	Holl Creek			0.07	25.41					0.07	25.41
H S Lorenz and Flora Richards, Executrix	5.00	14c	Holl Creek	0.07	25.41							0.07	25.41
George W Hines, Marvin A Hines, and Mason Hines	80.00	14f	Holl Creek					1.14	413.79			1.14	413.79
J H Duncan and Marian Duncan	40.00	14d	Holl Creek					0.57	206.90			0.57	206.90
Gladys Troy	160.00	15a	Lower Turner Creek	2.28	827.58							2.28	827.58
George W Hines, Marvin A Hines, and Mason Hines	40.00	15b	Lower Turner Creek	0.57	206.90							0.57	206.90
R E Potter, Joe L Potter, L J Potter, and Forrest D Potter	160.00	29b	Egg Lake Slough-Taylor Creek	2.28	827.58							2.28	827.58
Albert W Joiner and Lillian B Joiner	23.00	29c	Egg Lake Slough-Taylor Creek	0.33	119.78							0.33	119.78
R E Potter, Joe L Potter, L J Potter, and Forrest D Potter	85.00	29a	Egg Lake Slough-Taylor Creek					1.22	442.83			1.22	442.83
L W Kramer	130.00	29d	Egg Lake Slough-Taylor Creek					1.86	675.13			1.86	675.13
J H Holl and Kenneth K Holl	204.00	46, 43a	Egg Lake Slough-Taylor Creek							2.92	1,059.89	2.92	1,059.89
Richard Hemsted and Karl Hemsted	400.50	30, 31, 32, 33, 34, 35	Widow Valley Creek	5.72	2,076.22							5.72	2,076.22
W Lee Jr	4.00	31a	Widow Valley Creek	0.06	21.78							0.06	21.78
L W Kramer	200.00	36	Widow Valley Creek					2.86	1,038.11			2.86	1,038.11
L W Kramer	1,075.00	37, 38	Widow Valley Creek			15.40	5,589.82					15.40	5,589.82
W L Gray	1.00	47a	Knox Spring	0.02	7.26							0.02	7.26
W L Gray	Domestic, Stockwater	47b	Knox Spring Channel	0.01	3.63							0.01	3.63
Gerald G Packwood	76.00	53	Bassett Hot Springs	1.08	392.01							1.08	392.01
Charles A Gerig and W L Gray	28.00	53a, 53	Bassett Hot Springs					0.40	145.19			0.40	145.19
Norris Gerig	133.00	28, 43	Bull Run Slough	1.90	689.65							1.90	689.65
Alvin E Watson and Mary V Watson	160.00	54a	Bull Run Slough			2.28	827.58					2.28	827.58
Andrew C Babcock and Dorothy J Babcock	168.00	72	Bull Run Slough					2.40	871.14			2.40	871.14
S J Thompson	40.00	54b	Bull Run Slough							0.57	206.90	0.57	206.90
Frank Iverson	372.50	62	Juniper Creek	5.33	1,934.66							5.33	1,934.66
Subtotal, Tributary Group	3,871.00			23.79	8,635.18	17.75	6,442.81	10.45	3,793.09	3.49	1,266.78	55.48	20,137.86
Big Valley Pit River Group													
Klaus Mohr	37.00	2				0.53	192.38					0.53	192.38
R M Bushey	152.00	3				2.17	787.66					2.17	787.66
Alden Miller	211.00	12				3.02	1,096.19					3.02	1,096.19
Robert Sherer and A F Gerig	100.00	12a				1.43	519.05					1.43	519.05
C M Shaw and R Shaw	134.50	13a				1.92	696.91					1.92	696.91
R A Blair	60.50	13b				0.86	312.16					0.86	312.16
R D Kerley and Angel E Kerley (Criss Ranch)	110.00	13d				1.57	569.87					1.57	569.87
R D Kerley and Angel E Kerley (Home Ranch)	880.00	28, 42, 44				1.94	704.17			10.63	3,858.43	12.57	4,562.60
J H Duncan and Marian Duncan	200.00	13c				2.86	1,038.11					2.86	1,038.11
Kenneth K Gould	84.00	14a				1.20	435.57					1.20	435.57

y required.

Big Valley Pit River Decree - Between Canby Bridge to Muck Valley
Modoc County Decree No. 6395

Seasons of Use

Continuous, regardless of season	365.25	days
April 1 through September 30	183.00	days
		days

				Allotments									
Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Total (cfs)	Total (AF)
George A Hines, Marvin A Hines, and Mason Hines	508.00	15		15 cubic feet per second to maintain channel storage and supply stock water or such amounts as may be reasonabl		7.26	2,635.20					7.26	2,635.20
Gladys Troy	112.00	14b				1.60	580.76					1.60	580.76
Albert W Joiner and Lillian B Joiner (Upper Ranch)	160.00	29c				2.28	827.58					2.28	827.58
Albert W Joiner and Lillian B Joiner (Miller Ranch)	263.00	17				3.76	1,364.79					3.76	1,364.79
Albert W Joiner and Lillian B Joiner (Home Ranch)	66.00	18				0.94	341.20					0.94	341.20
Ernest C Robinson	178.00	24				1.77	642.47			0.77	279.49	2.54	921.96
L H Monchamp	121.00	22a				1.73	627.95					1.73	627.95
F E Yowell	287.00	22b					0.00	4.10	1,488.20			4.10	1,488.20
H M Roberts	229.00	22b				0.21	76.22	3.06	1,110.70			3.27	1,186.93
Cyril R Mamath	609.00	24				3.83	1,390.20	2.84	1,030.85	2.03	736.84	8.70	3,157.88
D J Leventon (Courtright Ranch)	200.00	25				1.49	540.83	0.85	308.53	0.52	188.75	2.86	1,038.11
D J Leventon (Courtright Ranch)	140.00	25				1.00	362.98	1.00	362.98			2.00	725.95
Cornelius Iest	794.00	25				1.66	602.54	9.68	3,513.60			11.34	4,116.14
E K Brown and Leila A Brown	331.00	23				0.59	214.16	3.85	1,397.45	0.29	105.26	4.73	1,716.87
R E Potter, Joe L Potter, Forrest D Potter, and L J Potter	314.00	27				4.50	1,633.39					4.50	1,633.39
C R Brown, A G Brown, and E K Brown	202.00	26				2.89	1,049.00					2.89	1,049.00
H L Hayes, Jessie Hayes, and Emma Hayes	537.00	23, 24				3.37	1,223.23	1.17	424.68	3.13	1,136.11	7.67	2,784.02
Oral Gerig and Gertrude M Gerig	159.00	27a				2.27	823.95					2.27	823.95
W H Hunt Estate Co.	440.00	23				6.30	2,286.74					6.30	2,286.74
W H Gerig	305.50	23, 39				2.70	980.03			1.66	602.54	4.36	1,582.57
L W Kramer	640.50	28				5.24	1,901.99			3.91	1,419.23	9.15	3,321.22
E J Raehn	61.00	28				0.87	315.79					0.87	315.79
James H Pircen and Verna L Pircen	23.00	28				0.33	119.78					0.33	119.78
Peter Gerig (Knox Ranch)	268.00	28, 43				3.83	1,390.20					3.83	1,390.20
Peter Gerig (Home Ranch)	339.00	23, 43, 39				4.66	1,691.46			0.18	65.34	4.84	1,756.80
E V Wing	146.00	28				2.08	754.99					2.08	754.99
Norris Gerig	27.00	28, 43				0.39	141.56					0.39	141.56
Alvin E Watson and Mary V Watson	15.00	28				0.21	76.22					0.21	76.22
Ralph T Yordy	31.00	28				0.44	159.71					0.44	159.71
Andrew C Babcock and Dorotha J Babcock	12.00	28				0.17	61.71					0.17	61.71
Lester Babcock	268.00	42				2.23	809.43	2.23	809.43			4.46	1,618.87
Arad Babcock	97.00	42				0.81	294.01	0.81	294.01			1.62	588.02
J H Holl and Kenneth K Holl	407.00	28				5.82	2,112.52					5.82	2,112.52
J H Holl and Kenneth K Holl	160.00	45								2.28	827.58	2.28	827.58
Merlin Kennedy	32.50	48				0.47	170.60					0.47	170.60
Aubrey C Bieber and Carmen B Conner	30.00	48a				0.43	156.08					0.43	156.08
W M Snipes	193.00	49				1.61	584.39			1.13	410.16	2.74	994.55
Mary DeMange Kennedy	176.00	49				2.51	911.07					2.51	911.07
Kenneth McArthur and John R McArthur	320.00	49				4.56	1,655.17					4.56	1,655.17
Andrew C Babcock	53.00	49				0.76	275.86					0.76	275.86
Chester Babcock	154.00	49				2.20	798.55					2.20	798.55
R A Babcock	120.00	49				1.71	620.69					1.71	620.69
Ernest G Babcock and Bessie J Babcock	677.00	49				9.67	3,509.97					9.67	3,509.97
King A Stubblefield and Beatrice Stubblefield	160.00	51a				2.28	827.58					2.28	827.58
Estate of Walter Burnham Armstrong	381.00	49				5.44	1,974.59					5.44	1,974.59
Kenneth McArthur and John R McArthur, Anna McArthur	320.00	67				4.56	1,655.17					4.56	1,655.17
Kenneth McArthur and John R McArthur, Anna McArthur	680.00	66				7.58	2,751.35			2.14	776.77	9.72	3,528.12
E J Britten and Thelma Britten	876.00	68, 69				11.23	4,076.21			1.27	460.98	12.50	4,537.19
W L Campbell	120.00	71				1.28	464.61			0.43	156.08	1.71	620.69
S J Thompson	803.50	70, 71								11.50	4,174.21	11.50	4,174.21

Big Valley Pit River Decree - Between Canby Bridge to Muck Valley
Modoc County Decree No. 6395

Seasons of Use		
Continuous, regardless of season	365.25	days
April 1 through September 30	183.00	days
		days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotments First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Total (cfs)	Total (AF)
S J Thompson and W H Thompson	304.00	49				3.21	1,165.15			1.13	410.16	4.34	1,575.31
Subtotal, Big Valley Pit River Group	15,819.00			15.00	5,444.63	154.23	55,981.67	29.59	10,740.44	43.00	15,607.93	241.82	82,330.04

Surplus Class Claimants (in order of priority)	cfs	Acre-feet	Season	
Albert W Joiner and Lillian B Joiner	0.09	28.00	Nov 1 - Apr 1	
Oral Babcock, H W Killebrew, Richard B Keene, Homer C Jack	10.00	892.56	Apr 1 - May 15	
Oral Babcock, H W Killebrew, Richard B Keene, Homer C Jack	11.84	3,600.00	Jan 15 - May 15	
Big Valley Mutual Water Company	8.67	2,635.00	Oct 1 - June 1	
Big Valley Mutual Water Company	0.33	100.00	Oct 1 - June 1	
Big Valley Mutual Water Company	8.60	2,615.00	Oct 1 - June 1	
L W Kramer	6.75	2,476.86	May 1 - Nov 1	
L W Kramer	0.28	86.50	Feb 1 - Apr 1	
L W Kramer	0.09	27.80	Nov 1 - Apr 30	
Russell M Bushey	500 gpd	0.56	Jan 1 - Dec 31	
United States, Modoc Nat'l Forest	1800 gpd	2.02	Apr 1 - Nov 30	
United States, Modoc Nat'l Forest	650 gpd	0.73	May 1 - Oct 30	
Cornelius Iest	4.93	1,500.00	Nov 1 - Mar 31	
United States, Modoc Nat'l Forest	375 gpd	0.42	May 1 - Oct 30	
United States, Modoc Nat'l Forest	650 gpd	0.73	May 15 - Oct 15	
Clinton Peltier and Do-Be Melcon Peltier	0.63	190.00	Nov 1 - Apr 1	
George W Hines, Marvin A Hines and Mason M Hines	0.66	200.00	Oct 1 - May 1	
Alden Miller	0.60	182.00	Oct 1 - Apr 30	
United States, DOI, BLM	0.01	2.23	Oct 1 - May 31	
United States, DOI, BLM	0.00	0.21	Oct 1 - May 31	
California Dept of Water Resources	263.19	80,000.00	Jan 1 - Dec 31	Stone Coal Reservoir project for Big Valley Irrigation District
Pit Soil Conservation District	252.00	76,600.00	Oct 1 - Apr 30	
Total, Surplus Water Claims	568.67	171,140.62		

Summary	cfs	Acre-feet
Tributary Group	55.48	20,137.86
Big Valley Pit River Group	241.82	82,330.04
Total Senior Claimant Groups	297.30	102,467.90
Surplus Water Claimants	568.67	171,140.62
Total, Big Valley Pit River Decree Claims	865.97	273,608.52

Burney Creek Decree
Shasta County, Decree No. 5111

Seasons of Use

Continuous, regardless of season	365.25	days
May 5 through November 1	181.00	days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotment During Irrigation Period	Allotment Face Value (AF)
West Side Users					
Richard W Haynes	376.00		Haynes or Creek Laterals	9.45	1,696.31
J C Erickson	21.00		Erickson	0.60	107.70
John Snooks	18.00		Snooks	0.50	89.75
Timothy Desmond	75.00		Cayton or Natural Channel of Burney Creek	1.88	337.47
Karl Elling	314.00		Cayton or Elling	7.85	1,409.11
Mary Ann Cornaz	150.00		Greer-Cornaz or Natural Channel of Burney Creek	3.75	673.14
Ray Vedder	75.00		Greer-Cornaz or Natural Channel of Burney Creek	1.87	335.67
Subtotal, West Side Users	1,029.00			25.90	4,649.16
East Side Users					
A R Haynes	50.00		A R Haynes	1.25	224.38
Fred Greer	87.00		Greer-Cornaz	2.50	448.76
Mary Ann Cornaz	137.00		Greer-Cornaz	3.42	613.90
Red River Lumber Co.	175.00		Greer-Cornaz	4.33	777.25
Ednah M Black	320.00		Greer-Cornaz	8.80	1,579.64
Karl Elling	200.00		Cayton or Elling	5.00	897.52
Subtotal, East Side Users	969.00			25.30	4,541.45
Surplus Water Users					
Karl Elling	71.00		Cayton or Elling	0.90	323.11
Timothy Desmond	8.00		Cayton or Natural Channel of Burney Creek	0.10	35.90
Fred Greer	10.00		Greer-Cornaz	0.12	43.08
Mary Ann Cornaz	32.00		Greer-Cornaz or Natural Channel of Burney Creek	0.40	143.60
Red River Lumber Co.	150.00		Greer-Cornaz	1.88	674.94
Ednah M Black	137.00		Greer-Cornaz	1.70	610.31
Ray Vedder	64.00		Greer-Cornaz or Natural Channel of Burney Creek	0.80	287.21
Subtotal, Surplus Water Users	472.00			5.90	2,118.15
Total, Burney Creek Decree	2,470.00			31.50	11,308.76

Franklin Creek Decree
Modoc County Decree No. 3118

Seasons of Use		
Continuous, regardless of season	365.25	days
April 1 through September 30	183.00	days
		days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotments First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Total (cfs)	Total Face Value (AF)
Allotments from Franklin Creek													
Earl & Mary Ehrman	15.20		Ehrman	0.18	63.52							0.18	63.52
Ira A & Ida M Hanson	12.80		Hanson North, and/or Hanson Middle			0.16	58.08					0.16	58.08
P Indart	20.55		Indart Main and/or Indart South			0.26	94.37					0.26	94.37
G R Stone	12.80		Stone			0.16	58.08					0.16	58.08
John & Fannie Morrison	20.80		Morrison			0.26	94.37					0.26	94.37
Earl & Bernice Sherer and Bank of America NT&SA	8.00		North Channel			0.10	36.30					0.10	36.30
Paulina Lee	20.80		North Channel			0.26	94.37					0.26	94.37
J G & Mattie M Dawson	20.80		North Channel			0.26	94.37					0.26	94.37
P Indart	50.80		North Channel					0.63	228.67			0.63	228.67
Paulina Lee	52.00		North Channel					1.05	381.12			1.05	381.12
J G & Mattie M Dawson	83.90		North Channel					1.05	381.12			1.05	381.12
Ella M Shartel	10.30		North Channel					0.14	50.82			0.14	50.82
C E & Mary A Crowder	114.20		North Channel					1.43	519.05			1.43	519.05
G R Stone	21.80		Stone					0.28	101.63			0.28	101.63
John & Fannie Morrison	124.60		Morrison, Morrison Middle, and/or Morrison Lower					1.56	566.24			1.56	566.24
Earl & Bernice Sherer and Bank of America NT&SA	8.00		Morrison, Morrison Middle, and/or Morrison Lower					0.10	36.30			0.10	36.30

Franklin Creek Decree
Modoc County Decree No. 3118

Seasons of Use

Continuous, regardless of season	365.25	days
April 1 through September 30	183.00	days
		days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotments									
				First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Total (cfs)	Total Face Value (AF)
Ira A & Ida M Hanson	9.60		Hanson North, Hanson Middle, and/or Hanson South					0.12	43.56			0.12	43.56
P Indart	30.80		South Channel					0.40	145.19			0.40	145.19
Paulina Lee	79.90		South Channel					0.85	308.53			0.85	308.53
C E & Mary A Crowder	70.50		South Channel					0.88	319.42			0.88	319.42
Ira A & Ida M Hanson	19.50		Hanson North, Hanson Middle, and/or Hanson South							0.25	90.74	0.25	90.74
P Indart	15.60		Indart Main							0.20	72.60	0.20	72.60
Paulina Lee	12.00		Lee Upper							0.15	54.45	0.15	54.45
John & Fannie Morrison	22.50		Morrison and/or Morrison Middle							0.28	101.63	0.28	101.63
Earl & Bernice Sherer and Bank of America NT&SA	51.60		Morrison, Morrison Middle, and/or Morrison Lower							0.65	235.93	0.65	235.93
Total Franklin Creek Allotments	909.35			0.18	63.52	1.46	529.94	8.49	3,081.66	1.53	555.35	11.66	4,230.48

Hat Creek Decree

Shasta County Decree No. 5724	Summer Season		
Shasta County Decree No. 7858	Winter Season		
Seasons of Use			
Continuous, regardless of season		365.25	days
May 1 through October 27		180.00	days
October 28 through April 30		185.25	days

Name of Claimant	Name of Diversion System	Allotments Allotment (cfs)	Allotment (AF)
Summer Season Decree No. 5724			
Upper Users, First Rotation - Schedule I			
Harvey W Wilcox	Harvey Wilcox Upper or Harvey Wilcox Lower	2.13	379.34
Vint W Stevenson	Stevenson	2.38	423.97
Carrie Klots Hall and W P Hall	Hall	2.75	490.91
Alec Brown (Indian)	Alec Brown	0.50	89.26
Charles Hawkins	Hawkins	2.25	401.65
Charles Hawkins	Harry Wilcox Middle	1.88	334.71
Harry M Wilcox	Harry Wilcox Upper	5.63	1,004.13
Harry M Wilcox	Harry Wilcox Middle	8.25	1,472.73
R A Wilcox and Amy Wilcox	Harry Wilcox Upper	1.50	267.77
R A Wilcox and Amy Wilcox	Harry Wilcox Middle	13.00	2,320.66
R A Wilcox and Amy Wilcox	Harry Wilcox Lower	1.00	178.51
R A Wilcox and Amy Wilcox	Rube Wilcox	2.88	513.22
Felice Kelly Davis	Rube Wilcox - Davis	2.13	379.34
Holliday Brown (Indian)	Harry Wilcox Middle	1.13	200.83
William Valentine	Valentine Upper	1.13	200.83
William Valentine	Valentine Lower	0.50	89.26
Charles Heryford	Heryford Upper	1.50	267.77
Charles Heryford	Heryford Middle	0.50	89.26
Charles Heryford	Heryford Lower	1.50	267.77
Edith Snook (Indian)	Edith Snook	0.50	89.26
J S Ratledge	Ratledge-Henry Lonquist	3.50	624.79
J S Ratledge	Ratledge-Opdyke-Forest Service	0.88	156.20
Olive Opdyke	Ratledge-Opdyke-Forest Service	5.88	1,048.76
Perry Opdyke, Percy Opdyke	Opdyke	11.88	2,119.83
Henry Lonquist	Ratledge-Henry Lonquist	1.88	334.71
H Morris	Morris Upper or Morris Lower	16.13	2,878.51
Iva Morris (Mrs A L Doty, Iva Doty)	Morris Upper or Morris Lower	6.13	1,093.39
Clare Brown, Fay Brown	Reiger	3.25	580.17
Charles Sidney Gray	Gray	1.00	178.51
Subtotal, Schedule I, First Rotation		103.50	18,476.03
Upper Users, Second Rotation - Schedule II			
	Harvey Wilcox Upper	0.25	44.63
	Harvey Wilcox Lower	0.25	44.63
	Stevenson	0.25	44.63
	Gray	0.13	22.31
	Hall	0.50	89.26
	Alec Brown	0.13	22.31
	Hawkins	0.25	44.63
	Harry Wilcox Upper	0.75	133.88
	Harry Wilcox Middle	1.00	178.51
	Rube Wilcox - Davis	0.50	89.26
	Harry Wilcox Lower	0.25	44.63
	Valentine Upper	0.25	44.63
	Valentine Lower	0.25	44.63
	Heryford Upper	0.25	44.63
	Heryford Middle	0.25	44.63
	Heryford Lower	0.25	44.63
	Edith Snook	0.13	22.31
	Ratledge-Henry Longquist	0.75	133.88
	Ratledge-Opdyke-Forest Service	0.75	133.88
	Opdyke	1.00	178.51
	Morris Upper	0.75	133.88
	Morris Lower	0.75	133.88
	Rieger (for Clare and Fay Brown)	0.50	89.26
Subtotal, Schedule II, Second Rotation		10.13	1,807.44
Lower Users, First Rotation - Schedule III			
Vernon March	Morris Upper or Morris Lower	13.50	2,409.92
Harry A Lonquist	Harry Lonquist	0.75	133.88
Harry A Lonquist	Rieger	3.75	669.42
Harry A Lonquist	Harry Lonquist-Reynolds-Bidwell	2.50	446.28
Harry A Lonquist	Harry Lonquist-Reynolds-East Side	2.25	401.65
Harry A Lonquist	Harry Lonquist-Reynolds-Middle	0.50	89.26
N Reynolds, A N Reynolds (F Allen)	Harry Lonquist-Reynolds-East Side	1.25	223.14

Hat Creek Decree

Shasta County Decree No. 5724	Summer Season
Shasta County Decree No. 7858	Winter Season

Seasons of Use

Continuous, regardless of season	365.25	days
May 1 through October 27	180.00	days
October 28 through April 30	185.25	days

Name of Claimant	Name of Diversion System	Allotments Allotment (cfs)	Allotment (AF)
N Reynolds, A N Reynolds (F Allen)	Reynolds Canal	4.00	714.05
N Reynolds, A N Reynolds (F Allen)	Harry Lonquist-Reynolds-Middle	2.50	446.28
N Reynolds, A N Reynolds (F Allen)	Harry Lonquist-Reynolds-Bidwell	3.75	669.42
Henry Lonquist	Henry Lonquist	1.75	312.40
Henry Lonquist	Opdyke	0.13	22.31
Henry Lonquist	Henry & Fritz Lonquist Upper or Henry & Fritz Lonquist Lower	4.50	803.31
Fritz Lonquist	Henry & Fritz Lonquist Upper or Henry & Fritz Lonquist Lower	2.88	513.22
R E Bidwell	Harry Lonquist-Reynolds-Bidwell	8.75	1,561.98
Jeff Bone & Lee Bone (Indians)	Jeff Bone Upper	0.50	89.26
Jeff Bone & Lee Bone (Indians)	Jeff Bone Lower	0.50	89.26
Jeff Bone & Lee Bone (Indians)	Lee Bone	0.50	89.26
Sam Williams (Indian)	Lee Bone	0.50	89.26
Sam Williams (Indian)	Sam Williams	0.75	133.88
Julia Wilson (Indian)	Julia Wilson	2.00	357.02
Joe Wilson (Indian)	Joe Wilson	2.75	490.91
Harry Bob (Indian)	Julia Wilson	3.50	624.79
Ellen Brown (Alan Brown as successor)	Ellen Brown Upper	3.00	535.54
Ellen Brown (Alan Brown as successor)	Ellen Brown Lower	3.25	580.17
Ellen Brown (Alan Brown as successor)	Ellen Brown - W W Brown	4.00	714.05
Ellen Brown (Alan Brown as successor)	Hat Creek (no ditch)	2.00	357.02
W W Brown	Ellen Brown - W W Brown	7.50	1,338.84
W W Brown	Hat Creek (no ditch)	0.50	89.26
Charley Snooks (Indian)	Charley Snooks	0.50	89.26
David Doyel	Doyel	4.50	803.31
David Doyel	Hat Creek (no ditch)	0.50	89.26
David Doyel, Catherine Doyel, Effie May Doyel	Doyel	13.50	2,409.92
David Doyel, Catherine Doyel, Effie May Doyel	Hat Creek (no ditch)	5.75	1,026.45
Bertha Geissner	Bertha Geissner	10.25	1,829.75
Bertha Geissner	Doyel	2.00	357.02
Otto Geissner	Otto Geissner or Hat Creek (No Ditch)	8.00	1,428.10
Subtotal, Schedule III, First Rotation		129.00	23,028.10
Lower Users, Second Rotation - Schedulee IV			
	Henry Lonquist	0.75	133.88
	Henry & Fritz Lonquist Upper	0.38	66.94
	Henry & Fritz Lonquist Lower	0.38	66.94
	Harry Lonquist	0.25	44.63
	Harry Lonquist-Reynolds-Bidwell	1.00	178.51
	Harry Lonquist-Reynolds-East Side	0.75	133.88
	Harry Lonquist-Reynolds-Middle	0.25	44.63
	Reynolds Canal	0.75	133.88
	Jeff Bone Upper	0.13	22.31
	Jeff Bone Lower	0.13	22.31
	Lee Bone	0.25	44.63
	Julia Wilson	0.25	44.63
	Sam Williams	0.25	44.63
	Joe Wilson	0.25	44.63
	Ellen Brown Upper	0.25	44.63
	Ellen Brown - W W Brown	1.00	178.51
	Ellen Brown Lower	0.25	44.63
	Charley Snooks	0.13	22.31
	Doyel	1.00	178.51
	Bertha Geissner	0.25	44.63
	Otto Geissner	0.50	89.26
Subtotal, Schedule IV, Second Rotation		9.13	1,628.93
Schedule 2 - Decree No. 7858			
Harvey W Wilcox	Harvey Wilcox Upper, Harvey Wilcox Middle, and/or Harvey Wilcox Lower	3.06	1,124.36
Vint W Stevenson	Upper Ranch, Stevenson Channel and/or Stevenson	5.20	1,910.68
Ruby F Hencrat and Charles W Gray	Gray	0.75	275.58
Carrie Klotz Hall and W P Hall	Hall	2.79	1,025.15

Hat Creek Decree

Shasta County Decree No. 5724	Summer Season		
Shasta County Decree No. 7858	Winter Season		
Seasons of Use			
Continuous, regardless of season		365.25	days
May 1 through October 27		180.00	days
October 28 through April 30		185.25	days

Name of Claimant	Name of Diversion System	Allotments Allotment (cfs)	Allotment (AF)
Mrs M H Shearin	Shearin Upper and/or Shearin Lower	0.96	352.74
Alex Brown (Indian)	Alex Brown	0.25	91.86
Estate of Harry M Wilcox and Emma E Wilcox	Hawkins, Harry Wilcox Upper and/or Harry Wilcox Middle	9.40	3,453.92
Gladys Gertrude Smith, Ermyl Roberta Ward, Ida May Wilcox	Harry Wilcox Middle, Wilcox Lower and/or Wilcox Davis	10.54	3,872.80
Holiday Brown (Indian)	Harry Wilcox Middle, and/or Holiday Brown	0.56	205.77
Dessie Snooks (Indian)	Wilcox-Davis	1.06	389.48
William Valentine and Fred Valentine	Valentine Upper and/or Valentine Lower	0.81	297.62
Charles Heryford	Heryford Upper, Herford Middle, and/or Herford Lower	1.75	643.02
Edith Snooks (Indian)	Edith Snooks	0.25	91.86
J S Ratledge and Sabilla J Ratledge	Ratledge-Lonquist and/or Ratledge-Opdyke-Forest Service	2.19	804.69
Perry Opdyke	Opdyke and/or Ratledge-Opdyke-Forest Service	8.88	3,262.85
Henry Lonquist	Ratledge-Lonquist, Henry Lonquist Upper and/or Henry Lonquist Lower	5.56	2,042.96
Iva Doty and Asa L Doty	Morris Upper and/or Morris Lower	11.12	4,085.91
S E Korns	Reiger	1.63	598.92
Vernon March	Morris Upper and/or Morris Lower	6.75	2,480.21
Harry A Lonquist	Harry Lonquist, Reiger, Lonquist-Reynolds-Bidwell, and/or Lonquist Reynolds	4.88	1,793.10
Sofia U Lonquist	Lonquist-Reynolds-Bidwell and/or Reynolds Dam	5.75	2,112.77
R E Bidwell	Lonquist-Reynolds-Bidwell and/or Bidwell	4.98	1,829.84
L H Sullivan and Eva B Sullivan	Reiger	2.30	845.11
Jackson Bone (Indian)	Bone Upper and/or Bone Lower	0.50	183.72
Lee Bone (Indian)	Lee Bone	0.50	183.72
Sam Williams (Indian)	Lee Bone and/or Williams	0.60	220.46
Julia Wilson (Indian)	Julia Wilson	1.00	367.44
Harry Bob (Indian)	Julia Wilson	1.75	643.02
Lorena Wilson Mitchell, Alta Wilson Mullen, Hattie Wilson, Flora Wilson, and Ira Wilson (Indians)	Joe Wilson	1.38	507.06
Alan Brown	Brown Upper, Brown Lower and/or Ellen Brown-W W Brown	6.13	2,252.40
W W Brown	Ellen Brown, W W Brown	4.60	1,690.21
Kate Snooks, Greely Snooks, Cecilia Barnes, and Dessie Snooks (Indians)	Charley Snooks	0.25	91.86
David Doyel, Catherine Doyel and Effie May Doyel	Doyel and/or Doyel East	12.12	4,453.35
Bertha Geissner	Bertha Geissner and/or Doyel	6.12	2,248.72
Otto Geissner	Otto Geissner	4.00	1,469.75
W E Dunwoody	Jones	0.50	183.72
Clara Grant (Indian)	Grant Upper and/or Grant Lower	0.50	183.72
Subtotal, Schedule 2, Decree No. 7858		131.37	48,270.33

Summary			Allotment (AF)
Upper Users, First Rotation - Schedule I	Summer Irrigation, Stockwater, Domestic	103.50	18,476.03
Upper Users, Second Rotation - Schedule II		10.13	1,807.44
Lower Users, First Rotation - Schedule III	Summer Irrigation, Stockwater, Domestic	129.00	23,028.10
Lower Users, Second Rotation - Schedulee IV		9.13	1,628.93
Schedule 2 - Decree No. 7858	Winter Irrigation, Stockwater, Domestic	131.37	48,270.33
Total, Hat Creek Decrees		383.12	93,210.83

North Fork Pit River (and all its tributaries except for Franklin Creek)
Modoc County Decree No. 4074

Seasons of Use

Continuous, regardless of season	365.25	days
April 1 to September 30	183.00	days
April 15 to September 30	169.00	days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotments First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Fifth Priority Class (cfs)	Fifth Priority Face Value (AF)	Total cfs	Total AF
Linville Creek and Its Tributaries Claimants															
Grace F Bonner	4.90	1	Crabtree	0.10	72.45									0.10	72.45
J W Watkins and Dottie Watkins	112.60	2, 3, 4, 5	Watkins Upper, Watkins House, Watkins Middle, Watkins Lower	1.60	1,159.14									1.60	1,159.14
C C Clarke and Belle Clarke	150.70	6, 7, 8, 9, 10	Clarke Pond, Clarke Upper, Clarke House, Clarke Upper Meadow, Clarke Lower Meadow	1.10	796.91	1.10	399.27							2.20	1,196.18
Milan S Renner	70.00	11, 12	Renner House, Page-Renner	1.01	731.71									1.01	731.71
Lake Shore Cattle Company	323.20	12, 148, 149, 150	Page-Renner, Page Upper Collecting, Page, Page Lower Collecting	0.10	72.45	3.29	1,194.19							3.39	1,266.63
Subtotal, Linville Creek Group	661.40			3.91	2,832.65	4.39	1,593.46	0.00	0.00	0.00	0.00	0.00	0.00	8.30	4,426.11
Joseph Creek and its Tributaries Claimants															
Martin Espil and Lucie Espil	80.00	14, 15, 16, 17, 18	Upper Shingle, Lower Shingle, South Couch, Upper Couch, Lower Couch	0.65	470.90					0.50	181.49			1.15	652.39
V L Jacobs and Georgia Jacobs	29.10	19, 152	Jacobs, Jacobs East Spring, Jacobs West Spring	0.40	289.79									0.40	289.79
Irivin K Wilson	89.00	20, 21, 22, 23	Wilson Upper, Wilson House, Wilson Main, Wilson Lower	1.19	862.11					0.09	32.67			1.28	894.78
LeRoy G Black	21.60	22	Wilson Main			0.40	145.19							0.40	145.19
LeRoy G Black	16.40	24	Joseph Creek	0.20	144.89	0.30	108.89							0.50	253.79
Carl William Blac, Mable Sophia Black, Walter Vernon Black, Mildred Black, LeRoy G Black and Capitola Nunn Black	234.20	24, 25	Joseph Creek, Lower Joseph	2.15	1,557.60					1.25	453.72			3.40	2,011.31
United States in Trust	62.80	26	X L Joseph			1.30	471.87							1.30	471.87
Carl William Blac, Mable Sophia Black, Walter Vernon Black, Mildred Black, LeRoy G Black and Capitola Nunn Black	253.50	27, 28, 29, 30	Schoolhouse, Black Upper, Black Middle, Black Lower			1.30	471.87	1.70	617.06	0.55	199.64			3.55	1,288.56
Subtotal, Joseph Creek Group	786.60			4.59	3,325.28	3.30	1,197.82	1.70	617.06	2.39	867.51	0.00	0.00	11.98	6,007.67
Thoms Creek and Its Tributaries Claimants															
Philip W McKenney	2.40	31, 31A, 31B, 32	Wortman 1st East, Wortman 2nd East, Wortman 3rd East, Wortman Lower	0.10	72.45									0.10	72.45
Herman Acty	9.00	38 to 40	Acty	0.20	144.89									0.20	144.89
Robert T Johnstone and Jeane Mary Johnstone	18.90	33, 34, 35, 36	Jones Upper Left, Jones Upper Right, Jones Lower Right, Jones Lower Left	0.10	72.45	0.38	127.38							0.48	199.82
Alfred DeWitt	69.10	37, 41 to 45	DeWitt Thoms, DeWitt Bowlin	0.30	217.34	1.05	351.97							1.35	569.31
Clyde Hays and Ruth Hays	33.20	46, 47 to 53, 57 to 59, 61	Hays Garden, Hays Meadow, Hays Cantrall, Hays Mile	0.27	195.60	0.98	328.50							1.25	524.11
Howard Royce and Pearl Royce	38.40	54, 55 ,56	H Royce Upper, H Royce Middle, H Royce Lower	0.04	28.98	0.42	140.79							0.46	169.77
Clara May DeWitt and Willie DeWitt	4.00	56A	Willie DeWitt			0.06	20.11							0.06	20.11

North Fork Pit River (and all its tributaries except for Franklin Creek)
Modoc County Decree No. 4074

Seasons of Use

Continuous, regardless of season	365.25	days
April 1 to September 30	183.00	days
April 15 to September 30	169.00	days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotments											
				First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Fifth Priority Class (cfs)	Fifth Priority Face Value (AF)	Total cfs	Total AF
J M Royce	14.60	62, 63	Royce Upper Thoms, Royce Lower Thoms			0.10	33.52	0.15	50.28					0.25	83.80
Albert Stiner, Harold A Stiner, and Howard J Stiner	20.00	64, 65	Stiner Upper, Stiner Lower					0.40	134.08					0.40	134.08
C A Spaulding and Elsie Spaulding	42.30	66 to 70	Spaulding					0.84	281.57					0.84	281.57
Rufus S Carter, Charles M Carter, George Carter, Jacob M Carter, Oliver W Carter, Mrs. Jake Rechsteiner, and Mrs T A Read	21.10	69	Spaulding Lower North					0.30	100.56					0.30	100.56
The Federal Land Bank of Berkeley	32.40	71, 72, 73	Baker Upper, Baker North, Baker Lower			0.05	16.76	0.60	201.12					0.65	217.88
W F Dukes	1.30	74	Dukes			0.10	33.52							0.10	33.52
Subtotal, Thoms Creek Group	306.70			1.01	731.71	3.14	1,052.55	2.29	767.62	0.00	0.00	0.00	0.00	6.44	2,551.88
Gleason Creek and Its Tributaries Group															
Ella Russell	64.60	84, 85, 86	Russell Upper, Russell Middle, Russell Lower	0.20	144.89							0.80	290.38	1.00	435.27
Georgia M Jones	133.00	87, 88, 89, 90, 91	Jones North, Jones Upper South, Jones Pasture, Jones Middle South, Jones Lower South			0.20	144.89	1.80						2.00	144.89
J B Faulkner	10.00	86A, 86B, 86C	Faulkner Upper, Faulkner Middle, Faulkner Lower							0.20	72.60			0.20	72.60
United States in Trust	94.30	92	X L Gleason			0.20	144.89			1.15	417.42			1.35	562.31
Subtotal, Gleason Creek Group	301.90			0.20	144.89	0.40	289.79	1.80	0.00	1.35	490.02	0.80	290.38	4.55	1,215.07
Parker Creek and Its Tributaries Claimants															
P D McDowell and L Gayle McDowell	155.00	93, 95, 96, 98	Pepperdine-McDowell, McDowell Upper, McDowell House, McDowell Upper Meadow, McDowell Lower Meadow	0.21	152.14	1.89	686.02			0.15	54.45			2.25	892.61
Wheeler E Pepperdine & Nettie L Pepperdine	46.50	93, 100, 100A, 100B	Pepperdine-McDowell, Pepperdine Upper, Pepperdine Lower, Pepperdine House	0.07	50.71	0.63	228.67							0.70	279.39
W S Trumbo	111.50	101, 102, 103, 110	Trumbo Upper Shields, Trumbo Lower Shields, Trumbo Upper Isle, Trumbo Lower Isle	0.20	144.89	1.50	544.46							1.70	689.36
W S Trumbo	12.40	111, 112	Page Upper, Page Lower			0.20	72.60							0.20	72.60
Martha E Page	135.20	111, 112	Page Upper, Page Lower	0.20	144.89	1.70	617.06							1.90	761.95
Myrtle O Stanton	15.00	111, 112	Page Upper, Page Lower			0.20	72.60							0.20	72.60
Martha E Page	23.00	100, 133	Pepperdine Upper, Plum Canyon Reservoir							0.25	90.74			0.25	90.74
Leland Chester Porter, Floyd Eldon Porter, and Oakley Willis Porter	65.00	134	Plum Creek							0.50	181.49			0.50	181.49
James C Porter, Cleve Smith, and Carlton Porter	40.00	158A	Nikolai	0.10	72.45					0.90	326.68			1.00	399.12
Estate of A R Conklin	72.00	158	Conklin							0.63	228.67			0.63	228.67
G B Dorris	129.00	104, 105, 106	Payne Upper, Payne Noth, Payne Lower	0.20	144.89			1.60	580.76					1.80	725.65

North Fork Pit River (and all its tributaries except for Franklin Creek)
Modoc County Decree No. 4074

Seasons of Use

Continuous, regardless of season	365.25	days
April 1 to September 30	183.00	days
April 15 to September 30	169.00	days

				Allotments											
Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Fifth Priority Class (cfs)	Fifth Priority Face Value (AF)	Total cfs	Total AF
W S Trumbo	100.00	105, 107, 108, 109	Payne North, Trumbo South Parker, Trumbo North Parker, Stanton					1.30	471.87					1.30	471.87
Mytrle O Stanton	110.00	109	Stanton	0.20	144.89			1.40	508.17					1.60	653.06
Electa Fogarty	105.00	113	Fogarty-Porter	0.20	144.89			1.25	453.72					1.45	598.61
Martha E Page	24.00	114	Fogarty Upper					0.35	127.04					0.35	127.04
Electa Fogarty	10.00	115	Fogarty Lower					0.15	54.45					0.15	54.45
Leland Chester Porter, Floyd Eldon Porter, and Oakley Willis Porter	153.00	116, 117, 118, 120, 123, 124	Alice Porter Main, Alice Porter Upper North, Alice Porter Lower North, Parker, Peral Porter, Alice Porter Slough	0.20	144.89			1.78	646.10	0.20	72.60			2.18	863.58
Pearl F Gibson and C C Gibson	159.00	113, 121, 123	Fogarty-Porter, Porter Upper Reservoir Pearl Porter	0.20	144.89			0.63	228.67	0.29	105.26			1.12	478.83
Pearl F Gibson and C C Gibson	33.50	120	Parker					0.50	181.49					0.50	181.49
James C Porter and Estate of Phear E Porter	86.00	120	Parker	0.40	289.79			0.95	344.83					1.35	634.61
United States in Trust	160.00	130, 130A	X L Parker	0.20	144.89			2.77	1,005.44					2.97	1,150.33
Pearl F Gibson and C C Gibson	41.50	125, 126	Arnold P & J Porter Middle					0.65	235.93					0.65	235.93
James C Porter and Estate of Phear E Porter	67.50	127, 129A	Board Dam, Porter West	0.20	144.89			0.95	344.83					1.15	489.72
James C Porter	81.00	129A, 130, 131, 131A, 131B	Porter West, X L Parker, J C Porter Lower					1.30	471.87					1.30	471.87
Subtotal, Parker Creek Group	1,935.10			2.58	1,869.11	6.12	2,221.41	15.58	5,655.15	2.92	1,059.89	0.00	0.00	27.20	10,805.56
North Fork of Pit River Claimants															
M R Woody	19.50	13	Woody	0.35	253.56									0.35	253.56
United States in Trust	423.00	135, 136	X L Upper Lauer, Lauer, X L Middle, X L Lower	7.00	5,071.24									7.00	5,071.24
C J Clarke Co	10.30	137, 138	X L Upper Lauer, Lauer, X L Middle, X L Lower	0.20	144.89									0.20	144.89
Frank McArthur	635.20	136	Lauer							3.53	1,281.30			3.53	1,281.30
Charles Bettandorff and Georgie Bettandorff	56.70	139	North Fork			2.00	725.95					0.30	108.89	2.30	834.84
Hans A Hoesch and Margaret M Hoesch	184.20	139	North Fork	0.20	144.89	3.00	1,088.93					0.30	108.89	3.50	1,342.71
A Bolliger and A Keller	55.20	139	North Fork			0.80	290.38					0.30	108.89	1.10	399.27
Sarah Laird, Eda Laird, James R Laird, Mildred (Laird) Kenfield, and Fannie F Laird	136.90	139	North Fork	0.20	144.89	2.12	769.51			0.30	108.89			2.62	1,023.29
Estate of B F Lynip, deceased	550.70	139	North Fork	0.20	144.89	5.08	1,843.91					1.31	475.50	6.59	2,464.30
C A Raker	130.50	139	North Fork			3.20	1,161.52							3.20	1,161.52
A Bolliger and A Keller	236.70	141, 142	Gloster, Hughes					4.00	1,451.90					4.00	1,451.90
John C Noer	10.00	141, 142	Gloster, Hughes					0.16	58.08					0.16	58.08
M J Gloster & Annie G Gloster	68.30	141, 142, 143, 144	Gloster, Hughes, Walls Pump, Walls & Gloster					2.00	725.95					2.00	725.95
Mary E Walls & Eleanor W Asher	85.80	141, 142, 143, 144	Gloster, Hughes, Walls Pump, Walls & Gloster					1.44	522.68					1.44	522.68
Kirk Williams	5.00	141, 142, 143, 144	Gloster, Hughes, Walls Pump, Walls & Gloster					0.40	145.19					0.40	145.19
P S Dorris	1,985.90	142	Hughes							6.33	2,297.63			6.33	2,297.63
G B Dorris and Beryl Parker Dorris	1,626.20	142	Hughes							6.33	2,297.63			6.33	2,297.63
W E Minard	26.50	142	Hughes							0.30	108.89			0.30	108.89
O D Austin and Thelma Austin	132.30	146	Butcher									0.73	264.97	0.73	264.97
Subtotal, North Fork of Pit River Group	6,378.90			8.15	5,904.37	16.20	5,880.20	8.00	2,903.80	16.79	6,094.35	2.94	1,067.15	52.08	21,849.87
Special Class Continuous Usage															
C T Watkins	2.55	1,847.38													

North Fork Pit River (and all its
tributaries except for Franklin Creek)
Modoc County Decree No. 4074

Seasons of Use

Continuous, regardless of season	365.25	days
April 1 to September 30	183.00	days
April 15 to September 30	169.00	days

				Allotments											
Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Fifth Priority Class (cfs)	Fifth Priority Face Value (AF)	Total cfs	Total AF
Grace F Bonner	0.03	21.73													
Electa Fogarty	1.00	724.46													
United States in Trust	0.10	72.45													
Subtotal, Speclal Class Continuous	3.68	2,666.02													
Surplus Class (Apr 1 - Sep 30)															
James C Porter	1.15	417.42													
Subtotal, Surplus Class	1.15	417.42													
Special Class (Apr 15 - Sep 30)															
J F Kerr	2.40	804.50													
F W Koenig and A H Koenig	0.20	67.04													
F L Wallace and Jane Wallace	2.40	804.50													
Subtotal, Special Class Apr 15-Sep 30	5.00	1,676.03													

North Fork Pit River (and all its
tributaries except for Franklin Creek)
Modoc County Decree No. 4074

Seasons of Use		
Continuous, regardless of season	365.25	days
April 1 to September 30	183.00	days
April 15 to September 30	169.00	days

				Allotments											
Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Fifth Priority Class (cfs)	Fifth Priority Face Value (AF)	Total cfs	Total AF

Summary	Total cfs	Total AF
Linville Creek Group	8.30	4,426.11
Joseph Creek Group	11.98	6,007.67
Thoms Creek Group	6.44	2,551.88
Gleason Creek Group	4.55	1,215.07
Parker Creek Group	27.20	10,805.56
North Fork Pit River Group	52.08	21,849.87
Special Class Continuous Group	3.68	2,666.02
Surplus Class Group	1.15	417.42
Special Class Apr 15-Sep 30 Group	5.00	1,676.03
Total, All Groups	110.55	46,856.17

Rattlesnake Creek Decree (Pit River in Hot Springs Valley)
Modoc County Decree Recorded in Book 17, page 171

Seasons of Use		
Continuous, regardless of season	365.25	days
April 1 through September 30	183.00	days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotments Allotment (cfs)	Allotment (AF)
Schedule 2, Allotments from Rattlensnake Creek and Pit River					
Spicer Corporation	399.00		Rattlesnake	2.00	725.95
P S Dorris and Bank of Modoc County (Hoy & Christen)	167.00		Butcher	1.15	417.42
Emma Godfrey	71.00		Barnes	0.90	326.68
Emma Godfrey, Estate of J W Cummins, A H Layton, John Strawn	124.00		Cummins	0.20	72.60
Hot Spring Valley Irrigation District, Estate of McBrien and McConnell, John Lybarger	225.00		McBrien	2.45	889.29
James M Edwards, Estate of G C Lindauer, Hot Spring Valley Irrigation District (Lindauer)	521.00		Lindauer Upper	0.80	290.38
Estate of G C Lindauer, Hot Spring Valley Irrigation District	242.00		Lindauer Lower	0.55	199.64
Estate of G C Lindauer, Frank McArthur, John Kelley, C S Baldwin, Hot Springs Valley Irrigation District	492.00		McArthur Upper	0.60	217.79
Frank McArthur	140.00		McArthur Lower	0.45	163.34
Frank McArthur, Bank of Modoc County (Claussen), Federal Land Bank of Berkeley	253.00		Claussen	0.40	145.19
Bank of Modoc County (Claussen), Ira Hulbert, Bank of Modoc County (Connelly), George Fellencer, Katherine E Hazelton, California Joint Stock Land Bank (Fitzhugh)	538.00		Fellencer	0.20	72.60
California Joint Stock Land Bank (Fitzhugh), Bank of Modoc County (Connelly)	273.00		Fitzhugh	0.65	235.93
California Joint Stock Land Bank (Fitzhugh), Bank of Modoc County (Connelly), George Fellencer, Estate of G L Kramer	220.00		Marie Caldwell Upper	0.40	145.19
Estate of G L Kramer	100.00		Marie Caldwell Lower	0.55	199.64
G B Wilcox	166.00		Warren Caldwell	1.10	399.27
G B Wilcox	99.00		Hughes	0.40	145.19
Federal Land Bank of Berkeley	28.00		Howe	0.80	290.38
Federal Land Bank of Berkeley (Howe), Lizzie D Pope	89.00		Lizzie Pope	0.40	145.19
Hot Spring Valley Irrigation District (Shelton)	0.00		No Dam	Stockwater	0.00
Hot Spring Valley Irrigation District (Anklin)	0.00		No Dam		0.00
Hot Spring Valley Irrigation District (Mohr)	0.00		No Dam		0.00
Mary L Elledge	0.00		No Dam		0.00
Dora H Kelley	0.00		No Dam		0.00
Subtotal, Schedule 2	4,147.00			14.00	5,081.65
Schedule 3 Allotments from Pit River and Rattlesnake Creek					
Estate of J M Clark	22.00		Kelley Ditch	0.44	159.71
Emma Godfrey	3.00		Kelley Ditch	0.06	21.78
Estate of J W Cummins	37.00		Kelley Ditch	0.74	268.60
S B and B L Kelley	43.00		Kelley Ditch	0.86	312.16
S B Kelley	4.00		Kelley Ditch	0.08	29.04
Dora B Kelley	82.00		Kelley Ditch	1.64	595.28
A H Layton	1.00		Kelley Ditch	0.02	7.26
T W Lush	15.00		Kelley Ditch	0.30	108.89
Spicer Corporation	35.00		Rattlesnake Canal	0.70	254.08
Pickering Lumber Company	39.00		Rattlesnake Canal	0.78	283.12
Spicer Corporation	364.00		Rattlesnake Creek and/or Rattlesnake Canal	7.28	2,642.46
Bank of Modoc County	4.00		Rattlesnake Creek and/or Rattlesnake Canal	0.08	29.04
P S Dorris	39.00		Butcher Dam	0.78	283.12
Bank of Modoc County	128.00		Butcher Dam	2.56	929.22
Emma Godfrey	71.00		Barnes Dam	1.42	515.42
Estate of J W Cummins	35.00		Barnes Dam, Cummins Dam, and/or Kelley Ditch	0.70	254.08

Rattlesnake Creek Decree (Pit River in Hot Springs Valley)
Modoc County Decree Recorded in Book 17, page 171

Seasons of Use		
Continuous, regardless of season	365.25	days
April 1 through September 30	183.00	days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotments Allotment (cfs)	 Allotment (AF)
A H Layton	32.00		Barnes Dam, Cummins Dam, and/or Kelley Ditch	0.64	232.30
Emma Godfrey	57.00		Barnes Dam, Cummins Dam, and/or Kelley Ditch	1.14	413.79
John Strawn	3.00		Barnes Dam, Cummins Dam, and/or Kelley Ditch	0.06	21.78
Hot Spring Valley Irrigation District	179.00		McBrien Dam	3.58	1,299.45
Estates of McBrien and McConnell	30.00		McBrien Dam	0.60	217.79
John Lybarger	16.00		McBrien Dam	0.32	116.15
James M Edwards	44.00		Lindauer Upper Dam	0.88	319.42
Estate of G C Lindauer	136.00		Lindauer Upper Dam	2.72	987.29
Hot Spring Valley Irrigation District	83.00		Lindauer Upper Dam	1.66	602.54
Estate of G C Lindauer	59.00		Lindauer Upper and/or Lower Dam	1.18	428.31
Hot Spring Valley Irrigation District	441.00		Lindauer Upper and/or Lower Dam	8.82	3,201.44
Estate of G C Lindauer	20.00		Lindauer Upper Dam, Lindauer Lower Dam, and/or McArthur Upper Dam	0.40	145.19
Frank McArthur	542.00		McArthur Upper and/or Lower Dam	10.84	3,934.65
John Kelley	12.00		McArthur Upper and/or Lower Dam	0.24	87.11
C S Baldwin	47.00		McArthur Upper and/or Lower Dam	0.94	341.20
Hot Spring Valley Irrigation District	65.00		McArthur Upper and/or Lower Dam	1.30	471.87
Frank McArthur	122.00		McArthur Upper Dam, McArthur Lower Dam, and/or Claussen Dam	2.44	885.66
Federal Land Bank of Berkeley	37.00		Claussen Dam	0.74	268.60
Bank of Modoc County	65.00		Claussen Dam, and/or Fellencer Dam	1.30	471.87
Katherine E Hazelton	94.00		Fellencer Dam	1.88	682.39
George Fellencer	259.00		Fellencer Dam	5.18	1,880.21
Bank of Modoc County	107.00		Fellencer Dam	2.14	776.77
Ira Hulbert	23.00		Fellencer Dam	0.46	166.97
California Joint Stock Land Bank	50.00		Fellencer Dam and/or Fitzhugh Dam	1.00	362.98
California Joint Stock Land Bank	228.00		Fitzhugh Dam	4.56	1,655.17
Bank of Modoc County	25.00		Fitzhugh Dam	0.50	181.49
California Joint Stock Land Bank	4.00		Marie Caldwell Upper Dam	0.08	29.04
Bank of Modoc County	73.00		Marie Caldwell Upper Dam	1.46	529.94
George Fellencer	54.00		Marie Caldwell Upper Dam	1.08	392.01
Estate of G L Kramer	89.00		Marie Caldwell Upper Dam	1.78	646.10
Estate of G L Kramer	100.00		Marie Caldwell Lower Dam	2.00	725.95
G B Wilcox	166.00		Warren Caldwell Dam	3.32	1,205.08
G B Wilcox	10.00		Hughes Dam	0.20	72.60
Annie Hughes	89.00		Hughes Dam	1.78	646.10
Federal Land Bank of Berkeley	28.00		Howe Dam	0.56	203.27
Federal Land Bank of Berkeley	25.00		Lizzie Pope Dam	0.50	181.49
Lizzie D Pope	64.00		Lizzie Pope Dam	1.28	464.61
Subtotal Schedule 3	4,400.00			88.00	31,941.82

Summary	Allotment (cfs)	Allotment (AF)
Schedule 2	14.00	5,081.65

Rattlesnake Creek Decree (Pit River in Hot Springs Valley)
Modoc County Decree Recorded in Book 17, page 171

Seasons of Use		
Continuous, regardless of season	365.25	days
April 1 through September 30	183.00	days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotments Allotment (cfs)	Allotments Allotment (AF)
Schedule 3	88.00	31,941.82			
Total	102.00	37,023.47			

Roaring Creek Decree
Shasta County, Decree No. 83723

Seasons of Use

Continuous, regardless of season	365.25	days
April 1 through November 1	215.00	days
November 1 through April 1	150.25	days

				Allotments									
Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Total cfs	Total AF
Schedule 3, Roaring Creek Claimants													
Reich, Walter H and Annabel	16.00	3								0.75	319.83	0.75	319.83
Vopat, Frank	10.00	3								0.47	200.43	0.47	200.43
Parham, Eugene and Linda et al	19.00	3								0.89	379.54	0.89	379.54
Epperson, Ronald T and Theresa M	4.00	3								0.19	81.02	0.19	81.02
Henry, Lynn and Christine	15.00	5		0.75	319.83							0.75	319.83
Carroll, Jerry T and Charlene C	25.00	5		1.26	537.32							1.26	537.32
Miller, Jack O and Helen	2.00	6								0.12	51.17	0.12	51.17
Leonard, Vernon I and Leona J	10.00	6								0.60	255.87	0.60	255.87
Caldwell, F B III and Easton, R B	5.00	6								0.30	127.93	0.30	127.93
Easton, Robert B and Constance C	3.00	6								0.18	76.76	0.18	76.76
Cantrell, Gloria	2.00	6								0.12	51.17	0.12	51.17
Bay Histology Service	2.00	2								0.12	51.17	0.12	51.17
Meckley, Chester and Mary J	Domestic	6								0.36	153.52	0.36	153.52
Terry, Eugene F and Marsha P	Domestic									0.01	7.24	0.01	7.24
Van Steene, Jack L and Doris A	Domestic									0.01	7.24	0.01	7.24
Nipper, Jack J and Grace M	Domestic									0.01	7.24	0.01	7.24
Reddick, Arthur C and Sally	Domestic									0.01	7.24	0.01	7.24
Sivain, Susan Marie Wimbler	Domestic									0.01	7.24	0.01	7.24
Garnett, Bernard E and Ruth M	Domestic									0.01	7.24	0.01	7.24
Close, James and Lucille	1.00	1								0.06	25.59	0.06	25.59
Wilson, Thomas E and Gayle A	Domestic									0.01	7.24	0.01	7.24
Richard, Charles L and Evelyn A	3.00	3								0.18	76.76	0.18	76.76
Roderick, James C and Delores J	5.00	5						0.15	63.97			0.15	63.97
Subtotal, Schedule 3, Roaring Creek Claimants	122.00			2.01	857.16	0.00	0.00	0.15	63.97	4.41	1,901.49	6.57	2,822.61
Schedule 4, Jake Creek Claimants													
Reich, Walter H and Annabel	16.00	4				0.75	319.83					0.75	319.83
Vopat, Frank	10.00	4				0.47	200.43					0.47	200.43
Parham, Eugene and Linda et al	19.00	4				0.89	379.54					0.89	379.54
Epperson, Ronald T and Theresa M	4.00	4				0.19	81.02					0.19	81.02
Subtotal, Schedule 4, Jake Creek Claimants	49.00			0.00	0.00	2.30	980.83	0.00	0.00	0.00	0.00	2.30	980.83
Schedule 5, Browns Creek Claimants													
Parham, Eugene and Linda et al	19.00					0.89	379.54					0.89	379.54
Epperson, Ronald T and Theresa M	4.00					0.19	81.02					0.19	81.02
Parham, Eugene and Linda et al	2.00							0.04	17.06			0.04	17.06
Henry, Lynn and Christine	15.00			0.75	319.83							0.75	319.83
Carroll, Jerry T and Charlene C	25.00									1.26	537.32	1.26	537.32
Subtotal, Schedule 5, Browns Creek Claimants	65.00			0.75	319.83	1.08	460.56	0.04	17.06	1.26	537.32	3.13	1,334.78
Schedule 6, Miscellaneous Claimants													
U S Forest Service				1500 gpd								0.00	0.00

Roaring Creek Decree
Shasta County, Decree No. 83723

Seasons of Use

Continuous, regardless of season	365.25	days
April 1 through November 1	215.00	days
November 1 through April 1	150.25	days

				Allotments									
Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Total cfs	Total AF
U S Forest Service				0.06	43.47							0.06	43.47
Roseberg Lumber Co				0.05	36.22							0.05	36.22
Subtotal, Schedule 6, Miscellaneous Claimants	0.00			0.11	79.69	0.00	0.00	0.00	0.00	0.00	0.00	0.11	79.69
Paragraph 19: Winter Season Domestic and Stockwater Entitlement													
Schedule 3, Roaring Creek Claimants													
Reich, Walter H and Annabel	16.00	3		0.01	2.98								
Vopat, Frank	10.00	3		0.01	2.98								
Parham, Eugene and Linda et al	19.00	3		0.01	2.98								
Epperson, Ronald T and Theresa M	4.00	3		0.01	2.98								
Henry, Lynn and Christine	15.00	5		0.01	2.98								
Carroll, Jerry T and Charlene C	25.00	5		0.01	2.98								
Miller, Jack O and Helen	2.00	6		0.01	2.98								
Leonard, Vernon I and Leona J	10.00	6		0.01	2.98								
Caldwell, F B III and Easton, R B	5.00	6		0.01	2.98								
Easton, Robert B and Constance C	3.00	6		0.01	2.98								
Cantrell, Gloria	2.00	6		0.01	2.98								
Bay Histology Service	2.00	2		0.01	2.98								
Meckley, Chester and Mary J	Domestic	6											
Terry, Eugene F and Marsha P	Domestic												
Van Steene, Jack L and Doris A	Domestic												
Nipper, Jack J and Grace M	Domestic												
Reddick, Arthur C and Sally	Domestic												
Sivain, Susan Marie Wimbler	Domestic												
Garnett, Bernard E and Ruth M	Domestic												
Close, James and Lucille	1.00	1		0.01	2.98								
Wilson, Thomas E and Gayle A	Domestic												
Richard, Charles L and Evelyn A	3.00	3		0.01	2.98								
Roderick, James C and Delores J	5.00	5		0.01	2.98								
Subtotal, Schedule 3, Roaring Creek Claimants	122.00			0.15	44.70								
Schedule 4, Jake Creek Claimants													
Reich, Walter H and Annabel	16.00	4		0.01	2.98								
Vopat, Frank	10.00	4		0.01	2.98								
Parham, Eugene and Linda et al	19.00	4		0.01	2.98								
Epperson, Ronald T and Theresa M	4.00	4		0.01	2.98								
Subtotal, Schedule 4, Jake Creek Claimants	49.00			0.04	11.92								
Schedule 5, Browns Creek Claimants													
Parham, Eugene and Linda et al	19.00			0.01	2.98								
Epperson, Ronald T and Theresa M	4.00			0.01	2.98								
Parham, Eugene and Linda et al	2.00			0.01	2.98								
Henry, Lynn and Christine	15.00			0.01	2.98								
Carroll, Jerry T and Charlene C	25.00			0.01	2.98								

Roaring Creek Decree
Shasta County, Decree No. 83723

Seasons of Use		
Continuous, regardless of season	365.25	days
April 1 through November 1	215.00	days
November 1 through April 1	150.25	days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotments First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Third Priority Class (cfs)	Third Priority Face Value (AF)	Fourth Priority Class (cfs)	Fourth Priority Face Value (AF)	Total cfs	Total AF
Subtotal, Schedule 5, Browns Creek Claimants	65.00			0.05	14.90								
Subtotal, Winter Season Domestic & Stockwater Allotments	236.00			0.24	71.52								

Summary	Total cfs	Total AF
Subtotal, Schedule 3, Roaring Creek Claimants	6.57	2,822.61
Subtotal, Schedule 4, Jake Creek Claimants	2.30	980.83
Subtotal, Schedule 5, Browns Creek Claimants	3.13	1,334.78
Subtotal, Schedule 6, Miscellaneous Claimants	0.11	79.69
Subtotal, Winter Season Domestic & Stockwater Allotments	0.24	71.52
Total, Roaring Creek Stream System Decree Claims	12.35	5,289.43

South Fork Pit River Decree
Modoc County Decree No. 3273

Seasons of Use

Continuous, regardless of season	365.25	days
April 1 to June 30	91.00	days
April 1 to October 15	198.00	days
July 1 to July 21	21.00	days
July 22 to August 11	21.00	days
August 12 to October 15	65.00	days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotments					
				First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Total cfs	Total AF
Schedule 2, Fitzhugh Creek and Its Tributaries Claimants									
John Blevins, Cecil Blevins, and Willetta L Blevins (Bowman)	67.50	124	North Fitzhugh Creek	0.60	235.64			0.60	235.64
Cornelia A Hershey, Davidella Hershey, Grace H Hershey, D N Hershey, and Florence F Hershey	104.50	125	North Fitzhugh Creek	1.00	392.73	0.60	235.64	1.60	628.36
Minnie Derevan	20.10	126, 127	North Fitzhugh Creek	0.50	362.23			0.50	362.23
Walter Cantrall, Elsie A Cantrall, A E Sweeney, and Frances E Sweeney	77.40	128 to 131	Middle and South Fitzhugh Creeks	0.50	362.23	0.70	274.91	1.20	637.14
Minnie Derevan	46.50	132 to 135	South Fitzhugh Creek			0.70	274.91	0.70	274.91
George M Clark and J E Clark	322.00	137 to 141	Fitzhugh Creek	0.60	434.68	4.40	1,728.00	5.00	2,162.68
Frank McArthur and Ethel M McArthur	316.50	142	Fitzhugh Creek	0.20	144.89	4.70	1,845.82	4.90	1,990.71
W E Armstrong	30.00	142	Fitzhugh Creek	0.20	144.89	0.30	117.82	0.50	262.71
Subtotal, Schedule 2, Fitzhugh Creek Claimants	984.50			3.60	2,077.29	11.40	4,477.09	15.00	6,554.38

South Fork Pit River Decree
Modoc County Decree No. 3273

Seasons of Use

Continuous, regardless of season	365.25	days
April 1 to June 30	91.00	days
April 1 to October 15	198.00	days
July 1 to July 21	21.00	days
July 22 to August 11	21.00	days
August 12 to October 15	65.00	days

				Allotments					
Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Total cfs	Total AF
Schedule 3, South Fork of Pit River and Its Tributaries Claimants									
John McGarva, Peter B McGarva, and Phyllis McGarva	121.80	40 to 46	North and South Forks of Parsnip Creek	0.85	615.79	0.90	162.45	1.75	778.24
J C Van Loan	572.20	47, 48, 49	West Valley Creek	3.65	2,644.29	4.50	812.23	8.15	3,456.52
Frank McArthur and Ethel M McArthur	293.30	1	Mill Creek	1.90	746.18			1.90	746.18
John Blevins, Cecil Blevins, and Willetta L Blevins			Mill Creek	0.44	318.76			0.44	318.76
A J Cantrall and Ida Cantrall	152.30	5, 6, 7, 9	Mill Creek	0.85	615.79	1.65	297.82	2.50	913.61
W S Brooks and Ada H Brooks	22.00	5, 6, 7, 9	Mill Creek					0.00	0.00
Walter Cantrall, Elsie A Cantrall	176.50	2, 3, 4, 7, 8, 9	Mill Creek	0.85	615.79	1.85	333.92	2.70	949.71
W S Brooks and Ada H Brooks	10.50	2, 3, 4, 7, 8, 9	Mill Creek					0.00	0.00
W S Brooks and Ada H Brooks	114.20	10 to 13	Mill Creek	0.85	615.79	1.15	207.57	2.00	823.36
Bessie Whitman and Della Johnson	24.20	21, 22	Soup Creek					0.00	0.00
Arthur Flournoy	91.90	4	Mill Creek	0.85	615.79	1.15	207.57	2.00	823.36
Bessie Whitman and Della Johnson	48.80	4	Mill Creek					0.00	0.00
Felice Leoni	148.00	2, 3, 4	Mill Creek	0.85	615.79	1.25	225.62	2.10	841.41
Bessie Whitman and Della Johnson	10.20	14	Mill Creek			0.15	27.07	0.15	27.07
Arthur Flournoy	178.10	23, 24	Mill Creek			2.80	505.39	2.80	505.39
Bessie Whitman and Della Johnson	19.30	23, 24	Mill Creek					0.00	0.00
George Campbell	52.40	27 to 32	East Creek	0.85	615.79	0.25	45.12	1.10	660.92
Arthur Flournoy	23.70	27 to 32	East Creek					0.00	0.00
Arthur Flournoy	1,736.50	27, 30, 33 to 39	East Creek	5.00	3,622.31	19.80	3,573.82	24.80	7,196.13
Verdi Lumber Company	73.00	50	South Fork of Pit River	0.25	181.12	1.53	276.16	1.78	457.27
Royal E Williams, Marion G Williams and Ann Eliza Duke	150.00	50	South Fork of Pit River			0.70	126.35	0.70	126.35
Arthur Flournoy	56.70	50	South Fork of Pit River	0.40	289.79			0.40	289.79
Arthur Flournoy	80.00	50	South Fork of Pit River	0.33	239.07	1.27	229.23	1.60	468.30
A T Coffman and Eppa W Coffman	171.70	50	South Fork of Pit River	0.18	130.40	1.90	342.94	2.08	473.35
A L Stinson, and Mary E Stinson	7.00	50	South Fork of Pit River	0.08	57.96			0.08	57.96
Douglas McGarva and Margaret McGarva	33.00	50	South Fork of Pit River	0.50	362.23			0.50	362.23
Town of Likely		50	South Fork of Pit River	0.06	43.47			0.06	43.47
Verdi Lumber Company	97.00	51	South Fork of Pit River	0.40	289.79	0.80	144.40	1.20	434.18
Homer Blevins	93.00	51	South Fork of Pit River	0.40	289.79	0.80	144.40	1.20	434.18
John Blevins, Cecil Blevins, and Willetta L Blevins	101.20	51	South Fork of Pit River	0.40	289.79	0.80	144.40	1.20	434.18

South Fork Pit River Decree
Modoc County Decree No. 3273

Seasons of Use

Continuous, regardless of season	365.25	days
April 1 to June 30	91.00	days
April 1 to October 15	198.00	days
July 1 to July 21	21.00	days
July 22 to August 11	21.00	days
August 12 to October 15	65.00	days

				Allotments					
Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Total cfs	Total AF
Dolph E Van Loan and Eva Van Loan	1.00	51	South Fork of Pit River					0.00	0.00
W H Flournoy and Gladys W Flournoy	160.50	52	South Fork of Pit River	0.17	123.16	1.28	231.03	1.45	354.19
Gary Williams and Theresa Williams	286.30		South Fork of Pit River	0.51	369.48	3.84	693.10	4.35	1,062.58
J A Hughes and Willie W Hughes	426.60		South Fork of Pit River	0.68	492.63	5.12	924.14	5.80	1,416.77
Frank McArthur and Ethel M McArthur	515.50		South Fork of Pit River	0.68	492.63	5.12	924.14	5.80	1,416.77
Dolph E Van Loan and Eva Van Loan	111.00	53	South Fork of Pit River	0.25	181.12	1.35	243.67	1.60	424.79
Dolph E Van Loan and Eva Van Loan	345.00		South Fork of Pit River	0.75	543.35	4.05	731.01	4.80	1,274.36
W H Flournoy and Gladys W Flournoy	294.10		South Fork of Pit River	0.50	362.23	2.70	487.34	3.20	849.57
Arthur Flournoy	10.00		South Fork of Pit River					0.00	0.00
Arthur Flournoy	400.00	54	South Fork of Pit River	1.50	1,086.69	3.50	631.74	5.00	1,718.43
F E Humphrey, V F Christensen and Charlotte E Christensen	400.00		South Fork of Pit River			5.00	902.48	5.00	902.48
Gary Williams and Theresa Williams	170.10	55	South Fork of Pit River			2.15	388.07	2.15	388.07
Frank McArthur and Ethel M McArthur	3,414.80	56, 58, 59, 61 to 77, 87 to 91	East Side Canal	1.25	905.58	43.55	7,860.60	44.80	8,766.17
Frank McArthur and Ethel M McArthur	230.60	92 to 96, 98	East Side Canal			3.00	541.49	3.00	541.49
S J Vaughon	17.30	92 to 96, 98	East Side Canal			0.25	45.12	0.25	45.12
Dolph E Van Loan and Eva Van Loan	480.00	57	East Side Canal	0.25	181.12	6.05	1,092.00	6.30	1,273.12
Mrs Katie H Nelson	526.30	60	East Side Canal	0.25	181.12	6.65	1,200.30	6.90	1,381.41
W E Armstrong	206.00	78 to 86	East Side Canal	0.25	181.12	2.45	442.21	2.70	623.33
W E Armstrong	144.60	97	East Side Canal			1.90	342.94	1.90	342.94
F E Humphrey, V F Christensen and Charlotte E Christensen	122.30	99	West Side Canal	0.10	72.45	1.45	261.72	1.55	334.17
Dolph E Van Loan and Eva Van Loan	140.00	99	West Side Canal	0.10	72.45	1.65	297.82	1.75	370.26
Frank McArthur and Ethel M McArthur	161.80	99	West Side Canal	0.10	72.45	1.95	351.97	2.05	424.41
F E Humphrey, V F Christensen and Charlotte E Christensen	1,251.10	100 to 104	West Side Canal	0.90	652.02	14.95	2,698.41	15.85	3,350.43
John McGarva, Peter B McGarva, and Phyllis McGarva	219.50	105	West Side Canal	0.15	108.67	2.65	478.31	2.80	586.98
R J Gaustad and Nellie Gaustad	175.00	106, 107	West Side Canal	0.15	108.67	2.05	370.02	2.20	478.69
R O Gaustad	77.00	106, 107	West Side Canal	0.05	36.22	0.95	171.47	1.00	207.69
R O Gaustad	75.00	108	West Side Canal	0.05	36.22	0.90	162.45	0.95	198.67
Raymond Stepp Bertha L Stepp, Lena Graham and Herbie Graham	90.00	108	West Side Canal	0.10	72.45	1.05	189.52	1.15	261.97
Frank McArthur and Ethel M McArthur	1,161.20	109 to 123	West Side Canal	0.80	579.57	13.90	2,508.89	14.70	3,088.46
Subtotal, Schedule 3, South Fork Pit River and Tributaries Claimants	16,271.10			29.48	20,074.85	182.71	30,279.99	196.34	50,354.84

Schedule 3, Surplus Rotational Allotments for Second Priority Class Claimants, July 1 through July 21

South Fork Pit River Decree
Modoc County Decree No. 3273

Seasons of Use

Continuous, regardless of season	365.25	days
April 1 to June 30	91.00	days
April 1 to October 15	198.00	days
July 1 to July 21	21.00	days
July 22 to August 11	21.00	days
August 12 to October 15	65.00	days

				Allotments					
Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Total cfs	Total AF
John McGarva, Peter B McGarva, and Phyllis McGarva	121.80	40 to 46	North and South Forks of Parsnip Creek			0.90	37.49		
J C Van Loan	572.20	47, 48, 49	West Valley Creek			4.50	187.44		
Frank McArthur and Ethel M McArthur	293.30	1	Mill Creek						
John Blevins, Cecil Blevins, and Willetta L Blevins			Mill Creek						
A J Cantrall and Ida Cantrall	152.30	5, 6, 7, 9	Mill Creek			1.65	68.73		
W S Brooks and Ada H Brooks	22.00	5, 6, 7, 9	Mill Creek						
Walter Cantrall, Elsie A Cantrall	176.50	2, 3, 4, 7, 8, 9	Mill Creek			1.85	77.06		
W S Brooks and Ada H Brooks	10.50	2, 3, 4, 7, 8, 9	Mill Creek						
W S Brooks and Ada H Brooks	114.20	10 to 13	Mill Creek			1.15	47.90		
Bessie Whitman and Della Johnson	24.20	21, 22	Soup Creek						
Arthur Flournoy	91.90	4	Mill Creek			1.15	47.90		
Bessie Whitman and Della Johnson	48.80	4	Mill Creek						
Felice Leoni	148.00	2, 3, 4	Mill Creek			1.25	52.07		
Bessie Whitman and Della Johnson	10.20	14	Mill Creek			0.15	6.25		
Arthur Flournoy	178.10	23, 24	Mill Creek			2.80	116.63		
Bessie Whitman and Della Johnson	19.30	23, 24	Mill Creek						
George Campbell	52.40	27 to 32	East Creek			0.25	10.41		
Arthur Flournoy	23.70	27 to 32	East Creek						
Arthur Flournoy	1,736.50	27, 30, 33 to 39	East Creek			19.80	824.73		
Subtotal, July 1 to 21 Surplus Rotation Claimants	3,795.90					35.45	1,476.60		
Schedule 3, Surplus Rotational Allotments for Second Priority Class Claimants, July 22 through August 11									
Verdi Lumber Company	73.00	50	South Fork of Pit River			1.53	63.73		
Royal E Williams, Marion G Williams and Ann Eliza Duke	150.00	50	South Fork of Pit River			0.70	29.16		
Arthur Flournoy	56.70	50	South Fork of Pit River						
Arthur Flournoy	80.00	50	South Fork of Pit River			1.27	52.90		
A T Coffman and Eppa W Coffman	171.70	50	South Fork of Pit River			1.90	79.14		
A L Stinson, and Mary E Stinson	7.00	50	South Fork of Pit River						
Douglas McGarva and Margaret McGarva	33.00	50	South Fork of Pit River						
Town of Likely		50	South Fork of Pit River						
Verdi Lumber Company	97.00	51	South Fork of Pit River			0.80	33.32		
Homer Blevins	93.00	51	South Fork of Pit River			0.80	33.32		

South Fork Pit River Decree
Modoc County Decree No. 3273

Seasons of Use

Continuous, regardless of season	365.25	days
April 1 to June 30	91.00	days
April 1 to October 15	198.00	days
July 1 to July 21	21.00	days
July 22 to August 11	21.00	days
August 12 to October 15	65.00	days

				Allotments					
Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Total cfs	Total AF
John Blevins, Cecil Blevins, and Willetta L Blevins	101.20	51	South Fork of Pit River			0.80	33.32		
Dolph E Van Loan and Eva Van Loan	1.00	51	South Fork of Pit River						
W H Flournoy and Gladys W Flournoy	160.50	52	South Fork of Pit River			1.28	53.32		
Gary Williams and Theresa Williams	286.30		South Fork of Pit River			3.84	159.95		
J A Hughes and Willie W Hughes	426.60		South Fork of Pit River			5.12	213.26		
Frank McArthur and Ethel M McArthur	515.50		South Fork of Pit River			5.12	213.26		
Dolph E Van Loan and Eva Van Loan	111.00	53	South Fork of Pit River			1.35	56.23		
Dolph E Van Loan and Eva Van Loan	345.00		South Fork of Pit River			4.05	168.69		
W H Flournoy and Gladys W Flournoy	294.10		South Fork of Pit River			2.70	112.46		
Arthur Flournoy	10.00		South Fork of Pit River						
Arthur Flournoy	400.00	54	South Fork of Pit River			3.50	145.79		
F E Humphrey, V F Christensen and Charlotte E Christensen	400.00		South Fork of Pit River			5.00	208.26		
Gary Williams and Theresa Williams	170.10	55	South Fork of Pit River			2.15	89.55		
Frank McArthur and Ethel M McArthur	3,414.80	56, 58, 59, 61 to 77, 87 to 91	East Side Canal			43.55	1,813.98		
Frank McArthur and Ethel M McArthur	230.60	92 to 96, 98	East Side Canal			3.00	124.96		
S J Vaughon	17.30	92 to 96, 98	East Side Canal			0.25	10.41		
Dolph E Van Loan and Eva Van Loan	480.00	57	East Side Canal			6.05	252.00		
Mrs Katie H Nelson	526.30	60	East Side Canal			6.65	276.99		
W E Armstrong	206.00	78 to 86	East Side Canal			2.45	102.05		
W E Armstrong	144.60	97	East Side Canal			1.90	79.14		
F E Humphrey, V F Christensen and Charlotte E Christensen	122.30	99	West Side Canal			1.45	60.40		
Dolph E Van Loan and Eva Van Loan	140.00	99	West Side Canal			1.65	68.73		
Frank McArthur and Ethel M McArthur	161.80	99	West Side Canal			1.95	81.22		
F E Humphrey, V F Christensen and Charlotte E Christensen	1,251.10	100 to 104	West Side Canal			14.95	622.71		
John McGarva, Peter B McGarva, and Phyllis McGarva	219.50	105	West Side Canal			2.65	110.38		
R J Gaustad and Nellie Gaustad	175.00	106, 107	West Side Canal			2.05	85.39		
R O Gaustad	77.00	106, 107	West Side Canal			0.95	39.57		
R O Gaustad	75.00	108	West Side Canal			0.90	37.49		

South Fork Pit River Decree
Modoc County Decree No. 3273

Seasons of Use		
Continuous, regardless of season	365.25	days
April 1 to June 30	91.00	days
April 1 to October 15	198.00	days
July 1 to July 21	21.00	days
July 22 to August 11	21.00	days
August 12 to October 15	65.00	days

				Allotments					
Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Total cfs	Total AF
Raymond Stepp Bertha L Stepp, Lena Graham and Herbie Graham	90.00	108	West Side Canal			1.05	43.74		
Frank McArthur and Ethel M McArthur	1,161.20	109 to 123	West Side Canal			13.90	578.98		
Subtotal, July 22 to August 11 Rotations Claimants	12,475.20					147.26	6,133.80		

Surplus Class Claimants, South Fork Pit River and Tributaries - Rotation Schedule from Paragraph 38 from August 12 to October 15	Cubic Feet per Second	Acre-Feet
Mill Creek Ditches	3.00	386.78
East Creek Ditches	3.20	412.56
Parsnip Creek Ditches	0.50	64.46
West Valley Creek Ditches	1.35	174.05
Masters Ditch	2.00	257.85
Jackson Ditch	1.00	128.93
Corporation Ditch	4.00	515.70
Van Loan Ditch	2.00	257.85
Flournoy Ditch	2.00	257.85
Williams Ditch	0.70	90.25
East and West Side Canals	8.00	1,031.40
Subtotal, August 12 to October 15 Rotations Claimants	27.75	3,577.69

South Fork Pit River Decree
Modoc County Decree No. 3273

Seasons of Use		
Continuous, regardless of season	365.25	days
April 1 to June 30	91.00	days
April 1 to October 15	198.00	days
July 1 to July 21	21.00	days
July 22 to August 11	21.00	days
August 12 to October 15	65.00	days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Name of Diversion System	Allotments First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Total cfs	Total AF
Summary	Cubic Feet per Second	Acre-Feet							
Subtotal, Schedule 2, Fitzhugh Creek Claimants	15.00	6,554.38							
Subtotal, Schedule 3, South Fork Pit River and Tributaries Claimants	196.34	50,354.84							
Subtotal, Basic South Fork Claimants Before Surplus Rotations	211.34	56,909.22							
Subtotal, July 1 to 21 Surplus Rotation Claimants	35.45	1,476.60							
Subtotal, July 22 to August 11 Rotations Claimants	147.26	6,133.80							
Subtotal, August 12 to October 15 Rotations Claimants	27.75	3,577.69							
Grand Total, All Claimants, Basic Plus Surplus Rotations	421.80	68,097.30							

Willow Creek Decree
Shasta County, Decree No. 87524

Seasons of Use

Continuous, regardless of season	365.25	days
April 1 through November 1	215.00	days
		days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Use	Allotments					
				First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Total cfs	Total AF
Schedule 3, Willow Creek Claimants									
Buffington, John L Jr		1	Domestic	Entire Flow of Spring					
Buffington, John L Jr	8.00	2	Domestic, Irrigation	Entire Flow of Spring					
Buffington, John L Jr		3	Domestic	Entire Flow of Spring					
Bull, Charles E	10.00	21	Domestic, Irrigation, Fire	Entire Flow of Spring					
Stanbro, Phillip W and Sharon A		5	Domestic, Stockwater	0.01	7.24			0.01	7.24
Stanbro, Phillip W and Sharon A	8.00	5	Irrigation			0.13	55.44	0.13	55.44
Colbert, Louis E and Wilma C	15.00	6	Irrigation			0.15	63.97	0.15	63.97
Gates, Robert L and Marjorie S		7, 8	Domestic	0.01	7.24			0.01	7.24
Gates, Robert L and Marjorie S	6.00	9	Irrigation, Recreation			0.06	25.59	0.06	25.59
Gabriele, Julius and Linda		11	Domestic, Irrigation	0.01	7.24			0.01	7.24
Gabriele, Julius and Linda	30.00	11				0.30	127.93	0.30	127.93
Pacific Gas & Electric Co		22	Stockwater	350 gpd	0.39				0.39
Bertagna, Joseph and Marian L		12	Domestic	0.01	7.24			0.01	7.24
Bertagna, Joseph and Marian L	10.00		Irrigation, Stockwater			0.10	42.64	0.10	42.64
Harber, Virgil and Pauline		15	Domestic	0.01	7.24			0.01	7.24
	1.00		Irrigation			0.01	4.26	0.01	4.26
Subtotal, Schedule 3 Willow Creek Claimants	88.00			0.05	36.62	0.75	319.83	0.80	356.45
Schedule 4, Minnow and Dunn Creeks Claimants									
Bertagna, Joseph and Marian L	10.00	13	Irrigation			0.10	42.64	0.10	42.64
Bertagna, Joseph and Marian L		14	Domestic	0.01	7.24			0.01	7.24
Bertagna, Joseph and Marian L	10.00	14	Irrigation			0.10	42.64	0.10	42.64
Bertagna, Paul J and Mary E	4.00	13	Irrigation			0.04	17.06	0.04	17.06
Webb, Joyce J		16	Domestic	0.01	7.24			0.01	7.24
Webb, Joyce J	2.00	16	Irrigation			0.02	8.53	0.02	8.53
Subtotal, Schedule 4 Minnow and Dunn Creeks Claimants	26.00			0.02	14.49	0.26	110.88	0.28	125.37
Schedule 5, Post-1914 Appropriative Water Rights									
Puhlman, Albert E and Carol J		4	Stockwater		2.30				

Willow Creek Decree
Shasta County, Decree No. 87524

Seasons of Use

Continuous, regardless of season	365.25	days
April 1 through November 1	215.00	days
		days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Use	Allotments First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Total cfs	Total AF
Gates, Robert L and Marjorie S	2.00		Irrigation, Domestic, Stockwater		10.00				
Lincoln, Richard G and Michele L	10.00		Irrigation, Domestic, Stockwater		20.00				
Gabriele, Julius and Linda	30.00		Irrigation, Domestic, Stockwater		14.40				
Wheeler, Ernest L			Stockwater		10.00				
Shaw, Veldon et al			Stockwater		10.00				
Klein, Frederick & Phyllis	3.00		Irrigation, Domestic		3.00				
Truman, John C and Helen G			Recreation, Fire		0.50				
Subtotal, Post-1914 Appropriative Water Rights	45.00			0.00	70.20				

Summary	Total cfs	Total AF
Subtotal, Schedule 3 Willow Creek Claimants	0.80	356.45
Subtotal, Schedule 4 Minnow and Dunn Creeks Claimants	0.28	125.37
Subtotal, Post-1914 Appropriative Water Rights		70.20
Total, Willow Creek Decree Claimants	1.08	552.02

Willow Creek Decree
Shasta County, Decree No. 87524

Seasons of Use		
Continuous, regardless of season	365.25	days
April 1 through November 1	215.00	days
		days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Use	Allotments					
				First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Total cfs	Total AF
Schedule 3, Willow Creek Claimants									
Buffington, John L Jr		1	Domestic	Entire Flow of Spring					
Buffington, John L Jr	8.00	2	Domestic, Irrigation	Entire Flow of Spring					
Buffington, John L Jr		3	Domestic	Entire Flow of Spring					
Bull, Charles E	10.00	21	Domestic, Irrigation, Fire	Entire Flow of Spring					
Stanbro, Phillip W and Sharon A		5	Domestic, Stockwater	0.01	7.24			0.01	7.24
Stanbro, Phillip W and Sharon A	8.00	5	Irrigation			0.13	55.44	0.13	55.44
Colbert, Louis E and Wilma C	15.00	6	Irrigation			0.15	63.97	0.15	63.97
Gates, Robert L and Marjorie S		7, 8	Domestic	0.01	7.24			0.01	7.24
Gates, Robert L and Marjorie S	6.00	9	Irrigation, Recreation			0.06	25.59	0.06	25.59
Gabriele, Julius and Linda		11	Domestic, Irrigation	0.01	7.24			0.01	7.24
Gabriele, Julius and Linda	30.00	11				0.30	127.93	0.30	127.93
Pacific Gas & Electric Co		22	Stockwater	350 gpd	0.39				0.39
Bertagna, Joseph and Marian L		12	Domestic	0.01	7.24			0.01	7.24
Bertagna, Joseph and Marian L	10.00		Irrigation, Stockwater			0.10	42.64	0.10	42.64
Harber, Virgil and Pauline		15	Domestic	0.01	7.24			0.01	7.24
	1.00		Irrigation			0.01	4.26	0.01	4.26
Subtotal, Schedule 3 Willow Creek Claimants	88.00			0.05	36.62	0.75	319.83	0.80	356.45
Schedule 4, Minnow and Dunn Creeks Claimants									
Bertagna, Joseph and Marian L	10.00	13	Irrigation			0.10	42.64	0.10	42.64
Bertagna, Joseph and Marian L		14	Domestic	0.01	7.24			0.01	7.24
Bertagna, Joseph and Marian L	10.00	14	Irrigation			0.10	42.64	0.10	42.64
Bertagna, Paul J and Mary E	4.00	13	Irrigation			0.04	17.06	0.04	17.06
Webb, Joyce J		16	Domestic	0.01	7.24			0.01	7.24
Webb, Joyce J	2.00	16	Irrigation			0.02	8.53	0.02	8.53
Subtotal, Schedule 4 Minnow and Dunn Creeks Claimants	26.00			0.02	14.49	0.26	110.88	0.28	125.37
Schedule 5, Post-1914 Appropriative Water Rights									
Puhlman, Albert E and Carol J		4	Stockwater		2.30				
Gates, Robert L and Marjorie S	2.00		Irrigation, Domestic, Stockwater		10.00				
Lincoln, Richard G and Michele L	10.00		Irrigation, Domestic, Stockwater		20.00				
Gabriele, Julius and Linda	30.00		Irrigation, Domestic, Stockwater		14.40				
Wheeler, Ernest L			Stockwater		10.00				
Shaw, Veldon et al			Stockwater		10.00				
Klein, Frederick & Phyllis	3.00		Irrigation, Domestic		3.00				
Truman, John C and Helen G			Recreation, Fire		0.50				
Subtotal, Post-1914 Appropriative Water Rights	45.00			0.00	70.20				

Willow Creek Decree
Shasta County, Decree No. 87524

Seasons of Use		
Continuous, regardless of season	365.25	days
April 1 through November 1	215.00	days
		days

Name of Claimant	Acreage to be supplied	Diversion No. as per DWR Map	Use	Allotments First Priority Class (cfs)	First Priority Face Value (AF)	Second Priority Class (cfs)	Second Priority Face Value (AF)	Total cfs	Total AF
Summary	Total cfs	Total AF							
Subtotal, Schedule 3 Willow Creek Claimants	0.80	356.45							
Subtotal, Schedule 4 Minnow and Dunn Creeks Claimants	0.28	125.37							
Subtotal, Post-1914 Appropriative Water Rights		70.20							
Total, Willow Creek Decree Claimants	1.08	552.02							

Deer Creek Decree
Tehama County Suit No. 2449
Stanford Vina Ranch, plaintiff

	Cubic Feet Per Second	Acre-feet	Source
Total Diversions in Decree	150	108,669	Deer Creek, thence Sacramento River

These rights were subsequently deeded over to Deer Creek Irrigation District in the late 1920s.

Source: Deer Creek Irrigation District

Appendix D

Section D.4
Consumptive Statements of Diversion and Use

Application ID	Holder Name	Highest Amount Claimed	Water Right Type Claimed	Year of First Use	Season	Purpose of Use	County	Source
S012967	Dept of Fish and Game	109,500.00	Riparian	1963	All	Fish Culture	Trinity	TRINITY RIVER
	Dept of Fish and Game Total	109,500.00						
S013092	EDGAR MURRISON	724.46	Pre-14	1900	All	Irrigation, Stockwater	Trinity	BIG CREEK
S013093	EDGAR MURRISON	1,224.00	Pre-14	1900	All	Irrigation, Stockwater	Trinity	BIG CREEK
S013094	EDGAR MURRISON	2,408.00	Pre-14	1900	All	Irrigation, Stockwater, Hydropower	Trinity	BIG CREEK
	EDGAR MURRISON Total	4,356.46						
S002528	KEITH L GROVES	2,400.00	Pre-14	1866	All	Irrigation, Stockwater, Domestic	Trinity	HALLS GULCH
	KEITH L GROVES Total	2,400.00						
S010724	ROGER P ECKART	2,062.00	Riparian	1875	All	Irrigation, Stockwater, Domestic, Hydropower	Trinity	DYER CREEK
S010725	ROGER P ECKART	12,000.00	Riparian/Pre-14	1875	All	Irrigation, Stockwater, Domestic, Hydropower	Trinity	BELL CREEK
S010726	ROGER P ECKART	265.00	Riparian	1875	All	Irrigation, Stockwater, Domestic, Hydropower	Trinity	UNST AKA GOODWIN CREEK
S012609	ROGER P ECKART	270.00	Riparian	1875	All	Irrigation, Stockwater, Domestic, Hydropower	Trinity	ROBARDS CREEK
S013923	ROGER P ECKART	1,700.00	Pre-14	1875	All	Irrigation, Stockwater, Domestic, Hydropower	Trinity	DIXIE CREEK
	ROGER P ECKART Total	16,297.00						
S000327	WEAVERVILLE COMMUNITY SERVICES DISTRICT	777.29	Pre-14	1891	All	Irrigation, Stockwater, Domestic	Trinity	WEST WEAVER CREEK
S000361	WEAVERVILLE COMMUNITY SERVICES DISTRICT	753.72	Pre-14	1852	All	Domestic	Trinity	EAST WEAVER CREEK
	WEAVERVILLE COMMUNITY SERVICES DISTRICT Total	1,531.01						
	Grand Total	134,084.47						

Pit River Watershed - Consumptive Statements of Diversion and Use

Application ID	Holder Name	Highest Claimed Amt	Claim Type	Year of First Use	Season	Purpose of Use	County	Source
S001453	ALBERT E PUHLMAN JR	466.00	Pre-14	1884	All	Irrigation, Stockwatering, Domestic	Shasta	NORTH FORK MONTGOMERY CREEK
S001454	ALBERT E PUHLMAN JR	466.00	Pre-14	1884	All	Irrigation, Stockwatering, Domestic	Shasta	SOUTH FORK MONTGOMERY CREEK
S001455	ALBERT E PUHLMAN JR	466.00	Pre-14	1884	All	Irrigation, Stockwatering, Domestic	Shasta	SAWDUST CREEK
	ALBERT E PUHLMAN JR Total	1,398.00						
S002265	CLIFFORD K OILAR	490.00	Riparian/Pre-14	1873	All	Irrigation, Stockwatering	Modoc	OILAR SPRINGS
S002266	CLIFFORD K OILAR	493.00	Riparian/Pre-14	1873	All	Irrigation, Stockwatering, Domestic	Modoc	UNST
S010786	CLIFFORD K OILAR	470.00	Riparian/Pre-14	1873	All	Irrigation, Stockwatering, Domestic	Modoc	UNSP
S010814	CLIFFORD K OILAR	490.00	Riparian/Pre-14	1873	All	Irrigation, Stockwatering	Modoc	OILAR SPRINGS
S010815	CLIFFORD K OILAR	100.00	Riparian/Pre-14	1957	May-Dec	Irrigation, Stockwatering	Modoc	UNST
S010816	CLIFFORD K OILAR	200.00	Riparian/Pre-14	1940	May-Oct	Irrigation, Stockwatering, Domestic	Modoc	WHIPPLE SPRINGS
	CLIFFORD K OILAR Total	2,243.00						
S008735	CRAIG MCARTHUR	19,528.00	Riparian/Pre-14	1875	All	Irrigation, Stockwatering, Domestic	Shasta	TULE RIVER
S008912	CRAIG MCARTHUR	1,130.00	Riparian/Pre-14	1875	All	Irrigation, Stockwatering, Domestic	Shasta	PEACOCK CREEK
S015104	CRAIG MCARTHUR	7,242.00	Pre-14	1911	All	Irrigation, Stockwatering, Domestic	Shasta	LEE DRAIN CANAL
	CRAIG MCARTHUR Total	27,900.00						
S014558	Dennis Hoffman	1,135.49	Riparian	1995	Mar-Oct	Irrigation	Lassen	PIT RIVER
S014731	Dennis Hoffman	1,150.83	Riparian	2003	Apr-Sept	Irrigation	Shasta	PIT RIVER
	Dennis Hoffman Total	2,286.32						
S004691	Dept of Fish and Game	1,464.00	Pre-14	1904	All	Fish Culture, Domestic	Modoc	PINE CREEK
S012964	Dept of Fish and Game	36,135.00	Riparian	1965	All	Recreation, Fishing	Shasta	ROCK CREEK SPRINGS
	Dept of Fish and Game Total	37,599.00						
S009112	DIXIE VALLEY RANCH	4,000.00	Riparian	1873	All	Irrigation, Stockwatering	Lassen	DAVIS CREEK
S009113	DIXIE VALLEY RANCH	5,000.00	Riparian/Pre-14	1873	All	Irrigation, Stockwatering	Lassen	INDIAN CREEK
S009114	DIXIE VALLEY RANCH	4,000.00	Riparian	1977	All	Irrigation, Stockwatering	Lassen	UNST
S009115	DIXIE VALLEY RANCH	2,000.00	Riparian/Pre-14	1873	All	Irrigation, Stockwatering	Lassen	LITTLE DAVIS CREEK
S009116	DIXIE VALLEY RANCH	2,000.00	Riparian/Pre-14	1873	All	Irrigation, Stockwatering	Lassen	RUSSEL DAIRY SPRING
S009133	DIXIE VALLEY RANCH	5,000.00	Riparian/Pre-14	1873	All	Irrigation, Stockwatering	Lassen	BIG JACK LAKE
S009138	DIXIE VALLEY RANCH	2,173.39	Riparian/Pre-14	1873	All	Irrigation, Stockwatering	Lassen	BIG SPRING
	DIXIE VALLEY RANCH Total	24,173.39						
S008053	ED DEVAUL	1,620.00	Riparian	1949	All	Irrigation, Stockwatering, Domestic	Shasta	UNST
	ED DEVAUL Total	1,620.00						
S013170	EDWARD A BOSWORTH JR	0.00	Pre-14	1885	All	Irrigation, Stockwatering	Shasta	CAYTON CREEK
S013171	EDWARD A BOSWORTH JR	2,421.17	Pre-14	1885	All	Irrigation, Stockwatering, Domestic	Shasta	NORTH FORK CLARK CREEK
S013172	EDWARD A BOSWORTH JR	4,824.34	Pre-14	1885	All	Irrigation, Stockwatering, Domestic	Shasta	CLARK CREEK
	EDWARD A BOSWORTH JR Total	7,245.51						
S000798	ELLEN E TAYLOR	1,451.90	Pre-14	1913	Apr-Nov	Irrigation, Stockwatering	Shasta	LOST CREEK
	ELLEN E TAYLOR Total	1,451.90						

Application ID	Holder Name	Highest Claimed Amt	Claim Type	Year of First Use	Season	Purpose of Use	County	Source
S014380	Glenn A Nader	2,279.00	Riparian	1876	Apr-Sept	Irrigation, Stockwatering	Modoc	WITCHER CREEK
S014381	Glenn A Nader	1,505.00	Pre-14	1873	Jun-Oct	Irrigation, Stockwatering	Modoc	WITCHER CREEK
S014382	Glenn A Nader	2,334.00	Riparian/Pre-14	1876	Mar-Oct	Irrigation, Stockwatering	Modoc	WITCHER CREEK
S014383	Glenn A Nader	420.00	Riparian	1876	Apr-Oct	Irrigation, Stockwatering	Modoc	WITCHER CREEK
S014384	Glenn A Nader	1,021.00	Pre-14	1876	Nov-Mar	Irrigation, Stockwatering	Modoc	WITCHER CREEK
	Glenn A Nader Total	7,559.00						
S013765	JOSEPH SCOTT VERMILYEA	8,789.00	Riparian	1983	All	Irrigation, Domestic	Shasta	BAKER CREEK
S013766	JOSEPH SCOTT VERMILYEA	2,076.00	Pre-14	1914	Mar-Nov	Irrigation, Stockwatering, Domestic	Shasta	STUMP CREEK
S013767	JOSEPH SCOTT VERMILYEA	720.00	Pre-14	1914	All	Irrigation, Stockwatering, Domestic	Shasta	LITTLE SHOTGUN CREEK
	JOSEPH SCOTT VERMILYEA Total	11,585.00						
S001050	KNOCH INC	19,560.00	Riparian/Pre-14	1909	All	Irrigation, Stockwatering	Shasta	FALL RIVER
	KNOCH INC Total	19,560.00						
S008540	LOWELL L NOVY	0.00	Riparian/Pre-14	1890	All	Irrigation, Stockwatering	Lassen	TULE LAKE RESERVOIR AKA MOON LAKE
S012914	LOWELL L NOVY	2,920.00	Riparian/Pre-14	1900	All	Irrigation, Stockwatering	Lassen	CEDAR CREEK
	LOWELL L NOVY Total	2,920.00						
S008627	MILANO LAND AND CATTLE CO LLC	2,500.00	Pre-14	1902	May-Oct	Irrigation, Stockwatering	Modoc	DUNCAN RESERVOIR
	MILANO LAND AND CATTLE CO LLC Total	2,500.00						
S014308	Outfitter Properties LLC-Oasis Springs	850.00	Riparian	1890	Apr-Sept	Irrigation, Stockwatering	Tehama	UNSP
S014309	Outfitter Properties LLC-Oasis Springs	195.00	Riparian	1900	Apr-Oct	Irrigation	Shasta	SPRING CREEK
S014310	Outfitter Properties LLC-Oasis Springs	500.00	Riparian	1900	Apr-Oct	Irrigation	Shasta	SPRING CREEK
S014311	Outfitter Properties LLC-Oasis Springs	1,700.00	Riparian	1875	Apr-Oct	Irrigation	Shasta	UNSP (AKA VINEYARD SPRING)
	Outfitter Properties LLC-Oasis Springs Total	3,245.00						
S002509	R HAMBY	1,600.00	Pre-14	1898	All	Irrigation, Stockwatering, Domestic	Shasta	EAST FORK NELSON CREEK
	R HAMBY Total	1,600.00						
S016096	Raymond J Paige	1,000.00	Riparian/Pre-14	1986	Mar-Oct	Irrigation	Shasta	LITTLE TULE RIVER TO FALL RIVER
S016097	Raymond J Paige	600.00	Riparian/Pre-14	1896	Mar-Oct	Irrigation	Shasta	LITTLE TULE RIVER TO FALL RIVER
	Raymond J Paige Total	1,600.00						
S014780	RICHARD L JENNINGS	5,250.00	Riparian/Pre-14	1885	Apr-Oct	Irrigation, Stockwatering	Modoc	PIT RIVER
S014781	RICHARD L JENNINGS	5,250.00	Riparian/Pre-14	1900	Apr-Oct	Irrigation, Stockwatering	Modoc	PIT RIVER
S014782	RICHARD L JENNINGS	2,800.00	Riparian/Pre-14	1870	Apr-Oct	Irrigation, Stockwatering	Modoc	RALSTON GULCH
S014783	RICHARD L JENNINGS	4,500.00	Riparian/Pre-14	1912	Apr-Oct	Irrigation, Stockwatering	Modoc	CANYON CREEK
S014784	RICHARD L JENNINGS	4,500.00	Riparian/Pre-14	1900	Apr-Sept	Irrigation, Stockwatering	Modoc	PIT RIVER
	RICHARD L JENNINGS Total	22,300.00						
S014913	Western Agricultural Services (River Butte Ranch)	150.00	Riparian	1965	Apr-Sept	Irrigation	Shasta	FALL RIVER
S014914	Western Agricultural Services (River Butte Ranch)	400.00	Riparian	1965	Apr-Sept	Irrigation	Shasta	FALL RIVER
	Western Agricultural Services (River Butte Ranch) Total	550.00						
S014193	Western Agricultural Services (Fall River Ranch)	375.00	Riparian	1900	Apr-Oct	Irrigation, Stockwatering	Shasta	FALL RIVER
S014194	Western Agricultural Services (Fall River Ranch)	60.00	Riparian	1900	Apr-Oct	Irrigation, Stockwatering	Shasta	FALL RIVER
	Western Agricultural Services (Fall River Ranch) Total	435.00						
S014937	Western Agricultural Services (River Ranch L P)	485.00	Riparian	1930	Apr-Oct	Irrigation	Shasta	FALL RIVER

Application ID	Holder Name	Highest Claimed Amt	Claim Type	Year of First Use	Season	Purpose of Use	County	Source
S014938	Western Agricultural Services (River Ranch L P)	15.00	Riparian	1872	All	Stockwatering, Domestic	Shasta	FALL RIVER
S014939	Western Agricultural Services (River Ranch L P)	550.00	Riparian	1920	Apr-Oct	Irrigation	Shasta	FALL RIVER
S014940	Western Agricultural Services (River Ranch L P)	75.00	Riparian	1950	Apr-Sept	Irrigation	Shasta	FALL RIVER
S014941	Western Agricultural Services (River Ranch L P)	15.00	Riparian	1900	All	Stockwatering, Domestic	Shasta	FALL RIVER
S014942	Western Agricultural Services (River Ranch L P)	15.00	Riparian	1870	All	Stockwatering	Shasta	FALL RIVER
S014943	Western Agricultural Services (River Ranch L P)	425.00	Riparian	1920	Apr-Oct	Irrigation, Stockwatering	Shasta	FALL RIVER
S014944	Western Agricultural Services (River Ranch L P)	70.00	Riparian	1950	Apr-Oct	Irrigation	Shasta	FALL RIVER
S014945	Western Agricultural Services (River Ranch L P)	1,200.00	Riparian	1870	Apr-Oct	Irrigation, Stockwatering	Shasta	FALL RIVER
	Western Agricultural Services (River Ranch L P) Total	2,850.00						
S012933	ROBERT G BAIRD	1,149.00	Pre-14	1872	Apr-Nov	Irrigation, Stockwatering	Modoc	TOMS CREEK
	ROBERT G BAIRD Total	1,149.00						
S012446	ROBERT H MACKEY & SONS INC	570.00	Riparian	1871	Apr-Oct	Irrigation, Stockwatering	Modoc	CANYON CREEK
S012447	ROBERT H MACKEY & SONS INC	570.00	Riparian	1890	Apr-Oct	Irrigation, Stockwatering	Modoc	CANYON CREEK
S014303	ROBERT H MACKEY & SONS INC	720.00	Riparian	1880	All	Irrigation, Stockwatering, Domestic	Modoc	UNSP
	ROBERT H MACKEY & SONS INC Total	1,860.00						
S004672	RONALD L SCHLUTER	1,500.00	Pre-14	1906	May-Oct	Irrigation, Stockwatering	Modoc	BIG DOBIE SOUTH
S004673	RONALD L SCHLUTER	900.00	Pre-14	1906	Apr-Sept	Irrigation	Modoc	BIG DOBIE NORTH
	RONALD L SCHLUTER Total	2,400.00						
S000106	S X RANCH INC	1,000.00	Riparian	1947	Apr-Sept	Irrigation	Lassen	PIT RIVER
S000107	S X RANCH INC	340.00	Riparian	1947	Apr-Oct	Irrigation, Stockwatering	Lassen	PIT RIVER
	S X RANCH INC Total	1,340.00						
S015534	SX Lowry Ranch	2,000.00	Pre-14	1897	Nov-Apr	Irrigation, Stockwatering	Modoc	SALISBURY GULCH AKA UNST
	SX Lowry Ranch Total	2,000.00						
S002877	WILLIAM K HAGGE	525.00	Riparian	1964	May-Sept	Irrigation, Stockwatering	Modoc	PIT RIVER
S002879	WILLIAM K HAGGE	150.00	Riparian	1947	May-Sept	Irrigation, Stockwatering	Modoc	PIT RIVER
S002880	WILLIAM K HAGGE	1,140.00	Riparian/Pre-14	1880	May-Sept	Irrigation, Stockwatering	Modoc	PIT RIVER
S014183	WILLIAM K HAGGE	380.00	Riparian	1945	May-Sept	Irrigation, Stockwatering	Modoc	PIT RIVER
	WILLIAM K HAGGE Total	2,195.00						
	Grand Total	193,565.12						

Application ID	Holder Name	Highest Claim Amt	Water Rights Claim Type	Year of First Use	Season	Purpose of Use	County	Source
S013390	A L HANSEN	2,800.00	Pre-14	1860	Apr-Nov	Irrigation	Plumas	GREENHORN CREEK
	A L HANSEN Total	2,800.00						
S000267	ALBANO P BRESCIANI	700.00	Riparian/Pre-14	1857	All	Stockwater	Plumas	CLEAR STREAM
	ALBANO P BRESCIANI Total	700.00						
S001884	Phillip A Bresciani	300.00	Pre-14	1904	May-Sep	Irrigation, Stockwater	Plumas	SPANISH CREEK
	Phillip A Bresciani Total	300.00						
S001885	ALBANO P BRESCIANI	360.00	Riparian/Pre-14	1878	May-Sep	Stockwater	Plumas	MILL CREEK
S001886	ALBANO P BRESCIANI	300.00	Riparian/Pre-14	1878	Apr-Sep	Stockwater	Plumas	MILL CREEK
S002099	ALBANO P BRESCIANI	350.00	Riparian/Pre-14	1872	Apr-Oct	Stockwater	Plumas	GREENHORN CREEK
S002100	ALBANO P BRESCIANI	540.00	Riparian/Pre-14	1877	May-Oct	Stockwater	Plumas	SPANISH CREEK
S002101	ALBANO P BRESCIANI	150.00	Riparian/Pre-14	1873	May-Sep	Stockwater	Plumas	HAUN CREEK
S002102	ALBANO P BRESCIANI	250.00	Riparian/Pre-14	1877	Apr-Aug	Stockwater	Plumas	MILL CREEK
S002103	ALBANO P BRESCIANI	70.00	Riparian/Pre-14	1877	Apr-Oct	Stockwater	Plumas	MILL CREEK
S002104	ALBANO P BRESCIANI	182.00	Riparian/Pre-14	1877	Apr-Oct	Stockwater	Plumas	MILL CREEK
	ALBANO P BRESCIANI Total	2,202.00						
S010594	BERRY CREEK WATER USERS INCORPORATED	2,477.66	Pre-14	1852	All	Irrigation, Stockwater	Butte	BERRY CREEK
	BERRY CREEK WATER USERS INCORPORATED Total	2,477.66						
S002956	BROOKS WALKER ET AL	60.00	Riparian/Pre-14	1900	May-Jun	Irrigation, Stockwater	Lassen	UNNAMED STREAM
S002957	BROOKS WALKER ET AL	90.00	Riparian/Pre-14	1900	May-Jul	Irrigation, Stockwater	Lassen	HOMER CREEK
S002958	BROOKS WALKER ET AL	30.00	Riparian/Pre-14	1900	May-Jun	Irrigation, Stockwater	Lassen	UNNAMED STREAM
S002960	BROOKS WALKER ET AL	30.00	Riparian/Pre-14	1900	May-Jun	Irrigation, Stockwater	Lassen	UNNAMED STREAM
S002962	BROOKS WALKER ET AL	9,306.00	Riparian/Pre-14	1900	May-Oct	Irrigation, Stockwater	Lassen	GOODRICH CREEK
S002963	BROOKS WALKER ET AL	7,866.00	Riparian/Pre-14	1900	May-Oct	Irrigation, Stockwater	Lassen	GOODRICH CREEK
	BROOKS WALKER ET AL Total	17,382.00						
S002315	DEAN PANFILI	225.00	Riparian/Pre-14	1957	Apr-Sep	Irrigation, Stockwater, Domestic	Plumas	LONG VALLEY CREEK
S002316	DEAN PANFILI	175.00	Riparian/Pre-14	1870	May-Sep	Irrigation	Plumas	LONG VALLEY CREEK
S002317	DEAN PANFILI	0.00	Riparian/Pre-14	1856	Apr-Sep	Irrigation, Stockwater	Plumas	LONG VALLEY CREEK

Feather River Watershed - Consumptive Statements of Diversion and Use

Application ID	Holder Name	Highest Claim Amt	Water Rights Claim Type	Year of First Use	Season	Purpose of Use	County	Source
S002318	DEAN PANFILI	613.78	Riparian/Pre-14	1870	Mar-Sep	Irrigation, Stockwater, Domestic	Plumas	LITTLE LONG VALLEY CREEK
	DEAN PANFILI Total	1,013.78						
S015506	GRAEAGLE LAND & WATER COMPANY	1,279.11	Pre-14	1820	Mar-Oct	Irrigation, Stockwater	Plumas	MOHAWK CREEK
S015913	GRAEAGLE LAND & WATER COMPANY	1,400.64	Pre-14	1820	All	Irrigation, Stockwater, Domestic	Plumas	MOHAWK CREEK
S015914	GRAEAGLE LAND & WATER COMPANY	607.64	Pre-14	1820	Mar-Oct	Irrigation, Stockwater	Plumas	MOHAWK CREEK
	GRAEAGLE LAND & WATER COMPANY Total	3,287.39						
S008734	GRAEAGLE WATER COMPANY A CALIF CORP	990.71	Riparian	1941	All	Irrigation, Stockwater, Domestic	Plumas	GRAY EAGLE CREEK
	GRAEAGLE WATER COMPANY A CALIF CORP Total	990.71						
S013351	MOHAWK VALLEY RANCH, INC	485.80	Pre-14	1880	Mar-Oct	Irrigation, Domestic	Plumas	UNST
S013352	MOHAWK VALLEY RANCH, INC	1,457.72	Riparian	1950	Mar-Oct	Golf Course Irrigation	Plumas	SULPHUR CREEK
S013353	MOHAWK VALLEY RANCH, INC	2,171.85	Riparian	1950	All	Golf Course Irrigation	Plumas	BOULDER CREEK
S013354	MOHAWK VALLEY RANCH, INC	485.96	Pre-14	1880	Mar-Oct	Irrigation	Plumas	BOULDER CREEK
S013355	MOHAWK VALLEY RANCH, INC	485.96	Pre-14	1880	Mar-Oct	Irrigation	Sierra	BOULDER CREEK
S013356	MOHAWK VALLEY RANCH, INC	723.95	Pre-14	1880	All	Golf Course Irrigation	Plumas	UNST
S013357	MOHAWK VALLEY RANCH, INC	1,447.90	Pre-14	1880	All	Golf Course Irrigation	Plumas	UNST
	MOHAWK VALLEY RANCH, INC Total	7,259.15						
S009189	PLUMAS PINES GOLF RESORT	10,700.00	Pre-14	1877	May-Oct	Irrigation	Plumas	JAMISON CREEK
	PLUMAS PINES GOLF RESORT Total	10,700.00						
S002953	RED RIVER FORESTS PARTNERSHIP	894.00	Riparian/Pre-14	1900	May-Oct	Irrigation, Stockwater	Lassen	MOUNTAIN MEADOWS CREEK
S002954	RED RIVER FORESTS PARTNERSHIP	5,660.00	Riparian/Pre-14	1900	May-Oct	Irrigation, Stockwater	Lassen	COTTONWOOD CREEK
	RED RIVER FORESTS PARTNERSHIP Total	6,554.00						

Feather River Watershed - Consumptive Statements of Diversion and Use

Application ID	Holder Name	Highest Claim Amt	Water Rights Claim Type	Year of First Use	Season	Purpose of Use	County	Source
S000262	REID LAND & CATTLE COMPANY	4,346.00	Pre-14	1857	May-Nov	Irrigation, Stockwater	Plumas	GREENHORN CREEK
S000263	REID LAND & CATTLE COMPANY	1,336.00	Pre-14	1857	All	Irrigation, Stockwater, Domestic	Plumas	CHANDLER CREEK
S000264	REID LAND & CATTLE COMPANY	1,217.00	Pre-14	1857	Jun-Nov	Irrigation, Stockwater	Plumas	TAYLOR CREEK
	REID LAND & CATTLE COMPANY Total	6,899.00						
S000544	RICHARD D FRIPP II	0.56	Pre-14	1876	All	Irrigation, Stockwater, Domestic	Plumas	COGSWELL RAVINE
S000545	RICHARD D FRIPP II	1,086.69	Pre-14	1856	All	Irrigation, Stockwater, Domestic	Plumas	LONG VALLEY CREEK
	RICHARD D FRIPP II Total	1,087.25						
S000266	RICHARD D LEONHARDT	970.00	Pre-14	1857	All	Irrigation, Stockwater	Plumas	MILL CREEK
S000268	RICHARD D LEONHARDT	1,200.00	Pre-14	1857	Apr-Oct	Irrigation, Stockwater	Plumas	SPANISH CREEK
S000269	RICHARD D LEONHARDT	240.00	Pre-14	1857	May-Oct	Irrigation, Stockwater	Plumas	FOUR LETTER CREEK
	RICHARD D LEONHARDT Total	2,410.00						
S000378	RICHVALE IRRIGATION DISTRICT	7,560.00	Pre-14	1914	Apr-Sep	Irrigation	Butte	CHEROKEE CANAL
S000379	RICHVALE IRRIGATION DISTRICT	6,000.00	Riparian	1947	Mar-Jan	Irrigation	Butte	LITTLE DRY CREEK
	RICHVALE IRRIGATION DISTRICT Total	13,560.00						
S000925	WESTERN CANAL WATER DISTRICT	348,469.00	Pre-14	1902	Apr-Jan	Irrigation	Butte	FEATHER RIVER
	WESTERN CANAL WATER DISTRICT Total	348,469.00						
S006764	WESTWOOD COMMUNITY SERVICES DISTRICT	0.00	Pre-14	1913	All	Domestic	Lassen	DUCK LAKE
S010000	WESTWOOD COMMUNITY SERVICES DISTRICT	1,053.00	Prescriptive	1924	All	Domestic	Lassen	WALKER SPRINGS
	WESTWOOD COMMUNITY SERVICES DISTRICT Total	1,053.00						
S015240	WILLIAM S KEELER TRUST	1,750.00	Riparian/Pre-14	1900	May-Sep	Irrigation, Stockwater	Lassen	GOODRICH CREEK
	WILLIAM S KEELER TRUST Total	1,750.00						
S013159	WILLIARD H WATTENBURG	0.00					Plumas	UNNAMED SPRING
	WILLIARD H WATTENBURG Total	0.00						
	Grand Total	430,894.94						

Application ID	Holder Name	Highest Amount Claimed	Water Rights Claim Type	Year of First Use	Season	Purpose of Use	County	Source
S017323	City of Folsom	50,712.40	Pre-14	1851	All	Municipal, Industrial	Sacramento	SOUTH FORK OF THE AMERICAN RIVER
S017326	City of Folsom	5,000.00	Pre-14	1851	All	Municipal, Industrial	Sacramento	SOUTH FORK OF THE AMERICAN RIVER
S017490	City of Folsom	22,000.00	Pre-14	1851	All	Municipal, Industrial	Sacramento	SOUTH FORK OF THE AMERICAN RIVER
S017491	City of Folsom	22,000.00	Pre-14	1851	All	Municipal, Industrial	Sacramento	SOUTH FORK OF THE AMERICAN RIVER
S000388	COLOMA-LOTUS RANCH DITCH USERS ASSOC	10,000.00	Pre-14	1853	Apr-Nov	Irrigation, Stockwater, Domestic	El Dorado	SOUTH FORK AMERICAN RIVER
S010717	EL DORADO IRRIGATION DISTRICT	60.75	Pre-14	1875	All	Irrigation, Municipal	El Dorado	SOUTH FORK AMERICAN RIVER
S000972	EL DORADO IRRIGATION DISTRICT	19.80	Pre-14	1856	Dec	Irrigation, Municipal, Industrial, Hydropower	El Dorado	CARPENTER CREEK
S000973	EL DORADO IRRIGATION DISTRICT	95.60	Pre-14	1873	Feb-May	Irrigation, Municipal, Industrial, Hydropower	El Dorado	UNST
S000974	EL DORADO IRRIGATION DISTRICT	678.00	Pre-14	1873	Apr-Oct	Irrigation, Municipal, Industrial, Hydropower	El Dorado	MILL CREEK
S000975	EL DORADO IRRIGATION DISTRICT	232.00	Pre-14	1873	Jan-Jun	Irrigation, Municipal, Industrial, Hydropower	El Dorado	BRYANT CREEK
S000976	EL DORADO IRRIGATION DISTRICT	132.90	Pre-14	1873	Jan-Jun	Irrigation, Municipal, Industrial, Hydropower	El Dorado	ESMERELDA CREEK
S004708	EL DORADO IRRIGATION DISTRICT	5,400.00	Pre-14	1876	Jul-Dec	Irrigation, Municipal, Industrial, Hydropower	Amador	SILVER FORK OF SOUTH FORK AMERICAN RIVER
S009034	EL DORADO IRRIGATION DISTRICT	40,373.00	Pre-14	1873	All	Irrigation, Municipal, Industrial, Hydropower	El Dorado	SOUTH FORK AMERICAN RIVER
S009035	EL DORADO IRRIGATION DISTRICT	360.00	Pre-14	1875	May-Aug	Irrigation, Municipal, Industrial, Hydropower	El Dorado	PYRAMID CREEK
S014323	EL DORADO IRRIGATION DISTRICT	3,968.00	Pre-14	1889	Apr-Oct	Irrigation, Municipal, Industrial, Hydropower	El Dorado	SLAB CREEK
S014968	EL DORADO IRRIGATION DISTRICT	3,373.00	Pre-14	1855	All	Irrigation, Municipal, Industrial, Hydropower	El Dorado	WEBER CREEK
S015937	EL DORADO IRRIGATION DISTRICT	1.55	Pre-14	1872	April	Irrigation, Municipal, Industrial, Hydropower	El Dorado	UNNAMED STREAM
S015938	EL DORADO IRRIGATION DISTRICT	150.60	Pre-14	1872	Dec-Apr	Irrigation, Municipal, Industrial, Hydropower	El Dorado	UNNAMED STREAM
S015939	EL DORADO IRRIGATION DISTRICT	41.64	Pre-14	1872	All	Irrigation, Municipal, Industrial, Hydropower	El Dorado	Stream at Spillway 8
S015940	EL DORADO IRRIGATION DISTRICT	15.20	Pre-14	1872	Feb-May	Irrigation, Municipal, Industrial, Hydropower	El Dorado	BULL CREEK
S015941	EL DORADO IRRIGATION DISTRICT	8,000.00	Pre-14	1872	Jul-Feb	Irrigation, Municipal, Industrial, Hydropower	Alpine	CAPLES LAKE
S014967	EL DORADO IRRIGATION DISTRICT	1,216.00	Pre-14	1852	Apr-Oct	Municipal, Industrial	El Dorado	HANGTOWN CREEK
S014597	GEORGETOWN DIVIDE PUBLIC UTILITY DISTRICT	2,404.00	Pre-14	1850	All	Irrigation, Domestic	El Dorado	MUTTON CANYON

Application ID	Holder Name	Highest Amount Claimed	Water Rights Claim Type	Year of First Use	Season	Purpose of Use	County	Source
S014598	GEORGETOWN DIVIDE PUBLIC UTILITY DISTRICT	2,165.00	Pre-14	1850	All	Irrigation, Domestic	El Dorado	BACON CANYON
S014599	GEORGETOWN DIVIDE PUBLIC UTILITY DISTRICT	850.00	Pre-14	1850	All	Irrigation, Domestic	El Dorado	UNST
S014600	GEORGETOWN DIVIDE PUBLIC UTILITY DISTRICT	1,295.00	Pre-14	1850	All	Irrigation, Domestic	El Dorado	DEEP CANYON
S014601	GEORGETOWN DIVIDE PUBLIC UTILITY DISTRICT	9,552.00	Pre-14	1850	Dec-Oct	Irrigation, Domestic	El Dorado	PILOT CREEK
S010794	NEVADA IRRIGATION DISTRICT	21,085.00	Pre-14	1880	All	Irrigation, Stockwater, Domestic	Placer	COON CREEK, ORR CREEK
S013791	NEVADA IRRIGATION DISTRICT	24,374.00	Pre-14	1853	All	Irrigation, Stockwater, Domestic, Mining	Placer	AUBURN RAVINE
S013790	NEVADA IRRIGATION DISTRICT	7,800.00	Pre-14	1853	Apr-Oct	Irrigation, Stockwater, Mining	Placer	AUBURN RAVINE
S000968	PACIFIC GAS AND ELECTRIC COMPANY	1,220.00	Prescriptive	1917	All	Irrigation, Domestic	Placer	ROCK CREEK
S000969	PACIFIC GAS AND ELECTRIC COMPANY	2,942.00	Prescriptive	1917	All	Irrigation, Domestic	Placer	DRY CREEK
S000959	PLACER COUNTY WATER AGENCY	5,422.00	Pre-14	1864	All	Irrigation, Domestic	Placer	CANYON CREEK
S000967	PLACER COUNTY WATER AGENCY	0.00	Pre-14	1864	All	Irrigation, Domestic	Placer	UNST
S010397	PLACER COUNTY WATER AGENCY	0.00	Pre-14	1896	All	Irrigation, Domestic	Placer	SOUTH FORK DRY CREEK
S010398	PLACER COUNTY WATER AGENCY	0.00	Pre-14	1909	All	Irrigation, Domestic	Placer	NORTH FORK DRY CREEK
S000656	San Juan Water District	33,000.00	Pre-14	1852	All	Domestic	Placer	FOLSOM LAKE
		285,939.44						

Yuba River Watershed - Consumptive Statements of Diversion and Use

Application ID	Holder Name	Highest Claimed Amt	Water Rights Claim Type	Year of First Use	Season	Purpose of Use	County	Source
S000645	BIG LAND DEVELOPMENT CORP	2,730.00	Riparian/Pre-14	1886	Apr-Oct	Irrigation, Stockwater	Butte	SOUTH HONCUT CREEK
	BIG LAND DEVELOPMENT CORP Total	2,730.00						
S010014	CITY OF NEVADA CITY	1,859.80	Pre-14	1910	All	Domestic	Nevada	LITTLE DEER CREEK
	CITY OF NEVADA CITY Total	1,859.80						
S016332	Hallwood Irrigation Company	69,798.00	Pre-14	1909	All	Irrigation	Yuba	Yuba River
	Hallwood Irrigation Company Total	69,798.00						
S001241	LAKE WILDWOOD ASSOCIATION	1,811.16	Pre-14	1861	All	Irrigation	Nevada	NIGGER CREEK
	LAKE WILDWOOD ASSOCIATION Total	1,811.16						
S004716	NEVADA IRRIGATION DISTRICT	94,346.00	Pre-14	1873	All	Hydropower, Irrigation, Domestic, Recreation	Nevada	CANYON CREEK
S004717	NEVADA IRRIGATION DISTRICT	27,007.00	Pre-14	1859	All	Hydropower, Irrigation, Domestic, Recreation	Nevada	CANYON CREEK
S010591	NEVADA IRRIGATION DISTRICT	2.20	Riparian	1967	May-Oct	Recreation	Nevada	DAMFINE SPRING
S010592	NEVADA IRRIGATION DISTRICT	3.20	Riparian	1967	May-Oct	Recreation	Sierra	UNST
S012949	NEVADA IRRIGATION DISTRICT	551.00	Pre-14	1851	Apr-Oct	Irrigation	Nevada	DEER CREEK
S012950	NEVADA IRRIGATION DISTRICT	13,500.00	Pre-14	1851	All	Irrigation, Stockwater, Domestic	Nevada	DEER CREEK
S012951	NEVADA IRRIGATION DISTRICT	7,900.00	Pre-14	1851	All	Irrigation, Domestic, Fire Protection, Recreation	Nevada	DEER CREEK
S012952	NEVADA IRRIGATION DISTRICT	34,300.00	Pre-14	1851	All	Irrigation, Domestic, Fire Protection, Recreation	Nevada	DEER CREEK
S012953	NEVADA IRRIGATION DISTRICT	30,645.00	Pre-14	1857	All	Irrigation, Domestic, Fire Protection, Recreation	Nevada	SOUTH FORK DEER CREEK
S013330	NEVADA IRRIGATION DISTRICT	83,639.00	Pre-14	1854	All	Irrigation, Domestic, Fire Protection, Recreation, Mining, Hydropower	Sierra	MIDDLE YUBA RIVER
S013800	NEVADA IRRIGATION DISTRICT	117,023.50	Pre-14	1872	All	Irrigation, Domestic, Fire Protection, Recreation, Mining, Hydropower	Nevada	CANYON CREEK
S013801	NEVADA IRRIGATION DISTRICT	47,996.00	Pre-14	1872	All	Irrigation, Domestic, Fire Protection, Recreation, Mining, Hydropower	Nevada	CANYON CREEK
S013927	NEVADA IRRIGATION DISTRICT	61,487.00	Pre-14	1874	All	Irrigation, Domestic, Fire Protection, Recreation, Mining, Hydropower	Nevada	SOUTH YUBA RIVER
S013928	NEVADA IRRIGATION DISTRICT	483,867.00	Pre-14	1874	All	Irrigation, Domestic, Fire Protection, Recreation, Mining, Hydropower	Nevada	SOUTH YUBA RIVER
S014353	NEVADA IRRIGATION DISTRICT	47,789.00	Riparian/Pre-14	1851	All	Irrigation, Domestic, Fire Protection, Recreation, Mining, Hydropower	Nevada	DEER CREEK
S016092	NEVADA IRRIGATION DISTRICT	1,279.00	Pre-14	1859	All	Irrigation, Domestic, Fire Protection, Recreation, Mining, Hydropower	Nevada	JACKSON CREEK
	NEVADA IRRIGATION DISTRICT Total	1,051,334.90						
	Grand Total	1,127,533.86						

Bear River Watershed - Consumptive Statements of Diversio and Use

Application ID	Holder Name	Highest Amount Claimed	Water Rights Claim Type	Year of First Use	Season	Purpose of Use	County	Source
S013809	NEVADA IRRIGATION DISTRICT	69,433.00	Pre-14	1853	All	Irrigation, Domestic	Nevada	BEAR RIVER
S013926	NEVADA IRRIGATION DISTRICT	22,675.00	Pre-14	1859	All	Irrigation, Mining	Nevada	WOLF CREEK
		92,108.00						

East Creeks Water Rights - Statements of Diversion and Use

Application ID	Holder Name	Highest Amount Claimed	Water Rights Claim Type	Year of First Use	Season	Purpose of Use	County	Source
S001115	1990 Johannessen Family Trust	453.72	Pre-14	1880	Apr-Sep	Irrigation, Stockwater	Shasta	DEER CREEK
S013144	1990 JOHANNESSEN FAMILY TRUST	2,759.01	Pre-14	1880	Apr-Oct	Irrigation, Stockwater	Shasta	DEER CREEK
	1990 Johannessen Family Trust Total	3,212.73						
S012313	BATTLE CREEK MEADOWS RANCH INC	350.00	Riparian/Pre-14	1900	Apr-Oct	Irrigation, Stockwater	Tehama	MARTIN CREEK
S012314	BATTLE CREEK MEADOWS RANCH INC	350.00	Riparian/Pre-14	1900	Apr-Oct	Irrigation, Stockwater	Tehama	MARTIN CREEK
S012315	BATTLE CREEK MEADOWS RANCH INC	350.00	Riparian/Pre-14	1900	Apr-Oct	Irrigation, Stockwater	Tehama	MARTIN CREEK
S012316	BATTLE CREEK MEADOWS RANCH INC	350.00	Riparian/Pre-14	1900	Apr-Oct	Irrigation, Stockwater	Tehama	SOUTH FORK BATTLE CREEK
S012318	BATTLE CREEK MEADOWS RANCH INC	350.00	Riparian/Pre-14	1900	Apr-Oct	Irrigation, Stockwater	Tehama	UNST
S012319	BATTLE CREEK MEADOWS RANCH INC	350.00	Riparian/Pre-14	1900	Apr-Oct	Irrigation, Stockwater	Tehama	UNST
S012320	BATTLE CREEK MEADOWS RANCH INC	350.00	Riparian/Pre-14	1900	Apr-Oct	Irrigation, Stockwater	Tehama	UNST
S012321	BATTLE CREEK MEADOWS RANCH INC	350.00	Riparian/Pre-14	1900	Apr-Oct	Irrigation, Stockwater	Tehama	UNST
S012322	BATTLE CREEK MEADOWS RANCH INC	350.00	Riparian/Pre-14	1900	Apr-Oct	Irrigation, Stockwater	Tehama	UNST
S012323	BATTLE CREEK MEADOWS RANCH INC	350.00	Riparian/Pre-14	1900	Apr-Oct	Irrigation, Stockwater	Tehama	UNST
	BATTLE CREEK MEADOWS RANCH INC Total	3,500.00						
S000550	BUTTE SINK WATERFOWL ASSOCIATION	43,800.00	Riparian/Pre-14	1900	All	Irrigation, Habitat	Butte	BUTTE CREEK
	BUTTE SINK WATERFOWL ASSOCIATION Total	43,800.00						
S002387	CLINE C SOULE	3,200.00	Riparian/Pre-14	1885	Apr - Oct	Irrigation, Stockwater	Siskiyou	BUTTE CREEK
	CLINE C SOULE Total	3,200.00						
S000731	DEER CREEK IRRIGATION DISTRICT	20,400.00	Adjudication	1923	Feb-Nov	Irrigation	Tehama	DEER CREEK
	DEER CREEK IRRIGATION DISTRICT Total	20,400.00						
S010988	DOUGLAS H BOSCO	159.17	Pre-14	1900	Apr-Oct	Irrigation, Stockwater	Shasta	NORTH FORK BATTLE CREEK
S010989	DOUGLAS H BOSCO	848.93	Pre-14	1900	Apr-Oct	Irrigation, Stockwater	Shasta	NORTH FORK BATTLE CREEK
S010990	DOUGLAS H BOSCO	159.17	Pre-14	1900	Apr-Oct	Irrigation, Stockwater	Shasta	NORTH FORK BATTLE CREEK
	DOUGLAS H BOSCO Total	1,167.27						
S000736	E J LOUIE & SONS	1,545.60	Pre-14	1872	Apr-Oct	Irrigation	Siskiyou	BUTTE CREEK
S000739	E J LOUIE & SONS	1,932.00	Pre-14	1872	Apr-Oct	Irrigation	Siskiyou	BUTTE CREEK
S000740	E J LOUIE & SONS	1,200.00	Pre-14	1872	Apr-Oct	Irrigation	Siskiyou	BUTTE CREEK
S000748	E J LOUIE & SONS	386.40	Pre-14	1872	Apr-Oct	Irrigation	Siskiyou	BUTTE CREEK
	E J LOUIE & SONS Total	5,064.00						
S009605	MAURICE JOHANNESSEN	2,759.01	Pre-14	1880	Apr-Oct	Irrigation, Stockwater	Shasta	DEER CREEK
	MAURICE JOHANNESSEN Total	2,759.01						
S008459	Paradise Irrigation District	9,251.00	Pre-14	1916	All	Domestic	Butte	LITTLE BUTTE CREEK
	Paradise Irrigation District Total	9,251.00						
S000729	STANFORD VINA RANCH IRRIGATION CO	9,676.50	Riparian/Pre-14	1900	May-Oct	Irrigation, Stockwater	Tehama	DEER CREEK
S000730	STANFORD VINA RANCH IRRIGATION CO	9,676.50	Riparian/Pre-14	1900	May-Oct	Irrigation, Stockwater	Tehama	DEER CREEK
	STANFORD VINA RANCH IRRIGATION CO Total	19,353.00						
S000732	U S BUREAU OF LAND MANAGEMENT	11,615.21	Pre-14	1870	Apr-Nov	Irrigation, Stockwater, Habitat	Tehama	BATTLE CREEK
	U S BUREAU OF LAND MANAGEMENT Total	11,615.21						

East Creeks Water Rights - Statements of Diversion and Use

Application ID	Holder Name	Highest Amount Claimed	Water Rights Claim Type	Year of First Use	Season	Purpose of Use	County	Source
S009976	WESTERN CANAL WATER DISTRICT	5,045.00	Pre-14	1916	Apr-Jun	Irrigation	Butte	BUTTE CREEK
	WESTERN CANAL WATER DISTRICT Total	5,045.00						
	Grand Total	128,367.21						

West Creeks (Cache and Stony) - Statements of Diversion and Use

Application ID	Holder Name	Highest Amount Claimed	Water Rights Claim Type	Year of First Use	Season	Purpose of Use	County	Source
S015943	PAYNE FARMS - WA PAYNE	1,800.00	Riparian	1990	May-Aug	Irrigation	Yolo	CACHE CREEK
	PAYNE FARMS - WA PAYNE	1,800.00						
S000608	YOLO COUNTY F C & W C DISTRICT	21,006.00	Riparian/Pre-14	1856	Mar-Dec	Irrigation, Domestic, Hydropower	Yolo	CACHE CREEK
S000609	YOLO COUNTY F C & W C DISTRICT	237,206.00	Riparian/Pre-14	1859	Mar-Dec	Irrigation, Domestic, Hydropower	Yolo	CACHE CREEK
S001063	YOLO COUNTY F C & W C DISTRICT	4,775.00	Riparian/Pre-14	1859	Apr-Oct	Irrigation, Domestic, Hydropower	Yolo	CACHE CREEK
S014986	YOLO COUNTY F C & W C DISTRICT	339,976.00	Riparian/Pre-14	1914	All	Irrigation, Municipal, Industrial, Recreation, Hydropower	Lake	CACHE CREEK
	YOLO COUNTY F C & W C	602,963.00						
S006354	U.S. BUREAU OF RECLAMATION	114,300.00	Fed Adjudication	1910	Jan-Nov	Irrigation	Colusa	LITTLE STONY CREEK
S006353	U.S. BUREAU OF RECLAMATION	56,000.00	Fed Adjudication	1910	Oct-Mar	Irrigation	Colusa	STONY CREEK
	U.S. BUREAU OF RECLAMATION	170,300.00						
	Grand Total	775,063.00						

Application ID	Holder Name	Highest Amount Claimed	Water Rights Claim Type	Year of First Use	Season	Purpose of Use	County	Source
S012208	ANDERSON-COTTONWOOD IRRIGATION DISTRICT	162,788.00	Pre-14	1917	Apr-Oct	Irrigation, Stockwater	Shasta	SACRAMENTO RIVER
	ANDERSON-COTTONWOOD IRRIGATION DISTRICT Total	162,788.00						
S013880	CARTER MUTUAL WATER COMPANY	3,829.00	Riparian	1924	May-Feb	Irrigation, Stockwater, Domestic	Colusa	SACRAMENTO RIVER
	CARTER MUTUAL WATER COMPANY Total	3,829.00						
S005221	CHARLES W TUTTLE JR	1,550.00	Riparian	1968	Feb-Sep	Irrigation	Colusa	SACRAMENTO RIVER
S005222	CHARLES W TUTTLE JR	6,050.00	Riparian/Pre-14	1912	Mar-Jan	Irrigation	Colusa	SACRAMENTO RIVER
	CHARLES W TUTTLE JR Total	7,600.00						
S014834	CITY OF SACRAMENTO	74,036.91	Pre-14	1849	All	Municipal	Sacramento	SACRAMENTO RIVER
	CITY OF SACRAMENTO Total	74,036.91						
S017223	Dead Horse LP	348.80	Riparian/Pre-14	1800s	All	Irrigation	Yolo	SACRAMENTO RIVER
S017224	Dead Horse LP	174.40	Riparian/Pre-14	1800s	All	Irrigation	Yolo	SACRAMENTO RIVER
	Dead Horse LP Total	523.20						
S016908	Deadhorse LP	174.40	Riparian/Pre-14	1800s	All	Irrigation	Yolo	SACRAMENTO RIVER
S018494	Deadhorse LP	348.80	Riparian/Pre-14	1800s	All	Irrigation	Yolo	Sacramento River
	Deadhorse LP Total	523.20						
S020061	Edward McDowell	440.00	Riparian/Pre-14	1800s	Apr-Oct	Irrigation	Sacramento	Sacramento River
S020612	Edward McDowell	605.00	Riparian/Pre-14	1800s	Apr-Oct	Irrigation	Sacramento	SACRAMENTO RIVER
S020616	Edward McDowell	605.00	Riparian/Pre-14	1800s	Apr-Oct	Irrigation	Sacramento	SACRAMENTO RIVER
	Edward McDowell Total	1,650.00						
S017096	Elliot Delta Orchards, LLC	376.00	Riparian/Pre-14	1800s	Apr-Oct	Irrigation	Sacramento	SACRAMENTO RIVER
S018886	Elliot Delta Orchards, LLC	444.00	Riparian/Pre-14	1800s	Apr-Oct	Irrigation	Sacramento	Sacramento River
	Elliot Delta Orchards, LLC Total	820.00						
S017093	Elliot Family Co., LLC	200.00	Riparian/Pre-14	1800s	Apr-Oct	Irrigation	Sacramento	SACRAMENTO RIVER
S017383	Elliot Family Co., LLC	352.00	Riparian/Pre-14	1800s	Apr-Oct	Irrigation	Sacramento	SACRAMENTO RIVER
S019707	Elliot Family Co., LLC	300.00	Riparian/Pre-14	1800s	Apr-Oct	Irrigation	Sacramento	SACRAMENTO RIVER
	Elliot Family Co., LLC Total	852.00						
S016915	Elliot Family Revocable Trust	821.00	Riparian/Pre-14	1800s	Apr-Oct	Irrigation	Sacramento	SACRAMENTO RIVER
S018859	Elliot Family Revocable Trust	394.00	Riparian/Pre-14	1800s	Apr-Oct	Irrigation	Sacramento	Sacramento River
	Elliot Family Revocable Trust Total	1,215.00						
S018613	Farmland Reserve, Inc.	1,800.00	Riparian	1950s	Apr-Oct	Irrigation	Butte	SACRAMENTO RIVER
	Farmland Reserve, Inc. Total	1,800.00						
S018603	Faye Properties, Inc.	3,200.00	Riparian	1800s	Mar-Sep	Irrigation	Yolo	SACRAMENTO RIVER
	Faye Properties, Inc. Total	3,200.00						
S007367	GLENN-COLUSA IRRIGATION DISTRICT	925,200.00	Pre-14	1906	All	Irrigation	Glenn	SACRAMENTO RIVER

Application ID	Holder Name	Highest Amount Claimed	Water Rights Claim Type	Year of First Use	Season	Purpose of Use	County	Source
	GLENN-COLUSA IRRIGATION DISTRICT Total	925,200.00						
S018956	Greene & Hemly - Merritt Island Ranch- Greene & Hemly, Inc	137.05	Riparian/Pre-14	1850	Mar-Oct	Irrigation	Yolo	SACRAMENTO RIVER
S018959	Greene & Hemly - Merritt Island Ranch- Greene & Hemly, Inc	589.32	Riparian/Pre-14	1850	Mar-Oct	Irrigation	Yolo	SACRAMENTO RIVER
S020804	Greene & Hemly - Merritt Island Ranch- Greene & Hemly, Inc	370.04	Riparian/Pre-14	1850	Mar-Oct	Irrigation	Yolo	Sacramento River
	Greene & Hemly - Merritt Island Ranch- Greene & Hemly, Inc Total	1,096.41						
S017190	Greene & Hemly - Randall Ranch Greene & Hemly Inc.	354.05	Riparian/Pre-14	1850	Mar-Oct	Irrigation	Sacramento	SACRAMENTO RIVER
S017191	Greene & Hemly - Randall Ranch Greene & Hemly Inc.	5.00	Riparian/Pre-14	1850	Mar-Oct	Irrigation	Sacramento	SACRAMENTO RIVER
	Greene & Hemly - Randall Ranch Greene & Hemly Inc. Total	359.05						
S017193	Greene & Hemly - Wheeler Ranch Greene and Hemly, Inc	753.79	Riparian/Pre-14	1850	Mar-Oct	Irrigation	Sacramento	SACRAMENTO RIVER
	Greene & Hemly - Wheeler Ranch Greene and Hemly, Inc Total	753.79						
S013264	HAROLD ARMSTRONG	2,200.00	Riparian	1895	Feb-Oct	Irrigation	Colusa	SACRAMENTO RIVER
	HAROLD ARMSTRONG Total	2,200.00						
S013717	JOSEPH BORGES RANCHES	1,400.00	Riparian	1922	Apr-Sep	Irrigation	Sacramento	SACRAMENTO RIVER
	JOSEPH BORGES RANCHES Total	1,400.00						
S017264	Joseph T Sanchez	700.00	Riparian/Pre-14	1800s	All	Irrigation	Sacramento	SACRAMENTO RIVER
S019830	Joseph T Sanchez	600.00	Riparian/Pre-14	1800s	All	Irrigation	Sacramento	SACRAMENTO RIVER
	Joseph T Sanchez Total	1,300.00						
S010294	LAUTRUP INVESTMENT PARTNERSHIP	1,000.00	Riparian	1965	Apr-Oct	Irrigation	Yolo	SACRAMENTO RIVER
	LAUTRUP INVESTMENT PARTNERSHIP Total	1,000.00						
S019846	Leary - Dennis Leary Trust 11/19/1990	0.00	Riparian	1800s	All	Irrigation	Sacramento	SACRAMENTO RIVER
	Leary - Dennis Leary Trust 11/19/1990 Total	0.00						
S018049	Leary - M G	349.00	Riparian/Pre-14	1800s	Apr-Nov	Irrigation	Sacramento	SACRAMENTO RIVER
	Leary - M G Total	349.00						
S018046	Leary (Dennis)	582.80	Riparian/Pre-14	1800s	Apr-Nov	Irrigation	Sacramento	SACRAMENTO RIVER
	Leary (Dennis) Total	582.80						
S019868	Leary etal	600.00	Riparian/Pre-14	1800s	All	Irrigation	Sacramento	SACRAMENTO RIVER
	Leary etal Total	600.00						
S018146	MARY CRANE	1,055.66	Riparian	1907	Apr-Oct	Irrigation	Sacramento	SACRAMENTO RIVER
	MARY CRANE Total	1,055.66						
S018012	MCCORMACK WILLIAMSON COMPANY	4,000.00	Riparian	1930	Apr-Sep	Irrigation	Sacramento	Sacramento River
S018018	MCCORMACK WILLIAMSON COMPANY	2,000.00	Riparian	1930	Apr-Sep	Irrigation	Sacramento	Sacramento River
S018021	MCCORMACK WILLIAMSON COMPANY	1,000.00	Riparian	1930	May-Aug	Irrigation	Sacramento	Sacramento River
	MCCORMACK WILLIAMSON COMPANY Total	7,000.00						
S018614	MYERS LAND COMPANY LLP	938.00	Riparian	1903	Apr-Sep	Irrigation	Yolo	SACRAMENTO RIVER
S018617	MYERS LAND COMPANY LLP	131.00	Riparian	1950	Apr-Sep	Irrigation	Yolo	SACRAMENTO RIVER
	MYERS LAND COMPANY LLP Total	1,069.00						
S002064	PACIFIC FRUIT FARMS	356.80	Riparian	1929	All	Irrigation	Sacramento	SACRAMENTO RIVER
S002065	PACIFIC FRUIT FARMS	356.80	Riparian	1929	All	Irrigation	Sacramento	SACRAMENTO RIVER
S002066	PACIFIC FRUIT FARMS	356.80	Riparian	1929	All	Irrigation	Sacramento	SACRAMENTO RIVER
S008159	PACIFIC FRUIT FARMS	356.80	Riparian	1929	All	Irrigation	Sacramento	SACRAMENTO RIVER
S019372	PACIFIC FRUIT FARMS	436.00	Riparian	1929	All	Irrigation	Sacramento	SACRAMENTO RIVER

Application ID	Holder Name	Highest Amount Claimed	Water Rights Claim Type	Year of First Use	Season	Purpose of Use	County	Source
S019375	PACIFIC FRUIT FARMS	85.02	Riparian	1929	All	Irrigation	Sacramento	SACRAMENTO RIVER
S019464	PACIFIC FRUIT FARMS	85.02	Riparian	1929	All	Irrigation	Sacramento	Sacramento River
	PACIFIC FRUIT FARMS Total	2,033.24						
S009896	PARROTT INVESTMENT COMPANY	8,805.67	Riparian	1971	Apr-Oct	Irrigation	Butte	SACRAMENTO RIVER
S009897	PARROTT INVESTMENT COMPANY	8,805.67	Riparian	1918	Apr-Oct	Irrigation	Butte	SACRAMENTO RIVER
S009898	PARROTT INVESTMENT COMPANY	8,805.67	Riparian	1979	Apr-Oct	Irrigation	Butte	SACRAMENTO RIVER
	PARROTT INVESTMENT COMPANY Total	26,417.00						
S001905	Pylman - A & M PYLMAN FARMS	945.71	Riparian	1915	Apr-Oct	Irrigation	Sacramento	SACRAMENTO RIVER
S001908	Pylman - A & M PYLMAN FARMS	1,418.56	Riparian	1915	Mar-Sep	Irrigation	Sacramento	SACRAMENTO RIVER
S001909	Pylman - A & M PYLMAN FARMS	945.71	Riparian	1915	Mar-Sep	Irrigation	Sacramento	SACRAMENTO RIVER
	Pylman - A & M PYLMAN FARMS Total	3,309.98						
S001237	PYLMAN VINEYARDS INC	338.07	Riparian/Pre-14	1910	Apr-Oct	Irrigation	Yolo	SACRAMENTO RIVER
S001867	PYLMAN VINEYARDS INC	338.07	Riparian/Pre-14	1910	Apr-Oct	Irrigation	Sacramento	SACRAMENTO RIVER
S020149	PYLMAN VINEYARDS INC	960.00	Riparian/Pre-14	1910	Apr-Oct	Irrigation	Yolo	Sacramento River
S020153	PYLMAN VINEYARDS INC	610.00	Riparian/Pre-14	1910	Apr-Oct	Irrigation	Yolo	Sacramento River
S020157	PYLMAN VINEYARDS INC	1,000.00	Riparian/Pre-14	1910	Apr-Oct	Irrigation	Yolo	Sacramento River
	PYLMAN VINEYARDS INC Total	3,246.14						
S020641	RECLAMATION DISTRICT #108	40,185.00	Riparian	1800s	Apr-Dec	Irrigation	Colusa	SACRAMENTO RIVER
S020645	RECLAMATION DISTRICT #108	118,058.00	Riparian	1800s	Apr-Dec	Irrigation	Colusa	SACRAMENTO RIVER
S020649	RECLAMATION DISTRICT #108	487.00	Riparian	1800s	Apr-Oct	Irrigation	Colusa	SACRAMENTO RIVER
S020653	RECLAMATION DISTRICT #108	169.00	Riparian	1800s	Apr-Oct	Irrigation	Colusa	SACRAMENTO RIVER
S020657	RECLAMATION DISTRICT #108	2,885.00	Riparian	1800s	May-Sep	Irrigation	Colusa	SACRAMENTO RIVER
S020661	RECLAMATION DISTRICT #108	10,414.00	Riparian	1800s	Apr-Jul	Irrigation	Yolo	SACRAMENTO RIVER
	RECLAMATION DISTRICT #108 Total	172,198.00						
S018031	RIVER GARDEN FARMS COMPANY	356.00	Riparian	1950	Mar-Sep	Irrigation	Yolo	SACRAMENTO RIVER
	RIVER GARDEN FARMS COMPANY Total	356.00						
S017210	Rivermaid Land Company	230.00	Riparian/Pre-14	1800s	All	Irrigation	Sacramento	SACRAMENTO RIVER
S017213	Rivermaid Land Company	330.00	Riparian/Pre-14	1800s	All	Irrigation	Sacramento	SACRAMENTO RIVER
S017222	Rivermaid Land Company	260.00	Riparian/Pre-14	1800s	All	Irrigation	Sacramento	SACRAMENTO RIVER
S017225	Rivermaid Land Company	170.00	Riparian/Pre-14	1800s	All	Irrigation	Sacramento	SACRAMENTO RIVER
S017226	Rivermaid Land Company	234.00	Riparian/Pre-14	1800s	All	Irrigation	Sacramento	SACRAMENTO RIVER
S017228	Rivermaid Land Company	1,300.00	Riparian/Pre-14	1800s	All	Irrigation	Sacramento	SACRAMENTO RIVER

Application ID	Holder Name	Highest Amount Claimed	Water Rights Claim Type	Year of First Use	Season	Purpose of Use	County	Source
S019320	Rivermaid Land Company	191.84	Riparian/Pre-14	1800s	All	Irrigation	Sacramento	SACRAMENTO RIVER
S019360	Rivermaid Land Company	174.40	Riparian/Pre-14	1800s	All	Irrigation	Sacramento	SACRAMENTO RIVER
S019377	Rivermaid Land Company	174.90	Riparian/Pre-14	1800s	All	Irrigation	Sacramento	SACRAMENTO RIVER
S019606	Rivermaid Land Company	261.60	Riparian/Pre-14	1800s	All	Irrigation	Sacramento	Sacramento River
	Rivermaid Land Company Total	3,326.74						
S009950	ROY MORRESCO JR	1,654.00	Riparian	1920	Apr-Jan	Irrigation	Sutter	SACRAMENTO RIVER
	ROY MORRESCO JR Total	1,654.00						
S020145	SACRAMENTO RIVER RANCH II LLC	3,834.40	Riparian	NA	NA	Irrigation	Yolo	Sacramento River
	SACRAMENTO RIVER RANCH II LLC Total	3,834.40						
S016992	Spinella (Art, Janelle)	269.20	Pre-14	1908	Apr-Oct	Irrigation	Sacramento	SACRAMENTO RIVER
	Spinella (Art, Janelle) Total	269.20						
S016993	Spinella (Frankie)	2,642.30	Pre-14	1910	Apr-Oct	Irrigation	Yolo	SACRAMENTO RIVER
S017329	Spinella (Frankie)	350.00	Pre-14	1910	Apr-Oct	Irrigation	Yolo	SACRAMENTO RIVER
	Spinella (Frankie) Total	2,992.30						
S012858	THE ARCHES LTD	1,320.00	Riparian/Pre-14	1800s	May-Aug	Irrigation	Sacramento	SACRAMENTO RIVER
S012860	THE ARCHES LTD	1,000.00	Riparian/Pre-14	1800s	May-Aug	Irrigation	Sacramento	SACRAMENTO RIVER
	THE ARCHES LTD Total	2,320.00						
S019793	TOWNE ENTERPRISES	942.00	Riparian	1996	Jan-Oct	Irrigation	Sacramento	SACRAMENTO RIVER
S019796	TOWNE ENTERPRISES	2,024.00	Riparian	1914	Jan-Sep	Irrigation	Sacramento	SACRAMENTO RIVER
S019799	TOWNE ENTERPRISES	0.00	Riparian	1914	All	Irrigation	Sacramento	SACRAMENTO RIVER
S019802	TOWNE ENTERPRISES	0.00	Riparian	1997	All	Irrigation	Sacramento	SACRAMENTO RIVER
S019808	TOWNE ENTERPRISES	5,942.00	Riparian	1914	Apr-Sep	Irrigation	Sacramento	SACRAMENTO RIVER
	TOWNE ENTERPRISES Total	8,908.00						
	Grand Total	1,433,668.02						

Application ID	Holder Name	Highest Amount Claimed	Water Rights Claim Type	Year of First Use	Season	Purpose of Use	County	Source
S014003	R J Gallo	6,000.00	Riparian	1940	All	Irrigation	Stanislaus	STANISLAUS RIVER
S009333	US Fish & Wildlife Service	2,040.00	Riparian	1950	All	Irrigation	Stanislaus	STANISLAUS RIVER
S004683	OAKDALE IRRIGATION DISTRICT	485,040.00	Pre-14	1913	All	Irrigation, Domestic	Calaveras	STANISLAUS RIVER
S010402	TUOLUMNE UTILITIES DISTRICT	3,668.00	Pre-14	1852	All	Irrigation, Domestic	Tuolumne	MORMON CREEK
S013888	JOSEPH J FRAGUERO	2,850.00	Pre-14	1884	All	Irrigation, Stockwater	Calaveras	ANGELS CREEK
		499,598.00						

Tuolumne River Watershed - Statements of Diversion and Use

Application ID	Holder Name	Highest Amount Claimed	Water Rights Claim Type	Year of First Use	Season	Purpose of Use	County	Source
S002635	CITY AND COUNTY OF SAN FRANCISCO PUC AGM WATER ENTERPRISE	581,280.00	Pre-14	1922	All	Municipal/ Industrial, Hydropower, Fish & Wildlife, Recreation	Tuolumne	TUOLUMNE RIVER
S002637	CITY AND COUNTY OF SAN FRANCISCO PUC AGM WATER ENTERPRISE	541,652.00	Pre-14	1925	All	Municipal/ Industrial, Hydropower, Fish & Wildlife, Recreation	Tuolumne	TUOLUMNE RIVER
S014379	CITY AND COUNTY OF SAN FRANCISCO PUC AGM WATER ENTERPRISE	258,778.00	Pre-14	1918	All	Municipal/ Industrial, Hydropower, Fish & Wildlife, Recreation	Tuolumne	CHERRY CREEK
	CITY AND COUNTY OF SAN FRANCISCO	1,381,710.00						
S014004	Gallo Vineyards Inc	268.22	Riparian	1960	Apr-Oct	Irrigation	Stanislaus	TUOLUMNE RIVER
	Gallo Vineyards Inc Total	268.22						
S011103	James E Coleman	1,520.00	Riparian	1917	Apr-Oct	Irrigation	Stanislaus	TUOLUMNE RIVER
	James E Coleman Total	1,520.00						
S009161	Joseph E Gallo	329.51	Riparian	1978	Mar-Oct	Irrigation	Stanislaus	TUOLUMNE RIVER
S011191	Joseph E Gallo	66.42	Riparian	1976	Mar-Oct	Irrigation	Stanislaus	TUOLUMNE RIVER
	Joseph E Gallo Total	395.93						
S000996	TUOLUMNE UTILITIES DISTRICT	10,167.00	Pre-14	1851	All	Irrigation, Stockwater, Domestic	Tuolumne	SULLIVAN CREEK
S000997	TUOLUMNE UTILITIES DISTRICT	4,815.00	Pre-14	1852	All	Irrigation, Stockwater, Domestic	Tuolumne	SULLIVAN CREEK
S001006	TUOLUMNE UTILITIES DISTRICT	3,808.00	Pre-14	1852	All	Irrigation, Stockwater, Domestic	Tuolumne	UNST (AKA POWER CREEK)
S001007	TUOLUMNE UTILITIES DISTRICT	893.00	Pre-14	1852	All	Irrigation, Stockwater, Domestic	Tuolumne	CURTIS CREEK
S010403	TUOLUMNE UTILITIES DISTRICT	730.00	Pre-14	1852	All	Irrigation, Stockwater, Domestic	Tuolumne	CURTIS CREEK
	TUOLUMNE UTILITIES DISTRICT Total	20,413.00						
S013848	TURLOCK IRRIGATION DISTRICT	1,196,100.00	Pre-14	1900	All	Irrigation, Domestic	Stanislaus	TUOLUMNE RIVER
	TURLOCK IRRIGATION DISTRICT Total	1,196,100.00						
	Grand Total	2,600,407.15						

Merced River Watershed - Statements of Diversion and Use

Application ID	Holder Name	Highest Amount Claimed	Water Rights Claim Type	Year of First Use	Season	Purpose of Use	County	Source
S007654	Gallo Vineyards Inc	360.00	Riparian	1910	Mar-Oct	Irrigation, Frost Protection	Merced	MERCED RIVER
S007655	Gallo Vineyards Inc	170.00	Riparian	1910	Apr-Oct	Irrigation, Frost Protection	Merced	MERCED RIVER
S007656	Gallo Vineyards Inc	1,275.00	Riparian	1910	Mar-Oct	Irrigation, Frost Protection	Merced	MERCED RIVER
S007657	Gallo Vineyards Inc	150.00	Riparian	1910	Mar-Dec	Irrigation, Frost Protection	Merced	MERCED RIVER
S007658	Gallo Vineyards Inc	135.00	Riparian	1910	Mar-Dec	Irrigation, Frost Protection	Merced	MERCED RIVER
S007661	Gallo Vineyards Inc	175.00	Riparian	1910	Mar-Dec	Irrigation, Frost Protection	Merced	MERCED RIVER
S007662	Gallo Vineyards Inc	155.00	Riparian	1910	Mar-Dec	Irrigation, Frost Protection	Merced	MERCED RIVER
S007663	Gallo Vineyards Inc	150.00	Riparian	1910	Mar-Dec	Irrigation, Frost Protection	Merced	MERCED RIVER
S007664	Gallo Vineyards Inc	230.00	Riparian	1910	Apr-Dec	Irrigation, Frost Protection	Merced	MERCED RIVER
S007665	Gallo Vineyards Inc	1,028.00	Riparian	1910	All	Irrigation, Frost Protection, Industrial	Merced	MERCED RIVER
S007666	Gallo Vineyards Inc	115.00	Riparian	1910	All	Irrigation, Frost Protection	Merced	MERCED RIVER
S007667	Gallo Vineyards Inc	180.00	Riparian	1910	Apr-Oct	Irrigation, Frost Protection	Merced	MERCED RIVER
S007668	Gallo Vineyards Inc	300.00	Riparian	1910	Apr-Oct	Irrigation, Frost Protection	Merced	MERCED RIVER
S007669	Gallo Vineyards Inc	200.00	Riparian	1910	Apr-Oct	Irrigation, Frost Protection	Merced	MERCED RIVER
S007670	Gallo Vineyards Inc	270.00	Riparian/Pre-14	1900	Apr-Oct	Irrigation, Frost Protection	Merced	MERCED RIVER
S007671	Gallo Vineyards Inc	210.00	Riparian/Pre-14	1900	Apr-Oct	Irrigation, Frost Protection	Merced	MERCED RIVER
S007672	Gallo Vineyards Inc	375.00	Riparian/Pre-14	1900	Apr-Oct	Irrigation, Frost Protection	Merced	MERCED RIVER
S007673	Gallo Vineyards Inc	210.00	Riparian/Pre-14	1900	Apr-Oct	Irrigation, Frost Protection	Merced	MERCED RIVER
S007710	Gallo Vineyards Inc	375.00	Riparian/Pre-14	1900	Mar-Oct	Irrigation, Frost Protection	Merced	MERCED RIVER
S007711	Gallo Vineyards Inc	5,500.00	Riparian/Pre-14	1900	Mar-Oct	Irrigation, Frost Protection	Merced	MERCED RIVER
S007712	Gallo Vineyards Inc	2,240.00	Riparian/Pre-14	1900	Mar-Oct	Irrigation, Frost Protection	Merced	MERCED RIVER
S007713	Gallo Vineyards Inc	1,050.00	Riparian/Pre-14	1900	Mar-Oct	Irrigation, Frost Protection	Merced	MERCED RIVER
	Gallo Vineyards Inc Total	14,853.00						
S007674	Henry Te Velde	1,205.00	Riparian	1900	Mar-Sep	Irrigation	Merced	MERCED RIVER
	Henry Te Velde Total	1,205.00						
S001496	Kelsey Ranch LP	5,496.00	Pre-14	1858	Apr-Oct	Irrigation, Stockwater, Domestic, Recreation	Merced	MERCED RIVER
S002055	Kelsey Ranch LP	2,649.00	Riparian/Pre-14	1858	All	Irrigation, Domestic	Merced	MERCED RIVER
	Kelsey Ranch LP Total	8,145.00						
S012547	MADERA IRRIGATION DISTRICT	21,457.00	Pre-14	1875	All	Irrigation	Madera	BIG CREEK
	MADERA IRRIGATION DISTRICT Total	21,457.00						
S004718	MERCED IRRIGATION DISTRICT	571,000.00	Pre-14	1911	All	Irrigation	Merced	MERCED RIVER
S004719	MERCED IRRIGATION DISTRICT	3,336.00	Riparian/Pre-14	1888	Apr-Oct	Irrigation	Merced	MERCED RIVER
	MERCED IRRIGATION DISTRICT Total	574,336.00						
	Grand Total	619,996.00						

San Joaquin River Watershed - Statements of Diversion and Use

Application ID	Holder Name	Highest Amount Claimed	Water Rights Claim Type	Year of First Use	Season	Purpose of Use	County	Source
S005469	ARNOLD SOUZA & SONS	1,242.00	Riparian	1963	Apr-Sep	Irrigation	Stanislaus	SAN JOAQUIN RIVER
	ARNOLD SOUZA & SONS Total	1,242.00						
S001073	COLUMBIA CANAL COMPANY	62,879.00	Pre-14	1872	Feb-Dec	Irrigation	Madera	SAN JOAQUIN RIVER
	COLUMBIA CANAL COMPANY Total	62,879.00						
S005005	COSTA VIEW FARMS #2, A CA GEN PARTNERSHIP	19,000.00	Riparian/Pre-14	1903	All	Irrigation, Stockwater	Madera	FRESNO RIVER
	COSTA VIEW FARMS #2, A CA GEN	19,000.00						
S010411	LONE TREE MUTUAL WATER COMPANY	18,376.00	Riparian	1955	All	Irrigation	Merced	SAN JOAQUIN RIVER
	LONE TREE MUTUAL WATER COMPANY Total	18,376.00						
S004978	MADERA IRRIGATION DISTRICT	51,741.00	Pre-14	1873	All	Irrigation	Madera	FRESNO RIVER
S014187	MADERA IRRIGATION DISTRICT	18,148.00	Pre-14	1873	Oct-Jul	Irrigation	Madera	NORTH FORK WILLOW CREEK
	MADERA IRRIGATION DISTRICT Total	69,889.00						
S001915	Mark D McKean	945.00	Riparian/Pre-14	1908	Apr-Oct	Irrigation	Fresno	FRESNO SLOUGH
S001916	Mark D McKean	770.00	Riparian	1908	Mar-Sep	Irrigation	Fresno	FRESNO SLOUGH
S001917	Mark D McKean	860.00	Riparian/Pre-14	1908	Feb-Oct	Irrigation	Fresno	FRESNO SLOUGH
	Mark D McKean Total	2,575.00						
S006296	MENEFEE RIVER RANCH COMPANY	2,105.00	Riparian	1952	Mar-Oct	Irrigation	Merced	FRESNO RIVER
	MENEFEE RIVER RANCH COMPANY Total	2,105.00						
S009320	PATTERSON IRRIGATION DISTRICT	60,200.00	Pre-14	1910	Mar-Sep	Irrigation	Stanislaus	SAN JOAQUIN RIVER
	PATTERSON IRRIGATION DISTRICT Total	60,200.00						
S015523	POINT MILLERTON RANCH LLC	2,100.00	Riparian/Pre-14	2002	All	Irrigation, Stockwater	Madera	FINE GOLD CREEK
	POINT MILLERTON RANCH LLC Total	2,100.00						
S014001	R J GALLO	5,304.00	Riparian	1950	All	Irrigation	Stanislaus	SAN JOAQUIN RIVER
S014002	R J GALLO	813.00	Riparian	1950	All	Irrigation, Stockwater	Stanislaus	SAN JOAQUIN RIVER
	R J GALLO Total	6,117.00						
S001116	ROBERT F FLYNN	4,200.00	Riparian	1926	All	Irrigation, Stockwater	Merced	DUCK SLOUGH
	ROBERT F FLYNN Total	4,200.00						
S009575	U S FISH & WILDLIFE SERVICE	12,976.00	Pre-14	1900	All	Irrigation, Wildlife Management	Merced	DEADMAN CREEK
	U S FISH & WILDLIFE SERVICE Total	12,976.00						
	Grand Total	261,659.00						

Appendix D

Section D.5
Other Pre-1914 Consumptive Water Rights Claims

Feather River Pre-1914 Consumptive Water Rights

1) South Feather Water & Power Agency (Formerly Oroville-Wyandotte Irrigation District) Claims:

Notice Date	Priority Date	Miners' Inches	Cubic Feet Per Second	Acre-feet	Source
	9/25/1852		All water		South Fork Feather River
	4/19/1854		All water		South Fork Feather River
	11/29/1854		All water		South Fork Feather River
	6/21/1862	240	5	3,477	South Fork Feather River
	8/15/1889	3,000	60	43,468	South Fork Feather River at LG Valley
	11/23/1908	5,000	100	72,446	Lost Creek
	11/23/1908	1,000	20	14,489	Lost Creek
	9/10/1910	10,000	200	144,893	South Fork Feather River at LG Valley
	9/10/1910	10,000	200	144,893	South Fork Feather River at LG Valley
	9/10/1910	10,000	200	144,893	South Fork Feather River at LG Valley
	9/29/1910	10,000	200	144,893	South Fork Feather River at LG Valley
	9/29/1910	10,000	200	144,893	South Fork Feather River at LG Valley
	4/22/1911	100	2	1,449	McCabe Creek
	4/22/1911	5,000	100	72,446	South Fork Feather River
	10/22/1914	7,500	150	108,669	Near Rock Creek, South Fork Feather River
	10/26/1914	5,000	100	72,446	Lower South Fork Feather River
			Total Face Value	533,784	(Less redundant claims in 1910 on South Fork Feather in LG Valley)

2) Western Canal Water District

County / Decree	Priority Date	Cubic Feet Per Second	Acre-feet	Source
Sutter/No. 2360	12/15/1924		150,000	Year-round Feather River
			145,000	Below Centerville PowerHouse
		Total Face Value	295,000	

3) Joint Water Districts of Feather River

Priority Date	Miners' Inches	Cubic Feet Per Second	Acre-feet	Source
7/29/1902	100,000	2,000	1,448,926	Feather River
5/12/1903	100,000	2,000	1,448,926	Feather River
3/29/1904	100,000	2,000	1,448,926	Feather River
3/3/1909		500	362,231	Feather River
		Total Face Value	1,811,157	(less redundant claims on Feather River)

Sutter Decree No. 2360, 12/15/1924	Miners' Inches	Cubic Feet Per Second	Acre-feet	Source
Sutter Butte Canal Company first right		1,200	869,355	Feather River
Great Western Power Company (later PG&E) second right		300	217,339	Feather River
Above 1500 cfs, SBCC's second right is 2/3 of flow between 1500 and 2700 cfs (1200 cfs difference)		800	579,570	Feather River
Above 1500 cfs, Great Western's second right is 1/3 of flow between 1500 and 2700 cfs		400	289,785	Feather River
Above 2700 cfs, Great Western and Western Canal Company receive the next 500 cfs		500	362,231	Feather River
Above 3200 cfs, SBCC has right to divert the next 500 cfs, including all accretions, whatever the source.		500	362,231	Feather River
		SBCC Total Face Value	1,811,157	
		Western Canal Company's total claims =	869,355	

Water Right Shares of Sutter Butte Canal Company's Decreed Water Rights allocated to Joint Water Districts

Biggs-West Gridley Water District	29.0%	525,236
Butte Water District	24.0%	434,678
Richvale Irrigation District	27.0%	489,012
Sutter Extension Water District	20.0%	362,231

Sources: South Feather Water Power Agency;
Western Canal Water District;
Joint Water Districts.

Yuba River Pre-1914 Consumptive Water Rights

1) Browns Valley Irrigation District

Priority Date	Miners' Inches	Cubic Feet Per Second	Acre-feet	Source
3/21/1890	10,000	200	144,893	North Yuba River

2) Yuba County Water Agency

Priority Date	Miners' Inches	Cubic Feet Per Second	Acre-feet	Source
1890		50	36,223	Colgate Head Dam, year-round - North Yuba River and its tributaries
		200	144,893	Hydropower only - Colgate Head Dam on North Yuba River
		60	43,468	Hydropower only - Colgate Head Dam on North Yuba River
		Total Face Value, Consumptive Rights	36,223	

Sources: Browns Valley Irrigation District;
Yuba County Water Agency; C-WIN.

Sacramento River Pre-1914 Consumptive Water Rights

1) Right Bank of Sacramento River at Wheel Ditch in Redding:
Shasta County Water Rights Book 2, p. 391, notice dated 11/21/1914
Deeded by McCoy Fitzgerald to Anderson-Cottonwood Irrigation Disrict, 12/30/1914

Notice Date	Priority Date	Miners' Inches	Cubic Feet Per Second	Acre-feet	Source
11/21/1914	11/21/1914	20,000	400	289,785	Wheel Ditch - Sacramento River

2) Glenn-Colusa Irrigation District

Notice Date	Priority Date	Miners' Inches	Cubic Feet Per Second	Acre-feet	Source
4/16/1903	4/15/1903	500,000	10,000	7,244,628	Sacramento River
2/26/1903	2/25/1903	150,000	3,000	2,173,388	Sacramento River
2/26/1903	2/25/1903	150,000	3,000	2,173,388	Sacramento River
12/7/1901	11/30/1901		5,000	3,622,314	Sacramento River
12/7/1901	11/30/1901		5,000	3,622,314	Sacramento River
12/21/1883	12/18/1883		5,000	3,622,314	Sacramento River
11/19/1903	11/13/1903		5,000	3,622,314	Sacramento River
				26,080,661	Sacramento River Total
8/1/1907	8/1/1907		5,000	3,622,314	Stony Creek
			5,000	3,622,314	Stony Creek
5/4/1905	4/26/1905		5,000	3,622,314	Stony Creek
				10,866,942	Stony Creek Total
11/23/1904	11/21/1904		2,000	1,448,926	Willow Creek
				1,448,926	Willow Creek Total
				38,396,529	Grand Total

3) City of Sacramento
Source: State Water Board Notice of Petitions for Extensions of Time to Complete Construction Under Permits 11358, 11359, 11360, and 11361, November 3, 1988

Notice Date	Priority Date	Miners' Inches	Cubic Feet Per Second	Acre-feet	Source
	1854		75	54,335	Sacramento River

Sources: Anderson-Cottonwood Irrigation District;
Glenn-Colusa Irrigation District;
City of Sacramento;
State Water Resources Control Board.

Turlock and Modesto Irrigation Districts' Pre-1914 Consumptive Water Rights

Holder Name	Date	Point of Diversion	Facility Name	Comment	Diversion	Diversion Units	Storage	Storage Units	Irrigation Season Face Amount, AF (246 days)
Turlock and Modesto Irrigation Districts and La Grange	5/18/1871	La Grange Dam	La Grange Dam	Acquired from F. Green and A.D. Allen	66	cubic feet per second			66 cfs max
Modesto Irrigation District	2/27/1913	La Grange Dam	La Grange Dam	Acquired from J.M. Finley	13,000	miner's inches			Not to exceed 250 cfs, among these first three water rights claims for a total of: 121,983.47
Modesto Irrigation District	11/13/1913	La Grange Dam	La Grange Dam	Acquired from Waterford Irrigation District	16,000	miner's inches			
Turlock and Modesto Irrigation Districts	1/16/1855	La Grange Dam	La Grange Dam	Acquired from Franklin Water Company					The sum of these water rights may not exceed 4,500 cfs diversion; Franklin Water Co and Elam Dye have no diversion amounts; all rights associated with this limit are converted to acre-feet:
Turlock and Modesto Irrigation Districts	1/18/1862	La Grange Dam	La Grange Dam	Acquired from Elam Dye					
Turlock and Modesto Irrigation Districts	5/18/1872	La Grange Dam	La Grange Dam	Acquired from John Burcham, M.A. Wheaton, and Charles Elliott	500,000	miner's inches			
Turlock Irrigation District	1/5/1889	La Grange Dam	La Grange Dam	Posted by TID	225,000	miner's inches			
Modesto Irrigation District	6/21/1890	La Grange Dam	La Grange Dam	Posted by MID	250,000	miner's inches			
Modesto Irrigation District	10/1/1908	La Grange Dam, Modesto Reservoir	La Grange Dam, Modesto Reservoir	Posted by MID	50,000	miner's inches	40,000	acre-feet	
Turlock Irrigation District	8/31/1911	La Grange Dam, Turlock Lake	La Grange Dam, Turlock Lake	Posted by TID	200,000	miner's inches	100,000	acre-feet	3,260,082.64
				Estimated Total Face Amount =					3,382,066.12

Source: Letter from Kenneth Petruzzelli, O'Laughlin and Paris LLP, attorneys for the Modesto Irrigation District, "Public Records Act Request for Pre-1914 Water Rights," dated January 14, 2011; California Water Impact Network. There are 50 miner's inches to 1 cubic foot per second.

Pre-1914 Appropriative Water Rights Claims of the City and County of San Francisco

Appropriation ID	Date	Point of Diversion	Facility Name	Face Amt (cfs)	Source
151(6)	7/22/1902	Stanislaus National Forest, Cherry Valley Reservoir Site, NE 1/4 Section 5, T1N R19E MDB&M	Cherry Valley Reservoir Site	1,000.00	Cherry Creek
151(4)	7/20/1902	Junction Eleanor & Cherry Creek, Section 16, T1N R19E MDB&M	Cherry Valley Reservoir Site	240.00	Eleanor & Cherry Creek
158	2/27/1911	Stanislaus National Forest, just north of S 1/4 corner of Setion 32, T2N R19E	Cherry Valley Reservoir Site	500.00	Cherry Creek
153(1)	10/24/1909	Stanislaus National Forest, just west of E 1/4 corner of Section 8, T2N R19E MDB&M	Cherry Valley Reservoir Site	1,000.00	Cherry Creek
151(21)	10/11/1909	Junction Eleanor & Cherry Creek, Section 16, T1N R19E MDB&M	Cherry Valley Reservoir Site	240.00	Eleanor & Cherry Creek
			Cherry Valley Reservoir Site Total	2,980.00	
160	2/18/1911	Yosemite National Park, NW 1/4 of Section 16, T1N R20E MDB&M	Hetch Hetchy Reservoir Site	500.00	Tuolumne River
155(2)	10/4/1908	Stanislaus National Forest near mouth of Jawbone Creek	Hetch Hetchy Reservoir Site	200.00	Tuolumne River
156(3)	9/29/1908	Yosemite National Park, NE 1/4 Section 17, T1N R20E MDB&M	Hetch Hetchy Reservoir Site	200.00	Tuolumne River
			Hetch Hetchy Reservoir Site Total	700.00	
154(6)	7/29/1901	Yosemite National Park, Lake Eleanor Reservoir Site (1/4 mile beow Lake Eleanor) SE 1/4 Section 34, T2N R19E MDB&M NW 1/4 within SE 1/4.	Lake Eleanor Reservoir Site	1,000.00	Eleanor Creek
155(1)	7/29/1901	Yosemite National Park NW 1/4 Section 3, T1N R19E MDB&M	Lake Eleanor Reservoir Site	100.00	Eleanor Creek
159	2/27/1911	Yosemite National Park, NW 1/4 Section 3, T1N R19E MDB&M	Lake Eleanor Reservoir Site	All the waters of Eleanor Creek	Eleanor Creek
154(14)	11/17/1909	Stanislaus National Park, West Bank NE 1/4 of NE 1/4Section 9 T!N R19E, MDB&M	Lake Eleanor Reservoir Site	100.00	Eleanor Creek
156(1)	10/1/1908	Yosemite National Park, NW 1/4 Section 3, T1N R19E	Lake Eleanor Reservoir Site	100.00	Eleanor Creek
			Lake Eleanor Reservoir Site Total	1,100.00	
163	2/28/1911	Stanislaus National Forest near mouth of Jawbone Creek	Tuolumne River at and Near Early Intake	500.00	Tuolumne River
161	2/21/1911	Stanislaus National Forest 1 1/4 miles upstream from Range Line between R18E and R19E	Tuolumne River at and Near Early Intake	500.00	Tuolumne River
162	2/20/1911	Stanislaus Forest near west line of new park boundary	Tuolumne River at and Near Early Intake	500.00	Tuolumne River
153(5)	10/15/1909	Stanislaus National Forest 1 1/4 miles upstream from Range Line between R18E and R19E	Tuolumne River at and Near Early Intake	1,000.00	Tuolumne River
151(22)	10/12/1909	Stanislaus National Forest, above junction with Cherry River	Tuolumne River at and Near Early Intake	240.00	Tuolumne River
156(2)	10/4/1908	Near mouth of Jawbone Creek	Tuolumne River at and Near Early Intake	300.00	Jawbone Creek Tuolumne River
			Tuolumne River at and Near Early Intake Total	3,040.00	
			Grand Total	7,820.00	
			Tuolumne River at and Near Early Intake Total in Acre-feet originally claimed	2,202,366.94	

Source: R.B. Hansen, *San Francisco's Water Rights on the Tuolumne River Watershed*, prepared under the direction of A.O. Olson, Manager and Chief Engineer, Hetch Hetchy Water Supply, Power and Utilities Engineering Bureau, City and County of San Francisco Public Utilities Commission, July 1951. Available from the UC Riverside Water Resources Collections and Archives, Call No. G4794 H1.

Merced River Riparian Pre-1914 Consumptive Water Rights

Water Right Type	Status	Holder Name	Date	Point of Diversion	Comment	Face Amount, AF
Appropriative	Pre-1914	Farmer's Canal Company	1876	Originally that of the Robla Ditch	2500 cfs, with no apparent seasonal limitations.	1,811,157
Appropriative	Pre-1914	Crocker-Huffman Land & Water Company	1883	Crocker-Huffman Dam	2500 cfs; this right was originally filed by C.H. Huffman personally, acquired by Huffman and Crocker's Merced Canal & Irrigation Company, later taken over by Crocker Huffman Land & Water Company in late 1880s. This water right was acquired by Merced Irrigation District in 1919 after the District was formed.	1,811,157
Riparian		Upton et al	1895	Various - along Merced River below Crocker-Huffman Dam	Maximum diversion of 225 cfs pursuant to the Upton Decree of 1895	163,004
Riparian		Dale & Cook Ranch owners	1876	Various individuals associated with ownership of the Dale and Cook Ranch	24 cfs amount to a total diversion of 1,900 AF during diversion season	1,900
Riparian		J.J. Stevinson	1930	Merced ID's boundary intersecting with McCoy Spillway, Arena Spillway, or Bear Creek	Diversion season is from April 1 through September 30 with varying flow rates each month therein, according to the Stevinson Decree. Merced ID agreed with Stevinson to exchange delivery of water from Lake McClure up to 24,000 acre-feet annually, in exchange for an easement for the District to incorporate Stevinson's riparian water into District operations at Lake McClure."The rights hereby conveyed by the Company to the District shall be an easement in all the right title, interest, estate, and claims of the Company in and to the lands...in which it has an interest, and as against any right which the Company may now have in and to the waters of said Merced River."	24,000
Riparian		Parties to the Cowell Agreement	1926	Crocker-Huffman Dam	Merced Irrigation District is required to provide releases from New Exchequer Dam to meet riparian right holders requirements.	93,793
					Pre-1914 and Riparian Water Rights, Merced River	3,905,012

Sources: Merced County Superior Court; C-WIN.

San Joaquin River Riparian and Pre-1914 Consumptive Water Rights Claims

San Joaquin River Irrigation Uses	Estimated Face Amount	Point of Diversion	Other Description
USBR Purchase Rights from Miller & Lux Inc.	624,200	Friant Dam, rediverted at Madera and Friant-Kern Canals	Subject of a water rights purchase contract with US Bureau of Reclamation, and appraised at this quantity of water (Etcheverry, 1936; California Water Project Authority, 1936).Originally grassland and "uncontrolled" riparian flood flows. Grassland flows were pre-1914 appropriative rights of the Miller & Lux canal company; "uncontrolled" flows were riparian rights associated with lands adjacent to the San Joaquin River owned by Miller & Lux cattle business for grazing.
San Joaquin River Exchange Contractors Rights - exchange/easement on cropland water rights	840,000	USBR diverts these flows from the San Joaquin River into Madera and Friant-Kern Canals	Subject of a water rights exchange contract with US Bureau of Reclamation (Engle, Part Two, 1957). Originally "cropland" rights owned by Miller & Lux Inc. on which permanent and other crops were cultivated with highly reliable senior appropriative and riparian water rights. The Exchange Contractors having provided USBR with an easement for these rights receives in their place flows from Shasta Reservoir via Delta Mendota Canal.
Chowchilla Farms/Water District	49,300	Chowchilla Canal diversion from San Joaquin River upstream of Mendota Pool, east side of the river.	Subject of a water rights purchase contract with US Bureau of Reclamation for appropriative rights via Chowchilla Canal and under appropriative and riparian rights through the Blythe Canal, acquisition of which would be used in storage at Friant Dam and diversion into Madera Canal (California Water Project Authority, No. 6, 1937). The lands from which these rights were purchased lie between Fresno and Chowchilla rivers along the east bank of the San Joaquin River.
Lands Between Chowchilla Farms and Stevinson Colony	40,281	Between Chowchilla River and Merced River along east side of San Joaquin River.	Subject to water rights purchase contracts with US Bureau of Reclamation (including lands of Bloss, Hatfield, Crane, Turner, Erreca and Hansen) (California Water Project Authority, No. 7, 1937). Includes lands formerly owned by Miller & Lux, Inc., conveyed with reservations of easements in and to use of water and upstream storage rights reserved to Miller & Lux. Estimate of water rights shown are for uncontrolled flood and riparian rights as described in 1936, subordinate only to prior appropriative, prescriptive and contractual rights held by Miller & Lux and associated companies.
Stevinson/East Side Canal	20,168	Pre-1914 appropriative and riparian diversions upstream on San Joaquin River from Merced River confluence.	Unclear whether US Bureau of Reclamation entered into a water rights purchase contract with Stevinson. Stevinson's diversion rights were considered subordinated to Edison Securities and Miller & Lux (California Water Project Authority, No. 8, 1939, 18), and Stevinson instead was able to arrange a supply of water for its lands via the Merced River from Merced Irrigation District under the Stevinson Contract. East Side Canal appropriation from the San Joaquin River was found to average 14,268 AF, while residual riparian rights to the San Joaquin averaged 5,900 AF.
Tranquillity & James Irrigation Districts - Fresno Slough	29,300	Riparian diversions along Fresno Slough upstream of Mendota Pool.	Diversions were subordinated to Miller & Lux rights and allowed only when San Joaquin River reached 1,360 cfs and then the districts could take just 12 percent up to a maximum of 140 cfs. Estimated face amount for these districts obtained from Table 5 of California Water Project Authority, 1936.
Edison Securities	33,127	Riparian diversions just upstream of Mendota Pool and Fresno Slough along left (south) bank of San Joaquin River	Subject of a water rights purchase contract with US Bureau of Reclamation for uncontrolled overflow riparian rights from the San Joaquin River and associated sloughs upstream of Mendota Pool, along south bank (California Water Project Authority, No. 8, 1938). Edison Securities purchased these riparian lands from the Herminghaus Estate in January 1928.
Friant to Gravelly Ford right holders	116,741	As many as 198 diversions and/or pumpers of water from lands adjacent to the San Joaquin River	Rights of most of these landowners were acquired by USBR, but some of those not immediately acquired by 1939 became plaintiffs in Rank v. Krug, a suit by water right holders and groundwater pumpers in this area against Friant Dam. Case decided by U.S. Supreme Court in 195?? The court determined that these water right holders collectively used about 200,000 acre-feet per year in this area of the San Joaquin River. This was the section of the river that received releases from Friant under D-990, and below Gravelly Ford, the river dried up through to the confluence with the Merced River. San Joaquin River Restoration Program Settlement Agreement states that riparian releases are now 117,000 to 126,000 acre-feet per year, consistent with "Steiner declaration."
Total Pre-1914 and Riparian Water Rights, Upper San Joaquin River	1,753,117		

Sources: State of California Water Project Authority, 1936-1939; *Rank v. Krug*; San Joaquin River Settlement Agreement, 2006.

Lands east of San Joaquin River, Between Chowchilla Farms and Stevinson Colony Assumed Riparian to that Stream or its Branch Channels	Area in Acres	Estimated Average Uncontrolled Diversions, based on 1.65 acre-feet per acre
A.J. Turner	158	261
George J. Hatfield	1,293	2,133
Charles S. Howard	5,514	9,098
Charles A. Crane	2,400	3,960
Ed P. Waltz	2,640	4,356
Fred A Solari and J.A. Turner	861	1,421
Dan L McNamara	1,236	2,039
Dan L McNamara	957	1,579
Martin Erreca	520	858
Nell E Hanson	527	870
Jessie S Potter(1)	2,270	3,746
Jessie S Potter(2)	6,037	9,961
Totals	24,413	40,281
Source: California Water Project Authority, 1937b, 1937c.		

Appendix D

Section D.6
Post-1914 Consumptive Water Rights Claims

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
A029129	20341		BLUE JAY WATER ASSOCIATION	10/19/1987	20.80	Trinity	TRINITY RIVER UNDERFLOW
			BLUE JAY WATER ASSOCIATION Total		20.80		
A027206	18568	12081	BRUCE G HANEY	2/5/1982	0.60	Trinity	TRINITY RIVER
			BRUCE G HANEY Total		0.60		
A021330	14347	10037	Chad Blevins	6/10/1963	5.20	Trinity	TRINITY RIVER
			Chad Blevins Total		5.20		
A017749	11255	6749	CHARLES HIGGS	7/31/1957	16.80	Trinity	TRINITY RIVER
			CHARLES HIGGS Total		16.80		
A027969	19275	12725	CHRISTOPHER T CROSS	2/3/1984	0.20	Trinity	TRINITY RIVER
			CHRISTOPHER T CROSS Total		0.20		
A010791	6398	4625	COVINGTON MUTUAL WATER COMPANY	3/24/1944	2,171.90	Trinity	EAST FORK STUART FORK TRINITY RIVER
			COVINGTON MUTUAL WATER COMPANY Total		2,171.90		
A017743	11178	6988	DAVID COVINGTON	1/28/1964	33.30	Trinity	TRINITY RIVER
			DAVID COVINGTON Total		33.30		
A026530	18389	12111	DAVID L SULLIVAN	9/24/1980	1.10	Trinity	TRINITY RIVER UNDERFLOW
			DAVID L SULLIVAN Total		1.10		
A026529A	18429	12935	GARTH R SUNDBERG	1/22/1982	0.50	Trinity	TRINITY RIVER UNDERFLOW
			GARTH R SUNDBERG Total		0.50		
A021142	14094	8656	GEORGE PAINTER	1/28/1963	0.30	Trinity	TRINITY RIVER
			GEORGE PAINTER Total		0.30		
A029111	20233	13386	GERARD A KAZ	9/16/1987	1.20	Trinity	TRINITY RIVER UNDERFLOW
			GERARD A KAZ Total		1.20		
A029183	20269	13322	HAZEL J SCHOTT	2/3/1988	2.30	Trinity	TRINITY RIVER
			HAZEL J SCHOTT Total		2.30		
A029336	20343	13616	James Lee and Billie Jo Bonk Revocable Trust	11/9/2005	0.30	Trinity	TRINITY RIVER
			James Lee and Billie Jo Bonk Revocable Trust Total		0.30		
A026660	18369	12082	JEFFREY J BUTLER	12/10/1980	0.60	Trinity	TRINITY RIVER
			JEFFREY J BUTLER Total		0.60		
A029302	20344	13485	KATHERINE L RIDENOUR	7/18/1988	1.80	Trinity	TRINITY RIVER UNDERFLOW
			KATHERINE L RIDENOUR Total		1.80		
A024059	16579	10904	KATHY WATSON	5/3/1972	1.40	Trinity	TRINITY RIVER UNDERFLOW
			KATHY WATSON Total		1.40		
A027867	19134	12721	Ken Tamplen	9/14/1983	1.10	Trinity	TRINITY RIVER UNDERFLOW
			Ken Tamplen Total		1.10		
A017669	11106	6566	Lewiston Community Service District	6/21/1957	543.00	Trinity	TRINITY RIVER
			Lewiston Community Service District Total		543.00		
A018177	11654	6612	LEWISTON PARK MUTUAL WATER COMPANY, INC	6/11/1958	311.30	Trinity	ALDER GULCH, TRINITY RIVER
			LEWISTON PARK MUTUAL WATER COMPANY, INC Total		311.30		
A027639	18898	12674	MADELINA CORONA	1/24/1983	0.30	Trinity	TRINITY RIVER
			MADELINA CORONA Total		0.30		

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
A020923	13998	8410	MARCIA OSA COATES	9/4/1962	0.30	Humboldt	TRINITY RIVER
			MARCIA OSA COATES Total		0.30		
A023097	15783	10384	MARK GIBERSON	7/25/1968	5.60	Trinity	TRINITY RIVER
			MARK GIBERSON Total		5.60		
A028907	20081	13096	NOELLE ROGET	9/25/1986	2.00	Trinity	TRINITY RIVER
			NOELLE ROGET Total		2.00		
A015365	9527	5059	NORMAN EVANS	6/3/1953	0.80	Trinity	TRINITY RIVER
A015366	9528	5060	NORMAN EVANS	6/3/1953	0.30	Trinity	TRINITY RIVER
			NORMAN EVANS Total		1.10		
A027855	19198	12716	RALPH M MCCOMB	8/31/1983	0.50	Trinity	TRINITY RIVER UNDERFLOW
			RALPH M MCCOMB Total		0.50		
A020084	13120	7920	ROGER F KENDELL	4/13/1961	2.20	Trinity	TRINITY RIVER
			ROGER F KENDELL Total		2.20		
A016087	10146	5302	RONALD JURIN	10/13/1954	1,642.50	Humboldt	TRINITY RIVER
			RONALD JURIN Total		1,642.50		
A015227	9531	5145	RUSSELL H HAGEN JR	3/9/1953	2.30	Humboldt	TRINITY RIVER
			RUSSELL H HAGEN JR Total		2.30		
A026531	18390	12060	STAN POFF	9/24/1980	0.40	Trinity	TRINITY RIVER UNDERFLOW
			STAN POFF Total		0.40		
A022840	15541	10386	STEPHEN DUTTON	6/30/1967	3.40	Trinity	TRINITY RIVER
			STEPHEN DUTTON Total		3.40		
A021166	14149	8631	STEVEN B PETERSON	2/18/1963	7.60	Trinity	TRINITY RIVER
			STEVEN B PETERSON Total		7.60		
A024462	17650		TRINITY VILLAGE WATER COMPANY	9/19/1973	360.00	Trinity	TRINITY RIVER
			TRINITY VILLAGE WATER COMPANY Total		360.00		
A011927	7140	3513	U S SHASTA-TRINITY NATL FOREST	6/9/1947	852.90	Trinity	EAST FORK STUART FORK TRINITY RIVER
			U S SHASTA-TRINITY NATL FOREST Total		852.90		
A021019	14077	8386	U S SIX RIVERS NATL FOREST	11/16/1962	29.00	Trinity	TRINITY RIVER
			U S SIX RIVERS NATL FOREST Total		29.00		
A005628	11967		U.S. BUREAU OF RECLAMATION	7/30/2027	3,349,943.80	Contra Costa, Trinity	OLD RIVER, TRINITY RIVER
A015374	11968		U.S. BUREAU OF RECLAMATION	7/29/2002	417,193.30	Contra Costa, Trinity	OLD RIVER, TRINITY RIVER
A015375	11969		U.S. BUREAU OF RECLAMATION	9/16/1959	3,030,761.80	Contra Costa, Trinity	Old River, TRINITY RIVER
A016767	11971		U.S. BUREAU OF RECLAMATION	7/29/2002	700,000.00	Contra Costa, Trinity	TRINITY RIVER
A017374	11973		U.S. BUREAU OF RECLAMATION	7/29/2002	1,085,966.30	Contra Costa, Trinity	TRINITY RIVER
			U.S. BUREAU OF RECLAMATION Total		8,583,865.20		
A023882	16413	10503	WADE AMMON SR	10/1/1971	4.00	Trinity	SOUTH FORK TRINITY RIVER
			WADE AMMON SR Total		4.00		

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
A029410	20757		WEAVERVILLE COMMUNITY SERVICES DISTRICT	2/14/1989	870.00	Trinity	TRINITY RIVER
			WEAVERVILLE COMMUNITY SERVICES DISTRICT Total		870.00		
A028537	19864	12946	WILLIAM E HOYER	8/14/1985	0.10	Trinity	TRINITY RIVER UNDERFLOW
			WILLIAM E HOYER Total		0.10		
			Grand Total		8,590,763.10		

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
A001300	1360	2302	1994 ORAL BABCOCK LIVING TRUST	05/29/19	3,600.00	Lassen	EAST FORK JUNIPER CREEK
A001696	1361	2595	1994 ORAL BABCOCK LIVING TRUST	03/01/20	892.60	Lassen	DARK CANYON CREEK
			1994 ORAL BABCOCK LIVING TRUST Total		4,492.60		
A005549	2891	1366	AGENCY 5	06/28/27	282.40	Siskiyou	SOUTH FORK BEAR CREEK
			AGENCY 5 Total		282.40		
A004554	2316	1602	Alan K. Nelson	11/14/35	185.00	Modoc	DUTCH FLAT CREEK
			Alan K. Nelson Total		185.00		
A002383	1170	2169	ALTURAS RANCHES LLC	06/07/21	900.00	Modoc	JUNIPER GULCH
A010079	8453	4291	ALTURAS RANCHES LLC	12/05/40	745.00	Modoc	CROOKS CANYON
A013339	7970	6443	ALTURAS RANCHES LLC	09/07/49	470.00	Modoc	BIG JUNIPER CREEK
A013526	8456	4294	ALTURAS RANCHES LLC	12/29/49	113.80	Modoc	CROOKS CANYON
A014759	9219	6071	ALTURAS RANCHES LLC	04/17/52	93.50	Modoc	CROOKS CANYON
A016047	10304	6951	ALTURAS RANCHES LLC	09/15/54	204.00	Modoc	CROOKS CANYON
A016048	10305	6952	ALTURAS RANCHES LLC	09/15/54	204.00	Modoc	CROOKS CANYON
A021557	14924	9579	ALTURAS RANCHES LLC	11/27/63	1,370.00	Modoc	UNST, UNXX
			ALTURAS RANCHES LLC Total		4,100.30		
A020606	13624	8511	ANTHONY BOKARES	02/13/62	15.00	Lassen	UNST
A022408	15210	9918	ANTHONY BOKARES	02/28/66	14.00	Lassen	UNST, UNST (2)
			ANTHONY BOKARES Total		29.00		
A027640	18903	12948	AUGUSTINO DE MARIA	01/27/83	4.20	Modoc	UNST
			AUGUSTINO DE MARIA Total		4.20		
A021194	14258	9878	BECKETT TRUST	03/14/63	0.10	Siskiyou	LAVA CRACK SPRINGS
			BECKETT TRUST Total		0.10		
A011646	8075	4939	BETTY ANN CARROLL	12/04/46	750.00	Lassen	HOLBROOK CANYON STREAM
A015526	9636	4938	BETTY ANN CARROLL	09/03/53	215.00	Lassen	HOLBROOK CANYON STREAM
			BETTY ANN CARROLL Total		965.00		
A002093	872	4360	BIG VALLEY MUTUAL WATER COMPANY	11/22/20	2,635.00	Modoc	ANTELOPE FLAT DRAINAGE AREA
A010109	6084	4361	BIG VALLEY MUTUAL WATER COMPANY	02/05/41	100.00	Modoc	ANTELOPE FLAT DRAINAGE
A010407	6083	4362	BIG VALLEY MUTUAL WATER COMPANY	03/17/42	2,865.00	Modoc	LAST CHANCE CREEK, WHALEN CREEK
			BIG VALLEY MUTUAL WATER COMPANY Total		5,600.00		
A010866	6319	4442	Black Ranch, LLC	08/22/44	184.50	Shasta	BURNEY CREEK
			Black Ranch, LLC Total		184.50		
A014605	9028	4968	BO THORENFELT	12/18/51	200.00	Lassen	UNST
			BO THORENFELT Total		200.00		
A026030	17951	11911	BRIAN J VANVORIS	06/20/79	1.90	Shasta	UNST
			BRIAN J VANVORIS Total		1.90		
A014689	9035	5250	BRYON E GIBBONS	02/27/52	30.00	Modoc	NORTH FORK GLEASON CREEK
			BRYON E GIBBONS Total		30.00		
A012845	7485	4429	CALIF DEPT OF FORESTRY & FIRE PROTECTION	12/03/48	72.40	Shasta	HATCHET CREEK
			CALIF DEPT OF FORESTRY & FIRE PROTECTION Total		72.40		
A022921	15644	9980	CALIFORNIA PINES PROPERTY OWNERS' ASSOCIATION	10/09/67	16.00	Modoc	SOUTH FORK FITZHUGH CREEK
A022922	15645	9979	CALIFORNIA PINES PROPERTY OWNERS' ASSOCIATION	10/09/67	11.00	Modoc	MIDDLE FORK FITZHUGH CREEK
			CALIFORNIA PINES PROPERTY OWNERS' ASSOCIATION Total		27.00		
A015331	9762	7286	CHARLENE E STONE	05/04/53	353.50	Shasta	HALL CREEK

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
			CHARLENE E STONE Total		353.50		
A029440	20654		CHARLES A ORWICK	03/17/89	49.00	Lassen	UNST
			CHARLES A ORWICK Total		49.00		
A011102	6482	3952	CLARK FRONTIN	07/09/45	325.80	Shasta	LITTLE ROARING CREEK
			CLARK FRONTIN Total		325.80		
A026068	18571		CLEO V HUNT	08/21/79	49.00	Lassen	WILLOW CREEK
			CLEO V HUNT Total		49.00		
A025835	18599	12335	CLIFFORD DE WITT	09/27/78	38.00	Modoc	UNST
			CLIFFORD DE WITT Total		38.00		
A020320	13198	8334	CORY BOSCHEE	07/24/61	5.00	Lassen	UNST
A025713	17569	12905	CORY BOSCHEE	04/07/78	9.00	Lassen	UNST
			CORY BOSCHEE Total		14.00		
A029694	20696		CRAIG HERMSMEYER	06/03/02	27.00	Lassen	UNSP
			CRAIG HERMSMEYER Total		27.00		
A014927	9196	5036	DANIEL TANKERSLEY	07/28/52	190.00	Lassen	UNST
			DANIEL TANKERSLEY Total		190.00		
A021750	14649	9048	DANIEL K DAVIS	04/21/64	25.00	Shasta	UNST
			DANIEL K DAVIS Total		25.00		
A016506	10376	9234	DARAN V MYERS	08/08/55	279.00	Lassen	UNST, WILLOW CREEK
			DARAN V MYERS Total		279.00		
A020366	13402	9254	DAVID CRAWFORD	08/22/61	49.00	Lassen	UNST
			DAVID CRAWFORD Total		49.00		
A021064	14089	8630	David Hunt	12/06/62	24.00	Lassen	UNST
			David Hunt Total		24.00		
A022637	15852	10320	David King	11/14/66	10.00	Lassen	UNST
			David King Total		10.00		
A022762	15472	9137	DAVID E LLOYD	04/06/67	3.00	Modoc	UNST
			DAVID E LLOYD Total		3.00		
A022887	15562	10015	DELBERT GOULD	08/22/67	12.00	Modoc	UNST
			DELBERT GOULD Total		12.00		
A028571	20220		DENNIS DAUGHERTY	10/02/85	1,237.50	Lassen	CEDAR CREEK
			DENNIS DAUGHERTY Total		1,237.50		
A025231	18834	13011	DIXIE VALLEY RANCH	01/04/77	49.90	Lassen	RUSSELL DAIRY CREEK, UNST
			DIXIE VALLEY RANCH Total		49.90		
A025522	17921	11827	DON A GORDON	10/11/77	6.60	Shasta	UNST
A026108	17978	11826	DON A GORDON	10/09/79	8.00	Shasta	UNST
			DON A GORDON Total		14.60		
A021059	14056	8335	DONALD B MCKERN	12/03/62	49.00	Lassen	UNST
			DONALD B MCKERN Total		49.00		
A001503	660	531	DONALD J MARTIN	04/29/26	158.80	Shasta	FALL RIVER
			DONALD J MARTIN Total		158.80		
A013095	8315	4236	EDWARD MOHR	05/16/49	22.10	Modoc	PIT RIVER
			EDWARD MOHR Total		22.10		
A018923	12202	6637	EDWARD F BRUCE	08/19/59	4.00	Shasta	UNST
			EDWARD F BRUCE Total		4.00		

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
A022804	15612	9565	ELLEN E TAYLOR	06/06/67	228.00	Shasta	UNST
			ELLEN E TAYLOR Total		228.00		
A026243	18595	13611	ELWOOD FORD	09/13/05	3.80	Shasta	UNST
			ELWOOD FORD Total		3.80		
A017857	11414	6589	ERNEST W BRUCE	10/23/57	135.00	Shasta	PIT RIVER
			ERNEST W BRUCE Total		135.00		
A020025	13599	10798	EUGENE M BREZNOCK	03/09/61	198.00	Lassen	UNST
A020085	13600	8348	EUGENE M BREZNOCK	04/13/61	3.50	Lassen	UNST
			EUGENE M BREZNOCK Total		201.50		
A025806A	018103 A	13107	FRED A COLLINS	07/29/91	3.80	Shasta	UNST
			FRED A COLLINS Total		3.80		
A013659	8943	6444	FREDRICK ANKLIN	03/29/50	840.00	Modoc	HILTON DAIRY CREEK
A014070	8975	9266	FREDRICK ANKLIN	11/22/50	22.50	Modoc	HILTON CREEK
			FREDRICK ANKLIN Total		862.50		
A011557	7210	6446	FROSTY ACRES INCORPORATED	09/18/46	200.00	Lassen	UNST
A011736	7052	4435	FROSTY ACRES INCORPORATED	02/18/47	40.00	Lassen	UNST, WILLOW CREEK
A011737	7053	4436	FROSTY ACRES INCORPORATED	02/18/47	3.00	Lassen	UNST
A019491	13360	8102	FROSTY ACRES INCORPORATED	06/16/60	50.00	Lassen	UNST
A021478	14999	10108	FROSTY ACRES INCORPORATED	09/26/63	230.00	Lassen	WILLOW CREEK
			FROSTY ACRES INCORPORATED Total		523.00		
A025856	20266		GENELLE VOORHEES	10/16/78	14.40	Shasta	UNST, WILLOW CREEK
			GENELLE VOORHEES Total		14.40		
A022399	15231	9037	GEORGE SHEPHERD	02/21/66	15.00	Modoc	UNST
			GEORGE SHEPHERD Total		15.00		
A023826	16662	10945	GEORGE R WRIGHT	07/27/71	17.00	Modoc	CROOKS CANYON, UNST
			GEORGE R WRIGHT Total		17.00		
A000930	428	330	GERALDINE SILVA	02/18/18	142.00	Modoc	UNST
			GERALDINE SILVA Total		142.00		
A025073	17557		GL JOHNS 2002 LIVING TRUST	05/24/76	49.00	Lassen	UNST
			GL JOHNS 2002 LIVING TRUST Total		49.00		
A019145	12799	8943	GOOSE VALLEY RANCH	04/04/07	4,000.00	Shasta	GOOSE CREEK
			GOOSE VALLEY RANCH Total		4,000.00		
A013524	8454	4292	GREEN VALLEY ENTERPRISES	12/29/49	227.50	Modoc	CROOKS CANYON
A014757	9217	4295	GREEN VALLEY ENTERPRISES	04/17/52	187.00	Modoc	CROOKS CANYON
A016046	10303	6950	GREEN VALLEY ENTERPRISES	07/18/63	408.00	Modoc	CROOKS CANYON
			GREEN VALLEY ENTERPRISES Total		822.50		
A026116	17974	13640	GREGORY R CALDWELL	04/11/06	20.00	Shasta	UNST
			GREGORY R CALDWELL Total		20.00		
A015339	9569	7237	HALCUMB CEMETERY DISTRICT	05/12/53	21.30	Shasta	MONTGOMERY CREEK
A021917	15596	10655	HALCUMB CEMETERY DISTRICT	09/25/64	22.00	Shasta	MONTGOMERY CREEK
			HALCUMB CEMETERY DISTRICT Total		43.30		
A019724	12980	9231	HAROLD W SIEMER	09/01/60	49.00	Lassen	UNCR
			HAROLD W SIEMER Total		49.00		
A029085	20238	13367	HARRY C BRAFF	08/10/87	1.10	Modoc	UNST

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
			HARRY C BRAFF Total		1.10		
A017256	10861	6858	HARRY J & MILI TURIELLO TRUST	08/27/56	13.50	Shasta	PEACOCK CREEK
A022452	15675	10435	HARRY J & MILI TURIELLO TRUST	04/25/66	36.00	Shasta	PEACOCK CREEK
			HARRY J & MILI TURIELLO TRUST Total		49.50		
A025783	17641	12731	Henrich 2002 Trust	07/13/78	14.90	Shasta	UNSP
A028219	19379	12733	Henrich 2002 Trust	08/15/84	3.60	Shasta	UNSP
A025784A	017642A	12732	Henrich 2002 Trust	09/16/86	5.00	Shasta	UNST
			Henrich 2002 Trust Total		23.50		
A018783	12140	8414	HOMER J ROBERTS	06/11/59	85.00	Modoc	UNST
A021280	14409	8415	HOMER J ROBERTS	05/13/63	85.00	Modoc	UNST
			HOMER J ROBERTS Total		170.00		
A003353	1768	9722	HOT SPRINGS VALLEY IRRIGATION DISTRICT	04/12/23	48,400.00	Modoc	RATTLESNAKE CREEK
A022427	15227	9723	HOT SPRINGS VALLEY IRRIGATION DISTRICT	03/17/66	20,000.00	Modoc	RATTLESNAKE CREEK
			HOT SPRINGS VALLEY IRRIGATION DISTRICT Total		68,400.00		
A021252	14278	8912	J A CONNER LIVING TRUST	04/23/63	49.00	Lassen	UNST
			J A CONNER LIVING TRUST Total		49.00		
A008627	4736	2378	J SCOTT & ELEANOR J VERMILYEA REVOCABLE TRUST 2000	04/03/36	457.00	Shasta	SHOTGUN CREEK
A021240	14262	9047	J SCOTT & ELEANOR J VERMILYEA REVOCABLE TRUST 2000	04/15/63	42.30	Shasta	UNSP, UNST
			J SCOTT & ELEANOR J VERMILYEA REVOCABLE TRUST 2000 Total		499.30		
A025000	17278	11664	JAMES H BICKFORD	02/23/76	200.00	Lassen	BEAVER CREEK, UNST
			JAMES H BICKFORD Total		200.00		
A002878	2026	1196	JANET PERRY	04/27/32	232.70	Shasta	HAT CREEK
			JANET PERRY Total		232.70		
A009609	5445	4437	JOE RUSS	06/06/39	100.00	Modoc	FRANKLIN CREEK
A009610	5446	4438	JOE RUSS	06/06/39	400.00	Siskiyou	FRANKLIN CREEK
A012005	7349	5491	JOE RUSS	07/24/47	120.00	Modoc	DRY CREEK
A020109	13413	8895	JOE RUSS	05/04/61	110.00	Modoc	UNST
A020936	14192	8896	JOE RUSS	09/11/62	20.00	Modoc	UNST
A021454	14575	8985	JOE RUSS	09/06/63	619.00	Modoc	LINNVILLE CREEK
A024016	16809	12904	JOE RUSS	04/03/72	568.00	Modoc	LINNVILLE CREEK
			JOE RUSS Total		1,937.00		
A022761	15471	9136	JOHN KAHL	04/06/67	2.00	Modoc	UNST
			JOHN KAHL Total		2.00		
A023950	16457	10697	JOHN A YOUNGER	12/16/71	680.00	Modoc	UNDR
			JOHN A YOUNGER Total		680.00		
A016857	10677	5720	JOHN ASKEW	01/27/56	2.00	Lassen	UNST
A026194	18410	13346	JOHN ASKEW	02/01/80	0.80	Lassen	UNST
			JOHN ASKEW Total		2.80		
A002227	1893	4940	JOHN B CROOK	02/23/21	5,250.00	Lassen	COYOTE FLAT DRAINAGE AREA
			JOHN B CROOK Total		5,250.00		
A004700	2608	2083	JOHN F PARRISH	09/04/40	381.80	Shasta	HAT CREEK
			JOHN F PARRISH Total		381.80		
A029321	20792		JOHN W CAPIK	08/19/88	45.00	Modoc	LINNVILLE CREEK, UNST

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			JOHN W CAPIK Total		45.00		
A030251	21250		JOHNSON CREEK DITCH USER'S ASSOCIATION	10/19/09	181.00	Shasta	UNST
			JOHNSON CREEK DITCH USER'S ASSOCIATION Total		181.00		
A025931	18350	13252	JOSEPH LOUIS OSA	02/28/79	27.00	Shasta	UNST
			JOSEPH LOUIS OSA Total		27.00		
A009761	5494	3318	JUANITA C GARDNER TRUST	11/04/39	492.50	Modoc	UNST
			JUANITA C GARDNER TRUST Total		492.50		
A021664	14735	10181	JUNIPER ACRES WATER ASSOCIATION	03/02/64	2.80	Modoc	UNSP
			JUNIPER ACRES WATER ASSOCIATION Total		2.80		
A026244	18418	12315	KEITH MACDONALD	03/03/80	1.10	Shasta	UNST
			KEITH MACDONALD Total		1.10		
A005812	3592	2179	KRAMER RANCH LLC	01/28/28	2,563.40	Lassen, Modoc	WIDOW VALLEY CREEK
A017267	10726	5192	KRAMER RANCH LLC	09/07/56	27.80	Modoc	WIDOW VALLEY CREEK
			KRAMER RANCH LLC Total		2,591.20		
A000245	190	250	LARRY R WILLMORE	02/03/16	181.00	Shasta	CLARK CREEK
			LARRY R WILLMORE Total		181.00		
A026038	18018	11918	LASSEN GOLD MINING INC	06/29/79	55.00	Lassen	UNST
A027034	18637	11923	LASSEN GOLD MINING INC	10/05/81	20.00	Lassen	UNST
			LASSEN GOLD MINING INC Total		75.00		
A024977	17063	11560	LEON URRUTIA	01/20/76	49.00	Modoc	UNST
			LEON URRUTIA Total		49.00		
A013207	8000	5072	LOOKOUT RANCH & LODGE LP	07/05/49	1,500.00	Modoc	TAYLOR CREEK
			LOOKOUT RANCH & LODGE LP Total		1,500.00		
A028610	20217		LOWELL L NOVY	10/31/85	2,790.00	Lassen	CEDAR CREEK
			LOWELL L NOVY Total		2,790.00		
A010820	6290	4188	M D & N L MYERS FAMILY 1986 REVOCABLE TR	05/18/44	90.00	Lassen	CHACE VALLEY CREEK
A013504	8430	6063	M D & N L MYERS FAMILY 1986 REVOCABLE TR	12/09/49	50.00	Lassen	UNST
			M D & N L MYERS FAMILY 1986 REVOCABLE TR Total		140.00		
A022750	15460	9138	MANUEL SOUZA	04/06/67	3.00	Modoc	UNST
A022751	15461	9169	MANUEL SOUZA	04/06/67	3.00	Modoc	UNST
A022752	15462	9172	MANUEL SOUZA	04/06/67	2.50	Modoc	UNST
A022753	15463	9212	MANUEL SOUZA	04/06/67	2.00	Modoc	UNST
A022754	15464	9131	MANUEL SOUZA	04/06/67	1.50	Modoc	UNST
A022755	15465	9139	MANUEL SOUZA	04/06/67	1.70	Modoc	UNST
A022756	15466	9128	MANUEL SOUZA	04/06/67	0.60	Modoc	UNST
A022757	15467	9168	MANUEL SOUZA	04/06/67	2.40	Modoc	UNST
A022758	15468	9175	MANUEL SOUZA	04/06/67	1.00	Modoc	UNST
A022759	15469	9135	MANUEL SOUZA	04/06/67	1.40	Modoc	UNST
A022760	15470	9134	MANUEL SOUZA	04/06/67	1.60	Modoc	UNST
			MANUEL SOUZA Total		20.70		
A020398	13622	9332	MANUEL A MORRIS	09/14/61	38.00	Modoc	KRESGE CANYON
			MANUEL A MORRIS Total		38.00		
A006398	3672	1554	MAPES RANCH, INC	08/07/29	4.30	Lassen	UNST
A019286	12548	7836	MAPES RANCH, INC	03/07/60	1.00	Lassen	UNST
			MAPES RANCH, INC Total		5.30		

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A013525	8455	4293	MCGARVA RANCH	12/29/49	113.80	Modoc	CROOKS CANYON
A014758	9218	6070	MCGARVA RANCH	04/17/52	93.50	Modoc	CROOKS CANYON
			MCGARVA RANCH Total		207.30		
A019743	13039	10035	MELVIN D MYERS	09/19/60	142.00	Lassen	BUTTE CREEK
			MELVIN D MYERS Total		142.00		
A028518	20218		MERRILL DAUGHERTY	04/14/88	315.00	Lassen	CEDAR CREEK
			MERRILL DAUGHERTY Total		315.00		
A000772	384	67	MICHAEL L SPAETH	10/09/19	22.30	Shasta	BY GONNY CREEK
			MICHAEL L SPAETH Total		22.30		
A026520	18999	13439	MILANO LAND AND CATTLE CO LLC	09/13/99	49.00	Modoc	BLACKS CANYON
A026521	19000	13440	MILANO LAND AND CATTLE CO LLC	09/13/99	142.00	Modoc	BLACKS CANYON
			MILANO LAND AND CATTLE CO LLC Total		191.00		
A021448	14429	10822	MONTGOMERY CREEK COMMUNITY CHURCH	09/03/63	0.20	Shasta	MONTGOMERY CREEK
			MONTGOMERY CREEK COMMUNITY CHURCH Total		0.20		
A016216	10191	5073	MORGAN RANCH COMPANY INC	01/24/55	200.00	Modoc	UNST
			MORGAN RANCH COMPANY INC Total		200.00		
A026197	18187	12069	NELLIE M DUNBAR	02/11/80	1.00	Shasta	UNST
			NELLIE M DUNBAR Total		1.00		
A015902	9988	5233	NELSON RANCHES	06/10/54	515.00	Modoc	JIM CREEK
A021318	14730	9346	NELSON RANCHES	05/31/63	215.00	Modoc	JIM CREEK
			NELSON RANCHES Total		730.00		
A016855	10715	5989	NOR CAL LAND & CATTLE CO	01/26/56	2.00	Lassen	UNST
			NOR CAL LAND & CATTLE CO Total		2.00		
A030720	20995		OAK RUN LUMBER CO LLC	06/23/98	3.00	Shasta	UNST
			OAK RUN LUMBER CO LLC Total		3.00		
A003566	1567	627	PARKS FAMILY 1995 REVOCABLE TRUST	08/04/23	3.00	Lassen	UNXX
			PARKS FAMILY 1995 REVOCABLE TRUST Total		3.00		
A008649	4793	2440	Patricia H Bushey	04/27/36	0.60	Modoc	UNSP
			Patricia H Bushey Total		0.60		
A027005	19072	12821	PAUL R JOLLY	09/15/81	3.90	Shasta	UNST
			PAUL R JOLLY Total		3.90		
A028892	20279		Peter D Stent	06/11/91	25.00	Shasta	BEAR CREEK
			Peter D Stent Total		25.00		
A026239	18761		PHILIP R GUNSAULS	02/28/80	35.00	Modoc	HALLS CANYON
			PHILIP R GUNSAULS Total		35.00		
A008194	4668	2076	PHYLLIS A HARRIS	12/22/34	200.00	Modoc	CLEAR LAKE
			PHYLLIS A HARRIS Total		200.00		
A001538	697	353	Pickering Family Trust	05/12/24	456.20	Shasta	FALL RIVER
			Pickering Family Trust Total		456.20		
A028570	20219		Pine Creek Cattle Company	10/02/85	157.50	Lassen	CEDAR CREEK
			Pine Creek Cattle Company Total		157.50		
A024696	18118	11874	R A STANFORD	10/17/74	23.00	Modoc	THOMAS & BAYNES DITCH, UNST
			R A STANFORD Total		23.00		
A014474	8866	6313	RAMIRO CHAVEZ	09/11/51	14.00	Lassen, Modoc	KELLY DRAW, UNKNOWN
			RAMIRO CHAVEZ Total		14.00		

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A000992	2307	1711	RAY BREINER	05/29/18	837.00	Modoc	FITZHUGH CREEK
A000993	2308	1712	RAY BREINER	05/29/18	457.00	Modoc	FITZHUGH CREEK
A000994	2309	1713	RAY BREINER	05/29/18	157.00	Modoc	FITZHUGH CREEK
A001252	2310	1714	RAY BREINER	04/21/19	400.00	Modoc	UNST
A007458	4506	4879	RAY BREINER	12/08/32	706.00	Modoc	FITZHUGH CREEK
			RAY BREINER Total		2,557.00		
A027787	19030	11857	REDWOOD ROD & GUN CLUB	06/30/83	3.30	Modoc	BOWMAN SPRINGS
			REDWOOD ROD & GUN CLUB Total		3.30		
A025806B	018103 B	13132	RICHARD D WILLARD	08/11/78	2.50	Shasta	UNST
			RICHARD D WILLARD Total		2.50		
A019517	13969	9567	RICHARD E SHOEMAKER	07/06/60	44.00	Lassen	FRAZIER CREEK
			RICHARD E SHOEMAKER Total		44.00		
A000135	69	284	RICHARD L JENNINGS	09/16/15	1,428.00	Modoc	PORTUGE FLAT DRAINAGE
A000486	202	53	RICHARD L JENNINGS	09/27/16	146.00	Modoc	RALSTON CREEK
A010835	6340	3101	RICHARD L JENNINGS	07/07/44	149.00	Modoc	RALSTON GULCH
			RICHARD L JENNINGS Total		1,723.00		
A019209	13968	8686	RICHARD W CALLISON	02/02/60	126.30	Lassen	FRAZIER CREEK
			RICHARD W CALLISON Total		126.30		
A014321	8871	5241	ROBERT HEATON	07/01/58	47.10	Shasta	ROARING CREEK
			ROBERT HEATON Total		47.10		
A022203	15185	9750	ROBERT C MCDONALD	06/23/65	20.00	Lassen	UNST
			ROBERT C MCDONALD Total		20.00		
A013466	8323	6293	ROBERT C PEDOTTI	11/16/49	565.00	Modoc	RYE GRASS SWALE
A018851	12597	9869	ROBERT C PEDOTTI	07/10/59	669.00	Modoc	RYE GRASS SWALE
			ROBERT C PEDOTTI Total		1,234.00		
A002237	987	444	Robert C. Mann	01/11/26	153.30	Modoc	PIT RIVER
			Robert C. Mann Total		153.30		
A021090	14039	8599	ROBERT H MACKEY & SONS INC	12/21/62	3.50	Modoc	UNST
A021091	14040	8600	ROBERT H MACKEY & SONS INC	12/21/62	11.00	Modoc	UNST
			ROBERT H MACKEY & SONS INC Total		14.50		
A026159	18367	12239	ROGER ERICKSON	12/28/79	0.50	Modoc	CANTRELL CREEK
			ROGER ERICKSON Total		0.50		
A001164	573	318	ROLLIE L GILLIAM	02/03/19	400.00	Modoc	RYE GRASS SWALE
A003398	1769	1813	ROLLIE L GILLIAM	05/04/23	130.00	Modoc	RYE GRASS SWALE
			ROLLIE L GILLIAM Total		530.00		
A021444	14410	10692	Ronald M LaGrande	08/27/63	93.00	Modoc	COOLEY GULCH
			Ronald M LaGrande Total		93.00		
A025784B	017642 B	12412	RONALD STICE	09/16/86	3.40	Shasta	UNST
			RONALD STICE Total		3.40		
A022562	15288	9753	RONALD VIERRA	08/29/66	24.00	Lassen	UNST
			RONALD VIERRA Total		24.00		
A000596	346	252	RONALD L SCHLUTER	02/24/17	563.00	Modoc	EMIGRANT CREEK
A003050	1396	1039	RONALD L SCHLUTER	09/22/22	295.00	Modoc	UNST

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			RONALD L SCHLUTER Total		858.00		
A020754	14061	9326	RONALD WESLEY KETLER	04/24/62	180.60	Modoc	UNST
A021405	14789	9325	RONALD WESLEY KETLER	07/23/63	55.00	Modoc	UNST, UNXX
A021908	15045	9336	RONALD WESLEY KETLER	09/17/64	45.00	Modoc	UNST
			RONALD WESLEY KETLER Total		280.60		
A000065	630	1146	SARAH WADE	03/15/32	30.70	Lassen	WILLOW CREEK
			SARAH WADE Total		30.70		
A021346	14382	8764	SHIRLEY A HUGHES TRUSTOR	06/18/63	18.00	Modoc	UNST
			SHIRLEY A HUGHES TRUSTOR Total		18.00		
A003220	1453	411	SIERRA PACIFIC INDUSTRIES	01/12/23	135.80	Shasta	NELSON CREEK
			SIERRA PACIFIC INDUSTRIES Total		135.80		
A014477	9129	4385	SL RANCH	05/21/56	200.00	Modoc	CROOKS CANYON
			SL RANCH Total		200.00		
A007860	4477	2474	SOUTH FORK IRRIGATION DISTRICT	03/05/34	17,000.00	Modoc	SOUTH FORK PIT RIVER, WEST VALLEY CREEK
A019309	12963	10603	SOUTH FORK IRRIGATION DISTRICT	03/14/60	2,240.00	Modoc	SOUTH FORK PIT RIVER, WEST VALLEY CREEK
			SOUTH FORK IRRIGATION DISTRICT Total		19,240.00		
A026955	18635	13409	Stephen Lyon	08/11/81	0.40	Shasta	UNSP
			Stephen Lyon Total		0.40		
A026795	18852	12922	STEPHEN C NELSON	04/20/81	49.00	Modoc	UNST
			STEPHEN C NELSON Total		49.00		
A016526	10828	8665	Steven Barber	08/15/55	5.40	Modoc	UNSP
A021923	14862	9173	Steven Barber	10/06/64	20.00	Modoc	UNSP
			Steven Barber Total		25.40		
A000338	137	54	SX Lowry Ranch	05/15/16	550.00	Modoc	GOVERNMENT CORRALS FLAT
A000421	885	1401	SX Lowry Ranch	08/03/16	1,550.00	Modoc	ANTELOPE PLAINS
A001108	568	4410	SX Lowry Ranch	10/05/18	380.00	Modoc	UNST
A023280	16046	10913	SX Lowry Ranch	05/15/79	2,000.00	Modoc	DOBE SWALE
A020904	14743	12437	SX Lowry Ranch	04/24/89	970.00	Modoc	UNST
			SX Lowry Ranch Total		5,450.00		
A006291	3873		TERRAL C YORK	05/17/29	500.00	Modoc	PARKER CREEK
			TERRAL C YORK Total		500.00		
A006290	3872		TERRY YORK	05/17/29	180.00	Modoc	PARKER CREEK
			TERRY YORK Total		180.00		
A021455	14781	11127	THE DENIS M ROUSE 1993 TRUST	09/10/63	34.00	Lassen	UNST (AKA HOMER JACK DITCH)
			THE DENIS M ROUSE 1993 TRUST Total		34.00		
A030197	20842	13614	THE HUNT FAMILY TRUST	11/08/05	4.50	Modoc	UNST
			THE HUNT FAMILY TRUST Total		4.50		
A020916	14574	10783	THE MCARTHUR 1989 TRUST	08/29/62	1,800.00	Lassen	EAST FORK JUNIPER CREEK, UNST
			THE MCARTHUR 1989 TRUST Total		1,800.00		
A025081	16924	11432	THOMAS M ORIGER	06/08/76	0.90	Modoc	UNST
			THOMAS M ORIGER Total		0.90		
A022935	15594	9632	TIM D BABCOCK	10/23/67	10.50	Lassen	UNST
			TIM D BABCOCK Total		10.50		
A028656	20237	13590	TIMOTHY W SKALLAND	03/19/04	6.00	Shasta	UNST (AKA INDIAN CREEK)
			TIMOTHY W SKALLAND Total		6.00		

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A020062	13147	8361	TOM GIFFORD	03/31/61	30.00	Modoc	UNST
A020063	13148	9260	TOM GIFFORD	03/31/61	42.00	Modoc	TURNER CREEK
			TOM GIFFORD Total		72.00		
A019862	13061	9279	TOMMY B. ESPERANCE	04/09/70	30.00	Lassen	UNST
			TOMMY B. ESPERANCE Total		30.00		
A000420	188	298	TRINITY MEADOWS LP	11/13/23	553.40	Shasta	HATCHET CREEK
			TRINITY MEADOWS LP Total		553.40		
A000760	852	465	U S FISH & WILDLIFE SERVICE	12/29/03	2,709.00	Modoc	PINE CREEK
A001042	853	466	U S FISH & WILDLIFE SERVICE	12/29/03	1,191.00	Modoc	PINE CREEK, STOCKDILL SLOUGH
A001321	854	13528	U S FISH & WILDLIFE SERVICE	12/29/03	6,100.00	Modoc	PARKER CREEK, STOCKDILL SLOUGH
A012263	7291	4822	U S FISH & WILDLIFE SERVICE	12/29/03	1,100.00	Modoc	PINE CREEK
			U S FISH & WILDLIFE SERVICE Total		11,100.00		
A012068	7103	3978	U S LASSEN NATL FOREST	09/04/47	1.10	Lassen	BOARD CABIN SPRING
A012069	7104	4001	U S LASSEN NATL FOREST	09/04/47	0.50	Lassen	FIVE TROUGHS SPRING
A014978	9234	4535	U S LASSEN NATL FOREST	08/19/52	0.80	Lassen	PAT MORRIS SPRING
A018840	12883	9191	U S LASSEN NATL FOREST	07/01/59	650.00	Lassen	LITTLE DAVIS CREEK, UNST
A019698	12777	7758	U S LASSEN NATL FOREST	08/22/60	0.40	Shasta	COBBLE SPRING
A019699	12778	7759	U S LASSEN NATL FOREST	08/22/60	0.40	Lassen	CONE CACHE SPRING
A019700	12779	7760	U S LASSEN NATL FOREST	08/22/60	1.10	Shasta	COYOTE SPRING
A021662	14493	8914	U S LASSEN NATL FOREST	03/02/64	1.90	Lassen	WILLOW SPRING
A021663	14494	8915	U S LASSEN NATL FOREST	03/02/64	1.30	Siskiyou	WILEY RANCH SPRINGS
A025248	17964	12076	U S LASSEN NATL FOREST	01/19/77	650.00	Lassen	BIG JACK LAKE
A025660	17965	12077	U S LASSEN NATL FOREST	01/27/78	50.00	Lassen	BIG JACK LAKE
A018105A01	14822	11220	U S LASSEN NATL FOREST	04/30/82	190.00	Shasta	PROCTOR CREEK, UNST
A018105A02	14822	11220	U S LASSEN NATL FOREST	04/30/82	40.00	Shasta	PROCTOR CREEK, UNST
A027411	20039	12932	U S LASSEN NATL FOREST	07/13/82	0.10	Shasta	SOLDIER CREEK
A027412	20040	12933	U S LASSEN NATL FOREST	07/13/82	0.20	Shasta	SOLDIER CREEK
A029987	20731		U S LASSEN NATL FOREST	08/09/91	2.80	Siskiyou	MAYFIELD SPRING
A030254	20752		U S LASSEN NATL FOREST	05/07/93	73.50	Shasta	UNST
			U S LASSEN NATL FOREST Total		1,664.10		
A009132	5320	3945	U S MODOC NATL FOREST	09/29/37	0.70	Siskiyou	HEMLOCK SPRING
A009202	5239	4577	U S MODOC NATL FOREST	12/10/37	0.70	Siskiyou	SCHONCHIN SPRING
A010841	6296	5038	U S MODOC NATL FOREST	07/18/44	0.80	Modoc	HARRIS SPRING
A012708	7536	3580	U S MODOC NATL FOREST	09/23/48	0.30	Modoc	BOTTLE CREEK, BOTTLE SPRING
A013190	7748	3581	U S MODOC NATL FOREST	06/30/49	0.40	Modoc	LAYTON SPRING
A013194	7751	4023	U S MODOC NATL FOREST	06/30/49	0.40	Modoc	COTTONWOOD FLAT SPRING
A013213	7752	4401	U S MODOC NATL FOREST	07/08/49	0.20	Lassen	UNSP
A013214	7753	4402	U S MODOC NATL FOREST	07/08/49	0.20	Modoc	UNSP
A013215	7754	4396	U S MODOC NATL FOREST	07/08/49	0.70	Lassen	UNSP
A013821	8359	3894	U S MODOC NATL FOREST	06/28/50	0.20	Modoc	HOWARDS GULCH CAMPGROUND SPRING
A014088	8664	4277	U S MODOC NATL FOREST	12/04/50	0.10	Modoc	WEST VALLEY SPRING
A014089	8665	4986	U S MODOC NATL FOREST	12/04/50	0.10	Modoc	FITZHUGH SPRING
A014090	8666	4484	U S MODOC NATL FOREST	12/04/50	0.30	Modoc	GROUSE SPRING
A014091	8742	4281	U S MODOC NATL FOREST	12/04/50	0.20	Modoc	COWHEAD SPRING
A018091	11574	6605	U S MODOC NATL FOREST	04/09/58	8.50	Modoc	UNST

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A018203	11655	6376	U S MODOC NATL FOREST	06/30/58	0.10	Modoc	UNSP
A018204	11656	6377	U S MODOC NATL FOREST	06/30/58	0.10	Modoc	UNSP
A018636	12026	6619	U S MODOC NATL FOREST	04/10/59	0.30	Lassen	RICHMAN SPRING
A019163	12503	7311	U S MODOC NATL FOREST	01/04/60	0.50	Lassen	SUMMIT SPRING
A019164	12504	6712	U S MODOC NATL FOREST	01/04/60	0.10	Modoc	HUNTER SPRING
A019165	12467	7467	U S MODOC NATL FOREST	01/04/60	0.10	Modoc	HIDDEN SPRING
A019166	12468	6713	U S MODOC NATL FOREST	01/04/60	0.20	Modoc	QUAIL SPRING
A019189	12469	7312	U S MODOC NATL FOREST	01/25/60	0.20	Lassen	CHICKEN SPRING
A019283	12505	7532	U S MODOC NATL FOREST	03/07/60	0.40	Modoc	RONEY SPRING
A019284	12506	6714	U S MODOC NATL FOREST	03/07/60	0.40	Modoc	STUDLEY SPRING
A019285	12507	7533	U S MODOC NATL FOREST	03/07/60	0.20	Modoc	HORSEHEAD SPRING
A019340	12470	6715	U S MODOC NATL FOREST	04/04/60	0.30	Modoc	HARPER SPRING
A019365	12508	7534	U S MODOC NATL FOREST	04/20/60	0.20	Modoc	FERN SPRING
A019367	12510	7314	U S MODOC NATL FOREST	04/20/60	0.20	Lassen	MUD SPRING
A019368	12511	6716	U S MODOC NATL FOREST	04/20/60	0.20	Lassen	WATER CANYON SPRING
A019369	12512	7535	U S MODOC NATL FOREST	04/20/60	0.20	Modoc	HOG GULCH SPRING
A019370	12557	6717	U S MODOC NATL FOREST	04/20/60	0.20	Lassen	DAGO SPRINGS
A019970	13069	8052	U S MODOC NATL FOREST	02/07/61	0.30	Modoc	FOX MOUNTAIN SPRING
A019971	13070	8053	U S MODOC NATL FOREST	02/07/61	0.40	Modoc	PLUM SPRING
A019972	13071	8333	U S MODOC NATL FOREST	02/07/61	7.50	Lassen	UNSP
A019973	13072	8054	U S MODOC NATL FOREST	02/07/61	0.20	Lassen	SCHOTT SPRING
A020112	13484	8055	U S MODOC NATL FOREST	05/08/61	0.10	Lassen	DEER SPRING
A020113	13485	8056	U S MODOC NATL FOREST	05/08/61	0.10	Lassen	STUMP SPRING
A020716	13706	8558	U S MODOC NATL FOREST	04/10/62	0.20	Lassen	WALKER FLAT DRAW SPRING
A020717	13707	8559	U S MODOC NATL FOREST	04/10/62	0.30	Lassen	INDIAN SPRING
A021095	14181	8841	U S MODOC NATL FOREST	01/02/63	0.20	Lassen	UNSP
A021097	14183	8842	U S MODOC NATL FOREST	01/02/63	0.20	Modoc	UNSP
A021099	14185	8843	U S MODOC NATL FOREST	01/02/63	0.20	Lassen	UNSP
A021100	14095	8653	U S MODOC NATL FOREST	01/02/63	0.20	Modoc	UNSP
A021101	14096	8592	U S MODOC NATL FOREST	01/02/63	0.30	Modoc	MUD SPRING
A021102	14097	8643	U S MODOC NATL FOREST	01/02/63	0.30	Modoc	PINE SPRING
A021103	14098	8622	U S MODOC NATL FOREST	01/02/63	0.60	Modoc	HOSKINS SPRING
A021104	14099	8623	U S MODOC NATL FOREST	01/02/63	0.80	Modoc	HEAD OF RUSH CREEK SPRING
A021105	14100	8654	U S MODOC NATL FOREST	01/02/63	0.50	Modoc	CHALK SPRING
A021165	14101	8659	U S MODOC NATL FOREST	02/18/63	0.70	Modoc	RONEY FLAT SPRING
A021491	14341	8773	U S MODOC NATL FOREST	10/07/63	0.50	Lassen	DEER SPRING
A021492	14342	8838	U S MODOC NATL FOREST	10/07/63	0.50	Lassen	BUNSELMEIER SPRING
A021501	14422	8840	U S MODOC NATL FOREST	10/15/63	0.50	Lassen	JIMMY PACKWOOD SPRING
A021502	14489	8906	U S MODOC NATL FOREST	10/15/63	0.50	Lassen	GERIG SPRING
A021503	14536	8907	U S MODOC NATL FOREST	10/15/63	0.40	Modoc	DEEP CUT SPRING
A026211	17982	12567	U S MODOC NATL FOREST	02/20/80	0.20	Lassen	UNST
A026216	17985	12091	U S MODOC NATL FOREST	02/20/80	0.20	Lassen	UNST
A026217	17986	12092	U S MODOC NATL FOREST	02/20/80	0.20	Lassen	UNST
A026218	17987	12093	U S MODOC NATL FOREST	02/20/80	0.20	Lassen	UNST
A026220	17989	12094	U S MODOC NATL FOREST	02/20/80	0.20	Lassen	UNST

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A026221	17990	12095	U S MODOC NATL FOREST	02/20/80	0.20	Lassen	WINDMILL FLAT
A026222	17991	12096	U S MODOC NATL FOREST	02/20/80	0.10	Lassen	UNSP
A026288	18180	12097	U S MODOC NATL FOREST	04/10/80	0.20	Lassen	UNST
A026290	18182	12098	U S MODOC NATL FOREST	04/10/80	0.20	Lassen	UNST
A026348	18251	12090	U S MODOC NATL FOREST	05/14/80	0.20	Modoc	UNST
A026405	18265	12099	U S MODOC NATL FOREST	06/06/80	0.10	Modoc	SHAKE CANYON
A026477	18381	12100	U S MODOC NATL FOREST	07/29/80	0.20	Lassen	UNST
A026897	19797	13446	U S MODOC NATL FOREST	06/30/81	0.10	Modoc	UNST
A026893	19794		U S MODOC NATL FOREST	06/30/81	0.20	Modoc	UNST
A026894	19795		U S MODOC NATL FOREST	06/30/81	0.20	Modoc	UNST
A026898	19798		U S MODOC NATL FOREST	06/30/81	0.20	Lassen	UNST
A027231	18659	12568	U S MODOC NATL FOREST	03/09/82	0.20	Lassen	UNST
A027233	18661	12568	U S MODOC NATL FOREST	03/09/82	0.20	Lassen	UNST
A027234	18662	12570	U S MODOC NATL FOREST	03/09/82	0.20	Lassen	UNST
A027235	18663	12571	U S MODOC NATL FOREST	03/09/82	0.20	Lassen	COYOTE FLAT DRAW
A027236	18664	12572	U S MODOC NATL FOREST	03/09/82	0.20	Lassen	UNST
A027237	18665	12573	U S MODOC NATL FOREST	03/09/82	0.20	Lassen	UNST
A027238	18666	12574	U S MODOC NATL FOREST	03/09/82	0.20	Lassen	UNST
A027431	18853	13495	U S MODOC NATL FOREST	07/15/82	0.10	Modoc	UNST
A027647	19599		U S MODOC NATL FOREST	02/01/83	102.00	Lassen	UNST
A027648	19600		U S MODOC NATL FOREST	02/01/83	96.50	Lassen	UNST
A027732	19288	12746	U S MODOC NATL FOREST	04/27/83	0.20	Lassen	UNST
A027733	19289	12747	U S MODOC NATL FOREST	04/27/83	0.20	Lassen	UNST
A027734	19290	12748	U S MODOC NATL FOREST	04/27/83	0.20	Lassen	UNST
A027735	19291	12749	U S MODOC NATL FOREST	04/27/83	0.20	Lassen	UNST
A027737	19293	12750	U S MODOC NATL FOREST	04/27/83	0.20	Lassen	UNST
A027738	19294	12738	U S MODOC NATL FOREST	04/27/83	0.20	Lassen	UNST
A027739	19295	12752	U S MODOC NATL FOREST	04/27/83	0.20	Lassen	UNST
A027740	19296	12753	U S MODOC NATL FOREST	04/27/83	0.20	Lassen	UNST
A027741	19297	12754	U S MODOC NATL FOREST	04/27/83	0.20	Lassen	UNST
A027742	19298	12755	U S MODOC NATL FOREST	04/27/83	0.20	Lassen	UNST
A027999	19750	13062	U S MODOC NATL FOREST	03/15/84	0.10	Modoc	UNST
A028001	19752	13359	U S MODOC NATL FOREST	03/15/84	0.20	Modoc	UNST
A028002	19753	13360	U S MODOC NATL FOREST	03/15/84	0.20	Modoc	UNST
A028004	19755	13015	U S MODOC NATL FOREST	03/15/84	0.20	Modoc	UNST
A028006	19757	13016	U S MODOC NATL FOREST	03/15/84	0.20	Modoc	UNST
A028007	19758	13017	U S MODOC NATL FOREST	03/15/84	0.20	Modoc	UNST
A028008	19759	13018	U S MODOC NATL FOREST	03/15/84	0.20	Modoc	UNST
A028009	19760	13019	U S MODOC NATL FOREST	03/15/84	0.20	Modoc	UNST
A028011	19762	13361	U S MODOC NATL FOREST	03/15/84	0.20	Modoc	UNST
A028012	19763	13362	U S MODOC NATL FOREST	03/15/84	0.20	Modoc	UNST
A028014	19765	13020	U S MODOC NATL FOREST	03/15/84	0.20	Modoc	UNST
A028019	19770	13021	U S MODOC NATL FOREST	03/15/84	0.20	Modoc	UNST
A028021	19772	13493	U S MODOC NATL FOREST	03/15/84	0.20	Lassen	UNST
A028022	19773	13022	U S MODOC NATL FOREST	03/15/84	0.20	Lassen	COYOTE FLAT DRAW

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A028024	19775	13023	U S MODOC NATL FOREST	03/15/84	0.20	Modoc	STONE COAL CREEK
A028027	19778	13466	U S MODOC NATL FOREST	03/15/84	0.20	Modoc	STONE COAL CREEK
A028028	19779	13024	U S MODOC NATL FOREST	03/15/84	0.20	Modoc	UNST
A028030	19781	13025	U S MODOC NATL FOREST	03/15/84	0.20	Lassen	WALKER DRAW
A028031	19782	13397	U S MODOC NATL FOREST	03/15/84	0.20	Lassen	UNST
A028000	19751		U S MODOC NATL FOREST	03/15/84	0.20	Modoc	UNST
A028005	19756		U S MODOC NATL FOREST	03/15/84	0.20	Modoc	UNST
A028015	19766		U S MODOC NATL FOREST	03/15/84	0.20	Lassen	UNST
A028016	19767		U S MODOC NATL FOREST	03/15/84	0.20	Lassen	UNST
A028017	19768		U S MODOC NATL FOREST	03/15/84	0.20	Lassen	CARY SPRING
A028018	19769		U S MODOC NATL FOREST	03/15/84	0.20	Modoc	UNST
A028026	19777		U S MODOC NATL FOREST	03/15/84	0.20	Modoc	MUD SPRING
A028029	19780		U S MODOC NATL FOREST	03/15/84	0.20	Modoc	UNST
A028032	19783		U S MODOC NATL FOREST	03/15/84	0.20	Modoc	UNST
A028033	19784		U S MODOC NATL FOREST	03/15/84	0.20	Modoc	DEEP CUT SPRINGS
A028398	19671	13366	U S MODOC NATL FOREST	02/26/85	0.10	Lassen	UNST
A028400	19673	13374	U S MODOC NATL FOREST	02/26/85	0.10	Modoc	UNST
A028838	20023	13496	U S MODOC NATL FOREST	05/20/86	0.20	Lassen	UNST
A028841	20026	13453	U S MODOC NATL FOREST	05/20/86	0.20	Lassen	AMBROSE CANYON
A028845	20030	13365	U S MODOC NATL FOREST	05/20/86	0.20	Lassen	UNST
A028846	20031	13392	U S MODOC NATL FOREST	05/20/86	0.20	Lassen	UNST
A028837	20022		U S MODOC NATL FOREST	05/20/86	0.20	Modoc	UNST
A028839	20024		U S MODOC NATL FOREST	05/20/86	0.20	Modoc	UNST
A028840	20025		U S MODOC NATL FOREST	05/20/86	0.20	Modoc	UNST
A028842	20027		U S MODOC NATL FOREST	05/20/86	0.20	Lassen	UNST
A028843	20028		U S MODOC NATL FOREST	05/20/86	0.20	Lassen	SOUTH FORK JUNIPER CREEK
A028844	20029		U S MODOC NATL FOREST	05/20/86	0.20	Lassen	UNST
A028847	20032	13545	U S MODOC NATL FOREST	07/11/03	0.20	Lassen	UNST
A026899	19799	13550	U S MODOC NATL FOREST	07/22/03	0.20	Lassen	UNST
A026895	19796	13556	U S MODOC NATL FOREST	09/10/03	0.20	Modoc	ROCK SPRINGS
A028399	19672	13567	U S MODOC NATL FOREST	09/24/03	0.10	Lassen	UNST
A027432	18854	13574	U S MODOC NATL FOREST	11/24/03	0.10	Modoc	YELLOWJACKET SPRING
A028836	20021	13573	U S MODOC NATL FOREST	11/24/03	0.20	Lassen	UNST
			U S MODOC NATL FOREST Total		247.00		
A013019	7741	3782	U S SHASTA-TRINITY NATL FOREST	04/05/49	0.20	Shasta	DEEP CREEK
A013186	8047	3783	U S SHASTA-TRINITY NATL FOREST	06/30/49	1.60	Siskiyou	SLAGGER CAMP SPRING
A013187	8048	3784	U S SHASTA-TRINITY NATL FOREST	06/30/49	1.60	Siskiyou	LOST SPRINGS
A013189	8050	3786	U S SHASTA-TRINITY NATL FOREST	06/30/49	1.40	Siskiyou	BEAR SPRINGS
A020670	13640	8641	U S SHASTA-TRINITY NATL FOREST	03/21/62	1.00	Siskiyou	BELNAP SPRING
A020671	13641	8674	U S SHASTA-TRINITY NATL FOREST	03/21/62	0.90	Siskiyou	HARRIS SPRING
			U S SHASTA-TRINITY NATL FOREST Total		6.70		
A016866	10676	6381	US BUREAU OF LAND MANAGEMENT	01/31/56	1.50	Lassen	UNST
A016868	10689	6382	US BUREAU OF LAND MANAGEMENT	01/31/56	10.80	Lassen	UNST
A016869	10639	6078	US BUREAU OF LAND MANAGEMENT	01/31/56	2.90	Lassen	BALD MOUNTAIN LAKE, UNST
A016870	10640	6079	US BUREAU OF LAND MANAGEMENT	01/31/56	0.20	Lassen	UNDR

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A016871	10641	6080	US BUREAU OF LAND MANAGEMENT	01/31/56	4.00	Lassen	UNST
A016873	10643	6081	US BUREAU OF LAND MANAGEMENT	01/31/56	4.40	Lassen	NORTH GULCH, SPRING GULCH, UNST
A016899	10719	6540	US BUREAU OF LAND MANAGEMENT	02/20/56	10.00	Shasta	UNST
A018105B	14823	11219	US BUREAU OF LAND MANAGEMENT	04/24/58	180.00	Shasta	PROCTER CREEK, UNST
A020527	13928	8530	US BUREAU OF LAND MANAGEMENT	12/15/61	54.70	Shasta	UNST
A020528	13601	8140	US BUREAU OF LAND MANAGEMENT	12/15/61	6.00	Shasta	UNST
A020933	13992	8568	US BUREAU OF LAND MANAGEMENT	09/06/62	6.70	Shasta	UNST
A020998	14034	8590	US BUREAU OF LAND MANAGEMENT	10/29/62	4.70	Shasta	UNST
A021060	14078	8581	US BUREAU OF LAND MANAGEMENT	12/03/62	0.10	Shasta	UNST
A021774	14725	9233	US BUREAU OF LAND MANAGEMENT	05/18/64	6.40	Shasta	UNST
A027616	19354	12775	US BUREAU OF LAND MANAGEMENT	12/23/82	1,533.00	Lassen	DRY CREEK
A028088	19503	13261	US BUREAU OF LAND MANAGEMENT	03/29/84	0.80	Modoc	UNST
A028091	19506	13085	US BUREAU OF LAND MANAGEMENT	03/29/84	0.60	Modoc	UNST
A028093	19508	13371	US BUREAU OF LAND MANAGEMENT	03/29/84	0.90	Lassen	UNST
A028095	19510	13086	US BUREAU OF LAND MANAGEMENT	03/29/84	1.00	Modoc	UNST
A028096	19511	13087	US BUREAU OF LAND MANAGEMENT	03/29/84	0.40	Modoc	UNST
A028098	19512	13303	US BUREAU OF LAND MANAGEMENT	03/29/84	0.80	Lassen	UNST
A028099	19513	13262	US BUREAU OF LAND MANAGEMENT	03/29/84	1.20	Lassen	UNST
A028089	19504		US BUREAU OF LAND MANAGEMENT	03/29/84	3.00	Modoc	UNST
A028090	19505		US BUREAU OF LAND MANAGEMENT	03/29/84	1.00	Modoc	UNST
A028094	19509		US BUREAU OF LAND MANAGEMENT	03/29/84	1.10	Lassen	UNST
A028261	19536	13349	US BUREAU OF LAND MANAGEMENT	10/01/84	1.20	Modoc	UNST
A028264	19539	13370	US BUREAU OF LAND MANAGEMENT	10/01/84	0.90	Lassen	UNST
A028265	19540	13373	US BUREAU OF LAND MANAGEMENT	10/01/84	0.30	Lassen	UNST
A028270	19545	13364	US BUREAU OF LAND MANAGEMENT	10/01/84	0.50	Modoc	UNST
A028271	19546	13391	US BUREAU OF LAND MANAGEMENT	10/01/84	1.20	Modoc	UNST
A028272	19547	13358	US BUREAU OF LAND MANAGEMENT	10/01/84	0.20	Modoc	UNST
A028273	19548	13338	US BUREAU OF LAND MANAGEMENT	10/01/84	0.50	Lassen	UNST
A028274	19549	13335	US BUREAU OF LAND MANAGEMENT	10/01/84	0.40	Lassen	UNST
A028275	19550	13376	US BUREAU OF LAND MANAGEMENT	10/01/84	0.80	Lassen	UNST
A028276	19551	13334	US BUREAU OF LAND MANAGEMENT	10/01/84	0.40	Lassen	UNST
A028262	19537		US BUREAU OF LAND MANAGEMENT	10/01/84	1.10	Lassen	UNST
A028701	19953	13464	US BUREAU OF LAND MANAGEMENT	01/03/86	1.00	Modoc	UNST
A028702	19954	13327	US BUREAU OF LAND MANAGEMENT	01/03/86	1.20	Lassen	UNST
A028703	19955	13330	US BUREAU OF LAND MANAGEMENT	01/03/86	0.70	Lassen	UNST
A028704	19956	13336	US BUREAU OF LAND MANAGEMENT	01/03/86	0.40	Modoc	UNST
A028709	19961	13319	US BUREAU OF LAND MANAGEMENT	01/03/86	0.60	Lassen	UNST
A028706	19958		US BUREAU OF LAND MANAGEMENT	01/03/86	5.20	Lassen	UNST
A028717	19946	13341	US BUREAU OF LAND MANAGEMENT	01/14/86	0.50	Lassen	UNST
A028718	19947	13084	US BUREAU OF LAND MANAGEMENT	01/14/86	0.80	Lassen	UNST
A028721	19950	13343	US BUREAU OF LAND MANAGEMENT	01/14/86	1.10	Modoc	UNST
A028893	20111	13372	US BUREAU OF LAND MANAGEMENT	09/08/86	0.40	Modoc	UNST
A028894	20112	13297	US BUREAU OF LAND MANAGEMENT	09/08/86	1.10	Modoc	UNST
A029230	20724		US BUREAU OF LAND MANAGEMENT	04/19/88	1.30	Lassen	UNST
A029232	20725		US BUREAU OF LAND MANAGEMENT	04/19/88	1.30	Lassen	UNST

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A029589	20649	13333	US BUREAU OF LAND MANAGEMENT	10/16/89	0.40	Lassen	UNST
A031051	21129		US BUREAU OF LAND MANAGEMENT	05/12/00	6.00	Modoc	UNST
A031052	21130		US BUREAU OF LAND MANAGEMENT	05/12/00	9.00	Modoc	UNST
A031053	21131		US BUREAU OF LAND MANAGEMENT	05/12/00	15.00	Modoc	UNST
A028258	19533	13555	US BUREAU OF LAND MANAGEMENT	09/10/03	0.40	Lassen	UNST
A028257	19532	13572	US BUREAU OF LAND MANAGEMENT	11/24/03	0.60	Lassen	UNST
A028259	19534	13652	US BUREAU OF LAND MANAGEMENT	06/30/06	0.80	Lassen	UNST
A028256	19531	13673	US BUREAU OF LAND MANAGEMENT	10/23/06	0.60	Lassen	UNST
			US BUREAU OF LAND MANAGEMENT Total		1,892.10		
A005804	3240	1087	WARREN L WEBER	01/13/28	136.20	Modoc	DRY CREEK
			WARREN L WEBER Total		136.20		
A025140	17110	11557	WILLIAM PAPEZ	09/01/76	8.50	Modoc	UNST
A027961	19258	12760	WILLIAM PAPEZ	01/26/84	3.50	Modoc	UNST
			WILLIAM PAPEZ Total		12.00		
A027438	19320		WILLIAM C PROCK	07/16/82	229.00	Modoc	UNST
			WILLIAM C PROCK Total		229.00		
			Grand Total		166,380.90		

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A013398	8208	5317	AMY POWELL-REILLY	10/13/49	0.30	Plumas	UNSP
			AMY POWELL-REILLY Total		0.30		
A028202	19382	12743	APRIL L KEENAN	08/01/84	0.30	Plumas	UNST
			APRIL L KEENAN Total		0.30		
A010025	5864	4105	ASSOCIATION OF THOMPSON LAKE	10/02/40	5.10	Plumas	THOMPSON LAKE
A029432	20487		ASSOCIATION OF THOMPSON LAKE	03/08/89	20.00	Plumas	THOMPSON LAKE
			ASSOCIATION OF THOMPSON LAKE Total		25.10		
A009275	5190	2732	BERNICE C TERRY	04/15/38	4.50	Plumas	CROMBERG SPRING
			BERNICE C TERRY Total		4.50		
A012394	7599	3752	BIG MEADOWS INC	03/09/48	41.30	Plumas	UNSP
			BIG MEADOWS INC Total		41.30		
A015111	9442	6153	BOB CARTER	12/10/52	1.70	Plumas	UNSP
			BOB CARTER Total		1.70		
A010349	5964	2936	BRYAN P PITCAVAGE	12/31/41	21.30	Plumas	CLEAR CREEK
			BRYAN P PITCAVAGE Total		21.30		
A020786	14328	8802	BUCKS LAKE LODGE	05/22/62	0.10	Plumas	UNSP, UNST
			BUCKS LAKE LODGE Total		0.10		
A014583	9845	8347	BUCKS LAKE LODGES INCORPORATED	11/20/51	4.20	Plumas	UNST
			BUCKS LAKE LODGES INCORPORATED Total		4.20		
A011477	6689	3505	BUCKS LAKE SUMMER WATER ASSOCIATION	07/22/46	0.60	Plumas	UNST
A021842	14893	9171	BUCKS LAKE SUMMER WATER ASSOCIATION	07/09/64	0.40	Plumas	UNST
			BUCKS LAKE SUMMER WATER ASSOCIATION Total		1.00		
A007370	4083	2235	CALIF DEPT OF TRANSPORTATION	09/08/32	2.20	Plumas	UNSP
A016380	10367	5872	CALIF DEPT OF TRANSPORTATION	05/17/55	3.40	Sierra	UNSP
			CALIF DEPT OF TRANSPORTATION Total		5.60		
A005630	16478		CALIF DEPT OF WATER RESOURCES	07/30/27	1,393,568.50	Butte, Contra Costa, Sacramento	FEATHER RIVER, ITALIAN SLOUGH, SACRAMENTO RIVER DELTA CHANNELS
A014443	16479		CALIF DEPT OF WATER RESOURCES	08/24/51	9,004,510.20	Butte, Contra Costa	FEATHER RIVER, SACRAMENTO SAN JOAQUIN DELTA CHANNELS

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A016951	14587	9389	CALIF DEPT OF WATER RESOURCES	03/20/56	18,200.00	Plumas	INDIAN CREEK
A016952	12945	9182	CALIF DEPT OF WATER RESOURCES	03/20/56	30,000.00	Plumas	LITTLE LAST CHANCE CREEK
A018844	12946	9928	CALIF DEPT OF WATER RESOURCES	07/06/59	4,962.00	Plumas	LITTLE LAST CHANCE CREEK
A020117	14588	10975	CALIF DEPT OF WATER RESOURCES	05/09/61	3,400.00	Plumas	INDIAN CREEK
A016950	15254		CALIF DEPT OF WATER RESOURCES	01/05/67	49,000.00	Plumas	BIG GRIZZLY CREEK
A021443	15255		CALIF DEPT OF WATER RESOURCES	01/05/67	34,000.00	Plumas	BIG GRIZZLY CREEK
			CALIF DEPT OF WATER RESOURCES Total		10,537,640.70		
A012548	7491	3530	CAMP TIMBERWOLF IMPROVEMENT COMMITTEE	06/16/48	0.40	Plumas	UNSP
			CAMP TIMBERWOLF IMPROVEMENT COMMITTEE Total		0.40		
A007003	3866	1575	CAROL A RHODEHOUSE	07/10/31	3,330.30	Plumas	BLACKHAWK CREEK
			CAROL A RHODEHOUSE Total		3,330.30		
A019730	12871	10458	CASIMIR JATCZAK	09/07/60	0.20	Plumas	UNST
			CASIMIR JATCZAK Total		0.20		
A010011	5685	2581	CITY OF PORTOLA	04/08/43	875.90	Plumas	WILLOW CREEK
A017069	12282	10013	CITY OF PORTOLA	05/03/56	600.00	Plumas	UNSP (5), UNSP (7)
			CITY OF PORTOLA Total		1,475.90		
A012900	7594	4841	Collin Harris	01/17/49	126.00	Sierra	ANTELOPE CREEK
			Collin Harris Total		126.00		
A029127	20591		COZETTE E GRAHAM	10/19/87	18.70	Plumas	TWELVE MILE RAVINE, UNST
			COZETTE E GRAHAM Total		18.70		
A007978	4430	2682	DANIEL WILSON	06/15/34	2.20	Plumas	INDIAN CREEK
			DANIEL WILSON Total		2.20		
A019121	13930	8392	DANIEL H CLIFTON	12/04/59	0.40	Sierra	TREASURE SPRING, TREASURE SPRING CREEK
			DANIEL H CLIFTON Total		0.40		
A015567	10328	7268	DANNY WILSON	10/05/53	0.20	Butte	BALSAM CREEK
			DANNY WILSON Total		0.20		
A017314	11155	8371	DARLA J WOJCIK FAMILY TRUST	10/08/56	1.90	Butte	OREGON GULCH

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			DARLA J WOJCIK FAMILY TRUST Total		1.90		
A009972	5640	3476	DAVID C NORTON	08/09/40	16.20	Plumas	UNSP
A014016	8784	9609	DAVID C NORTON	10/25/50	3.50	Plumas	UNSP
			DAVID C NORTON Total		19.70		
A004122	2107	2023	DAVID K LEE	05/15/40	135.80	Plumas	COLD SPRING, KINGS CREEK
A005171	2866	2024	DAVID K LEE	05/15/40	91.70	Plumas	SUNFLOWER FLAT CREEK
			DAVID K LEE Total		227.50		
A017739	11215	6958	DAVID ROBERT OSTLER	07/24/57	1.10	Sierra	UNSP
			DAVID ROBERT OSTLER Total		1.10		
A006728	3882	2143	DAWN INSTITUTE OF SCIENCE & ART	07/11/30	8.40	Plumas	UNSP
A009968	5684		DAWN INSTITUTE OF SCIENCE & ART	07/22/93	1.30	Plumas	UNSP
			DAWN INSTITUTE OF SCIENCE & ART Total		9.70		
A017195	11014	5884	DAWN M JONES	07/20/56	0.20	Plumas	UNST
			DAWN M JONES Total		0.20		
A016436	10623	6036	DEAN PANFILI	06/23/55	630.80	Plumas	LONG VALLEY CREEK
			DEAN PANFILI Total		630.80		
A001024	497	217	DELBERT H LEHR	07/17/18	108.60	Plumas	UNXX
A011786	6906	3421	DELBERT H LEHR	03/19/47	312.00	Plumas	EAST BRANCH OF NORTH FORK FEATHER RIVER
			DELBERT H LEHR Total		420.60		
A016583	10536	7291	Derek C Anderson	06/07/65	3.50	Plumas	UNST
			Derek C Anderson Total		3.50		
A021361	14791	9026	DEWEY S RAVENSCROFT	06/25/63	5.00	Plumas	FERN CANYON
			DEWEY S RAVENSCROFT Total		5.00		
A029537	20577	13827	DIANE MONTGOMERY	01/10/11	35.00	Sierra	UNST
			DIANE MONTGOMERY Total		35.00		
A026571	18470	13246	Donald A Wallace	10/07/80	89.00	Sierra	SIERRA VALLEY CHANNELS
			Donald A Wallace Total		89.00		
A017963	11625	6601	DUSTIN F DOYLE	01/28/58	0.10	Plumas	UNST
			DUSTIN F DOYLE Total		0.10		
A011271	6536	3737	ELLIOT P SMART	01/31/46	1.60	Plumas	WATERING TROUGH SPRING
			ELLIOT P SMART Total		1.60		
A008964	4958	2564	EST OF WILLIAM JAMES DAWSON JR	05/06/37	5.60	Plumas	UNST
			EST OF WILLIAM JAMES DAWSON JR Total		5.60		
A017132	10832	5918	Est. of Martin A. Poss	06/14/56	0.20	Plumas	UNST
			Est. of Martin A. Poss Total		0.20		
A008460	4682	2223	Feather River Land Trust, a Cal Nonprofit	10/03/35	200.00	Plumas	TAYLOR LAKE
A012844	7617	9165	Feather River Land Trust, a Cal Nonprofit	12/03/48	100.00	Plumas	TAYLOR LAKE
			Feather River Land Trust, a Cal Nonprofit Total		300.00		

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A026942	20121		FIVE BEARS HYDRO, INC	08/06/81	1,448.00	Plumas	SOUTH BRANCH WARD CREEK
A027349	20122		FIVE BEARS HYDRO, INC	06/03/82	5,791.80	Plumas	SOUTH BRANCH WARD CREEK
			FIVE BEARS HYDRO, INC Total		7,239.80		
A009616	5470	2570	FRAZIER CREEK WATER ASSOCIATION	06/14/39	112.20	Butte	EAST BRANCH FRAZIER CREEK, WEST BRANCH FRAZIER CREEK
			FRAZIER CREEK WATER ASSOCIATION Total		112.20		
A008996	5022	4494	FREELANDER TRUST	06/14/37	412.70	Plumas	CLEAR CREEK, OWL CREEK
A017303	12796	7821	FREELANDER TRUST	08/03/66	467.50	Plumas	CLEAR CREEK, OWL CREEK
			FREELANDER TRUST Total		880.20		
A015571	10136	7056	GARY L BROWN	10/07/53	607.00	Plumas	INDIAN CREEK
			GARY L BROWN Total		607.00		
A018968	13221	7798	GENE ALEXANDER	09/04/59	0.10	Plumas	UNST
			GENE ALEXANDER Total		0.10		
A010963	6386	3323	GENE H FISHER	01/26/45	27.40	Butte	ROMA CREEK
			GENE H FISHER Total		27.40		
A008495	4785	2340	GRAEAGLE LAND & WATER COMPANY	11/14/35	11,454.70	Plumas	GRAY EAGLE CREEK, LONG LAKE
A008496	4786	2341	GRAEAGLE LAND & WATER COMPANY	11/14/35	2,895.50	Plumas	GRAY EAGLE CREEK
A025030	17676	12546	GRAEAGLE LAND & WATER COMPANY	03/26/76	196.00	Plumas	FRAZIER CREEK
			GRAEAGLE LAND & WATER COMPANY Total		14,546.20		
A004022	1978	2010	GRAY EAGLE LODGE	06/11/24	5.40	Plumas	UNSP
A004023	1979	1042	GRAY EAGLE LODGE	05/14/31	610.90	Plumas	GRAY EAGLE CREEK
			GRAY EAGLE LODGE Total		616.30		
A021216	14766	9215	GRIZZLY LAKE RESORT IMPROVEMENT DISTRICT	04/01/63	42.00	Plumas	HUMBUG CREEK
			GRIZZLY LAKE RESORT IMPROVEMENT DISTRICT Total		42.00		
A017171	11030	6181	HAROLD D FRANCIS	07/11/56	0.20	Plumas	UNST
			HAROLD D FRANCIS Total		0.20		
A017471	11399	7881	HYDE FAMILY 1990 TRUST	02/20/57	5.40	Plumas	UNST
			HYDE FAMILY 1990 TRUST Total		5.40		
A023364	16585		JAMES D BAKER	10/07/69	0.40	Sierra	TREASURE SPRING, TREASURE SPRING CREEK
			JAMES D BAKER Total		0.40		
A017160	10997	5889	JAMES F RUTHERFORD	12/02/04	0.20	Plumas	UNST
			JAMES F RUTHERFORD Total		0.20		
A027754	19252	12757	JAMES P ROBBINS	05/12/83	3.40	Plumas	UNSP
			JAMES P ROBBINS Total		3.40		

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A012122	7659	3486	JEANNETTE S SASSER	10/08/47	0.50	Plumas	CROMBERG SPRING
			JEANNETTE S SASSER Total		0.50		
A017231	10894	6053	JEFFERY L WILSON	08/10/56	22.40	Plumas	JACKASS CREEK
			JEFFERY L WILSON Total		22.40		
A001712	730	1128	JOAN ESCALANTE	03/06/20	1.10	Butte	UNST
			JOAN ESCALANTE Total		1.10		
A015071	9532	5288	JOHN J GILLAM	11/03/52	144.80	Plumas	HARVEY RAVINE
			JOHN J GILLAM Total		144.80		
A020468	13751	8748	JOHN P SCHMIDT	11/06/61	0.20	Plumas	UNST
			JOHN P SCHMIDT Total		0.20		
A024048	16589	11004	Kathy L. McDonell	05/05/80	0.30	Plumas	CROMBERG SPRING
A025089	17679	11695	Kathy L. McDonell	02/26/85	1.00	Plumas	CROMBERG SPRING
			Kathy L. McDonell Total		1.30		
A006723	3634	2560	Kovach Trust	07/08/30	1,809.00	Butte	EMPIRE CREEK
			Kovach Trust Total		1,809.00		
A011753	7180	5086	LAKE MADRONE WATER DISTRICT	03/04/47	1.70	Butte	FERN DELL CREEK
A030657	21027		LAKE MADRONE WATER DISTRICT	10/07/97	200.00	Butte	BERRY CREEK
			LAKE MADRONE WATER DISTRICT Total		201.70		
A023580	16107	10828	LAKE OROVILLE INVESTMENT GROUP LLC	08/14/70	9.50	Butte	UNST
			LAKE OROVILLE INVESTMENT GROUP LLC Total		9.50		
A018149	11610	7646	LARRY MCMULLAN	05/22/58	0.20	Plumas	UNSP
			LARRY MCMULLAN Total		0.20		
A012117	7658	3484	Laura Rowan Peake	10/02/47	0.30	Plumas	CROMBERG SPRING
			Laura Rowan Peake Total		0.30		
A023924	16402	10760	LDS Recreation Properties LLC	11/18/71	57.70	Sierra	BONTA CREEK, UNST
			LDS Recreation Properties LLC Total		57.70		
A029501	20707		Lewis Van Vleck	06/12/89	44.50	Sierra	SIERRA VALLEY CHANNELS
			Lewis Van Vleck Total		44.50		
A005996	3203	1067	LOREN PERKINS	07/27/28	217.20	Plumas	UNCR
A009886	5589	2625	LOREN PERKINS	04/29/40	202.70	Plumas	UNCR
			LOREN PERKINS Total		419.90		
A016529A	10428	007026A	LOREN V PERKINS LIVING TRUST	08/17/55	5.10	Butte	CARTER RAVINE
A016530	10429	7027	LOREN V PERKINS LIVING TRUST	08/17/55	0.70	Butte	CARTER RAVINE
			LOREN V PERKINS LIVING TRUST Total		5.80		
A005015	2623	2118	LOTTS LAKE ASSOCIATION	05/13/26	0.20	Plumas	UNSP
			LOTTS LAKE ASSOCIATION Total		0.20		
A023564	16180	10365	LOUIS A PAYEN	07/22/70	403.00	Sierra	BIG SPRING, SMALL SPRING

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			LOUIS A PAYEN Total		403.00		
A011713	6995	3586	MARGUERITE A MOHIUDDIN	02/03/47	7.70	Plumas	UNSP
			MARGUERITE A MOHIUDDIN Total		7.70		
A016529B	10428	007026B	MARK PHILLIPS	08/17/55	6.50	Butte	UNSP
			MARK PHILLIPS Total		6.50		
A022485	15693	10425	MARK A GLOISTEIN	06/06/66	20.00	Sierra	UNST
			MARK A GLOISTEIN Total		20.00		
A014807	9846	4942	MARK D EVANS	05/15/52	0.20	Plumas	UNST
			MARK D EVANS Total		0.20		
A023260A	15932	11069	MARK L SCOTT	11/26/80	17.00	Butte	UNST
			MARK L SCOTT Total		17.00		
A008422	4644	2423	Mary Ann Nash	08/21/35	9.00	Butte	OGDEN CREEK
			Mary Ann Nash Total		9.00		
A000685	312	166	MASSACK WATER USERS ASSOCIATION	05/18/17	5.60	Plumas	UNSP
A029544	20513		MASSACK WATER USERS ASSOCIATION	08/18/89	1.70	Plumas	UNSP
			MASSACK WATER USERS ASSOCIATION Total		7.30		
A015570	10135	7055	MC INTYRE RANCHING INC	10/07/53	758.70	Plumas	INDIAN CREEK
			MC INTYRE RANCHING INC Total		758.70		
A019090	13222	7708	MICHAEL MONAHAN	11/20/59	0.20	Plumas	UNST
			MICHAEL MONAHAN Total		0.20		
A011243	6594	4540	MICHAEL NEWSOM	12/26/45	0.10	Plumas	UNSP
			MICHAEL NEWSOM Total		0.10		
A006469	3446	1600	MICHAEL D GRANT	10/28/29	0.70	Plumas	UNSP
A011201	6472	3482	MICHAEL D GRANT	11/01/45	17.90	Plumas	UNSP
			MICHAEL D GRANT Total		18.60		
A024815	18294	12167	MIGUEL AUBAN	12/01/08	1.40	Plumas	UNSP
			MIGUEL AUBAN Total		1.40		
A024421	17166	11470	MIGUEL AUBEN	07/26/73	2.00	Plumas	UNST
			MIGUEL AUBEN Total		2.00		
A031433	21285		MINERAL RESOURCES LLC	06/06/11	46.00	Butte	UNST
			MINERAL RESOURCES LLC Total		46.00		
A004281	2443	1232	MIRIAM C BARKER	10/28/24	5.10	Plumas	LITTLE GRAY EAGLE CREEK
			MIRIAM C BARKER Total		5.10		
A030596	20954	13840	NADINE M BASS	11/08/11	19.00	Sierra	UNST
			NADINE M BASS Total		19.00		
A010917	6403	3113	NORMAN F ROBERTS	11/21/44	1.10	Plumas	UNSP
			NORMAN F ROBERTS Total		1.10		
A020303	13390	8417	NORMAN R COTE	07/14/61	0.40	Plumas	UNST
			NORMAN R COTE Total		0.40		

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A014113	11518		North Yuba Water District	08/18/58	624,084.30	Butte, Plumas	LOST CREEK, SOUTH FORK FEATHER RIVER
			North Yuba Water District Total		624,084.30		
A026904	18878		OKIZU FOUNDATION	07/03/81	49.00	Butte	BERRY CREEK, UNST
A031379			OKIZU FOUNDATION	12/17/02	40.00	Butte	BERRY CREEK, UNST
			OKIZU FOUNDATION Total		89.00		
A019233	13931	8393	PAUL CUETO	02/15/60	0.40	Sierra	TREASURE SPRING, TREASURE SPRING CREEK
			PAUL CUETO Total		0.40		
A011397	6637	3381	PERRY GREENE	05/14/46	2.40	Plumas	UNSP
			PERRY GREENE Total		2.40		
A012279	7286	3603	PETER SENTER	01/30/48	0.10	Plumas	UNSP
			PETER SENTER Total		0.10		
A014653	9216	4183	PG&E	01/22/52	0.60	Plumas	UNST
			PG&E Total		0.60		
A011585	6666	3638	R C K RANCH LLC	10/09/46	464.10	Plumas	MORRIS SLOUGH
			R C K RANCH LLC Total		464.10		
A017776	11243	6014	RALPH F BECKER	08/16/57	2.20	Plumas	UNSP
			RALPH F BECKER Total		2.20		
A019265	13932	8394	RANDY JENSEN	02/28/60	0.40	Sierra	TREASURE SPRING, TREASURE SPRING CREEK
			RANDY JENSEN Total		0.40		
A007526	4213	2065	REGENTS OF THE UNIVERSITY OF CALIFORNIA	03/29/33	1.50	Plumas	SCHNEIDER CREEK
			REGENTS OF THE UNIVERSITY OF CALIFORNIA Total		1.50		
A019750	13241	8020	RICHARD GREIN	09/23/60	0.10	Plumas	UNSP
			RICHARD GREIN Total		0.10		
A004234	2125	631	RICHARD L SCHIWENDINGER	09/24/24	1.70	Plumas	RUSSEL SPRING, UNSP (3)
			RICHARD L SCHIWENDINGER Total		1.70		
A009207	5218	2284	ROBERT RITTER	12/22/37	0.30	Plumas	CROMBERG SPRING
			ROBERT RITTER Total		0.30		
A023260C	15932	11071	ROBERT TEICHMAN	11/26/80	0.20	Butte	UNST
			ROBERT TEICHMAN Total		0.20		
A011976	7075	6880	ROBERT A JONES	06/10/63	18.80	Plumas	UNSP
			ROBERT A JONES Total		18.80		
A004261	2148	732	ROBERT B BECKWITH	10/16/24	0.70	Plumas	UNSP
A020432	13824	9217	ROBERT B BECKWITH	01/18/91	0.50	Plumas	UNSP

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			ROBERT B BECKWITH Total		1.20		
A027688	19665	13174	ROBERT J PALOWODA	03/11/83	0.10	Plumas	UNST
			ROBERT J PALOWODA Total		0.10		
A025500	17476	11505	ROBERT S CONOVER	09/02/77	0.50	Plumas	UNST
			ROBERT S CONOVER Total		0.50		
A009274	5189	2193	ROBERT W ELFEN	04/15/38	0.60	Plumas	CROMBERG SPRING
A009392	5316	2572	ROBERT W ELFEN	08/18/38	0.60	Plumas	CROMBERG SPRING
			ROBERT W ELFEN Total		1.20		
A016910	10730	5905	ROBERT W STEIN	02/28/56	140.00	Plumas	BIG GRIZZLY CREEK
			ROBERT W STEIN Total		140.00		
A019653	12990	9223	RON CARPENTER	08/09/60	166.50	Plumas	HAUNS CREEK
			RON CARPENTER Total		166.50		
A020911	14297	8961	RONALD DREISBACH	08/27/62	76.00	Butte	GRIZZLY CREEK
			RONALD DREISBACH Total		76.00		
A014760	9210	5515	RUSSELL C WESTOVER JR	04/17/52	0.60	Plumas	UNSP
			RUSSELL C WESTOVER JR Total		0.60		
A022855	15751	10561	SEAN CUNNINGHAM	12/31/75	452.40	Plumas	MILL CREEK
			SEAN CUNNINGHAM Total		452.40		
A017870	11564	9566	SHIRLEY ISHAM	11/01/57	33.00	Plumas	MOSQUITO SPRINGS
			SHIRLEY ISHAM Total		33.00		
A016520	10670	9872	SIERRA BIBLE CAMP INC	08/12/55	19.20	Plumas	UNSP
			SIERRA BIBLE CAMP INC Total		19.20		
A009690	5443	3114	SIERRA PACIFIC HOLDING COMPAMY	08/08/39	150.00	Butte	GRUBBS CREEK, LITTLE FREY CREEK
			SIERRA PACIFIC HOLDING COMPAMY Total		150.00		
A006412	3643	1485	SOPER COMPANY	08/17/29	17.00	Yuba	STICKNER SPRING
A014218	8611	4300	SOPER COMPANY	03/29/51	3.40	Plumas	UNSP
A014219	8612	4301	SOPER COMPANY	03/29/51	48.00	Plumas	MOSES CREEK
			SOPER COMPANY Total		68.40		
A021440	14485	10038	SOPER COMPANY, A DELAWARE CORPORATION	08/22/63	2.20	Plumas	UNSP
			SOPER COMPANY, A DELAWARE CORPORATION Total		2.20		
A002142	1268		SOUTH FEATHER WATER & POWER AGENCY	12/17/20	5,000.00	Butte	LOST CREEK
A002778	2492		SOUTH FEATHER WATER & POWER AGENCY	03/06/22	31,148.90	Butte	LOST CREEK
A002979	1271		SOUTH FEATHER WATER & POWER AGENCY	08/12/22	133,935.80	Butte	LOST CREEK
A001651	1267		SOUTH FEATHER WATER & POWER AGENCY	01/05/23	145,508.40	Plumas	SOUTH FORK FEATHER RIVER
			SOUTH FEATHER WATER & POWER AGENCY Total		315,593.10		
A029060	20656		Squirrel Creek, LLC	07/07/87	9.00	Plumas	BEAR CREEK
			Squirrel Creek, LLC Total		9.00		

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A014864	9192	6512	THE CAMP TIMBERWOLF IMPROVMENT COMM, INC	06/18/52	1.50	Plumas	UNSP
			THE CAMP TIMBERWOLF IMPROVMENT COMM, INC Total		1.50		
A001739	1911	845	THERMALITO WATER AND SEWER DISTRICT	03/25/20	8,200.00	Butte	CONCOW CREEK
A003040	1912	737	THERMALITO WATER AND SEWER DISTRICT	09/16/22	8,200.00	Butte	CONCOW CREEK
			THERMALITO WATER AND SEWER DISTRICT Total		16,400.00		
A011205	6989	3483	THOMAS E NOLTE	11/07/45	1.10	Plumas	CROMBERG SPRING
			THOMAS E NOLTE Total		1.10		
A014810	9849	5616	TIME EADE	05/15/52	0.10	Plumas	UNST
			TIME EADE Total		0.10		
A016582	10535	6631	TOMMIE D MASSSENGILL	09/06/55	2.30	Plumas	UNST
			TOMMIE D MASSSENGILL Total		2.30		
A006171	3243	1089	TRAVIS O MCWILLIAMS	01/28/29	36.70	Butte	BRANCH OF BUSHMAN CREEK
			TRAVIS O MCWILLIAMS Total		36.70		
A009293	5181	2548	U S FOREST SERVICE	05/16/38	17.90	Sierra	UNSP
A014228	8709	3968	U S FOREST SERVICE	04/04/51	0.30	Sierra	UNSP
A014281	8800	4915	U S FOREST SERVICE	05/02/51	0.30	Sierra	UNSP
A014282	8801	4947	U S FOREST SERVICE	05/02/51	1.50	Sierra	LEWIS MILL GUARD STATION SPRING
A014283	8802	5334	U S FOREST SERVICE	05/02/51	0.50	Sierra	SARDINE LOOKOUT SPRING
A014284	8803	4701	U S FOREST SERVICE	05/02/51	0.30	Sierra	UNSP
A014285	8804	4186	U S FOREST SERVICE	05/02/51	0.70	Plumas	UNSP
A014286	8805	5013	U S FOREST SERVICE	05/02/51	1.30	Sierra	UNSP
A014287	8806	4922	U S FOREST SERVICE	05/02/51	0.60	Sierra	UNSP
A023225	16015	10230	U S FOREST SERVICE	01/30/69	0.60	Plumas	HORSETROUGH SPRING
A023226	16014	10274	U S FOREST SERVICE	01/30/69	0.80	Plumas	BECKWOURTH SPRING
A027284	18875		U S FOREST SERVICE	04/07/82	32.00	Sierra	CARMAN CREEK, UNST
			U S FOREST SERVICE Total		56.80		

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
A019416	12655	8021	U S LASSEN NATL FOREST	05/05/60	120.00	Plumas	MORRIS LAKE
A019417	12656	8022	U S LASSEN NATL FOREST	05/05/60	27.00	Plumas	GRASSY LAKE
A019418	12657	8023	U S LASSEN NATL FOREST	05/05/60	27.00	Plumas	SADDLE LAKE
A019419	12658	8024	U S LASSEN NATL FOREST	05/05/60	8.00	Plumas	LONG LAKE
A020429	13430	8025	U S LASSEN NATL FOREST	10/06/61	3.40	Butte	UNSP
A021083	14154	8026	U S LASSEN NATL FOREST	12/14/62	34.00	Plumas	SPRING VALLEY LAKE
			U S LASSEN NATL FOREST Total		219.40		
A008990	5028	2332	U S PLUMAS NATL FOREST	06/05/37	3.10	Plumas	UNCR
A008991	5029	2930	U S PLUMAS NATL FOREST	06/05/37	0.70	Plumas	UNSP
A009514	5369	3736	U S PLUMAS NATL FOREST	03/01/39	33.60	Butte	FOLEY GULCH, MOUNTAIN HOUSE CREEK
A003918	2625	861	U S PLUMAS NATL FOREST	05/24/39	23.40	Plumas	TOLLGATE CREEK
A009734	5826	3747	U S PLUMAS NATL FOREST	09/22/39	4.50	Plumas	UNST
A009770	5559	4894	U S PLUMAS NATL FOREST	11/21/39	4.70	Plumas	UNSP
A010726	6216	2968	U S PLUMAS NATL FOREST	11/05/43	0.90	Plumas	UNSP
A011146	6509	3339	U S PLUMAS NATL FOREST	09/06/45	3.00	Plumas	UNSP
A011907	7171	6503	U S PLUMAS NATL FOREST	05/27/47	1.70	Plumas	UNST
A012038	7092	5500	U S PLUMAS NATL FOREST	08/13/47	2.80	Plumas	KLING RAVINE
A012535	7401	3605	U S PLUMAS NATL FOREST	06/04/48	6.10	Plumas	UNSP
A013625	8291	5325	U S PLUMAS NATL FOREST	03/10/50	4.70	Plumas	COLD SPRINGS
A014761	9211	5070	U S PLUMAS NATL FOREST	04/17/52	0.30	Plumas	UNST
A014815	10916	6076	U S PLUMAS NATL FOREST	05/20/52	540.00	Plumas	SNAKE LAKE
A015676	9796	5371	U S PLUMAS NATL FOREST	01/08/54	0.30	Plumas	FANT SPRING
A016200	10940	8222	U S PLUMAS NATL FOREST	01/12/55	12.30	Plumas	CUB CREEK

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
A017074	10784	6101	U S PLUMAS NATL FOREST	05/04/56	0.70	Plumas	UNSP
A017832	11562	6924	U S PLUMAS NATL FOREST	09/23/57	0.20	Plumas	UNSP
A018185	11617	6281	U S PLUMAS NATL FOREST	07/17/58	0.20	Plumas	UNST
A018413	11822	6885	U S PLUMAS NATL FOREST	11/14/58	0.70	Butte	UNSP
A019239	12414	10956	U S PLUMAS NATL FOREST	02/16/60	0.90	Plumas	WEST BRANCH WHITEHORSE CREEK
A019586	12604	7673	U S PLUMAS NATL FOREST	07/28/60	0.70	Butte	BEAR RANCH L O SPRING
A019587	12605	7674	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	RIDGE SPRING
A019588	12606	7675	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	STONY CREEK SPRING
A019589	12607	7676	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	CHIPMUNK SPRING
A019590	12608	7677	U S PLUMAS NATL FOREST	07/28/60	0.20	Plumas	POISON CREEK SPRING
A019591	12609	8061	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	BEAR SPRING
A019592	12610	7678	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	CROCKER CUT-OFF SPRING
A019593	12611	7679	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	LITTLE DIXIE SPRING
A019594	12612	7680	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	DOYLE SPRING
A019596	12614	7682	U S PLUMAS NATL FOREST	07/28/60	0.20	Plumas	JENKINS #3 SPRING
A019597	12615	7683	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	GRANITE SPRING
A019598	12616	7684	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	PLINCO SPRING
A019599	12617	7685	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	CHASE SPRING
A019600	12618	8062	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	COYOTE SPRING
A019601	12619	7686	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	SQUAW CAMP SPRING
A019602	12620	7687	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	HORSE SHOE SPRING
A019603	12621	7688	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	HORTON CANYON SPRING
A019604	12622	8063	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	JUNIPER SPRING

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
A019605	12623	7689	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	FITCH CANYON SPRING
A019606	12624	7690	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	MAHOGANY SPRING
A019607	12625	7691	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	JENKINS #2 SPRING
A019608	12626	8064	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	MIDWAY HOUSE SPRING
A019609	12627	7692	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	DOWNING CABIN SPRING
A019610	12628	7693	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	JUNIPER SPRING
A019611	12629	8065	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	HOG SPRING
A019612	12630	7694	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	JOHNSON MILL SPRING
A019613	12631	7695	U S PLUMAS NATL FOREST	07/28/60	0.70	Butte	SPOON RAVINE SPRING
A019614	12632	7696	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	LONE SPRING
A019615	12633	7697	U S PLUMAS NATL FOREST	07/28/60	0.40	Plumas	SECTION 15 SPRING
A019617	12635	7699	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	SQUAW SUPPRESSION CAMP SPRING
A019619	12637	8066	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	RATTLESNAKE SPRING
A019620	12638	8067	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	CEDAR SPRING
A019621	12639	8068	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	PINE TREE SPRING
A019622	12640	7700	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	GALEPPI SPRING
A019623	12641	7701	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	MURDOCK CROSSING SPRING
A019624	12642	7702	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	SQUAW VALLEY SPRING
A019625	12643	7703	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	BASS #1 SPRING
A019626	12644	7704	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	SOUTH TROUGH SPRING
A019627	12645	7710	U S PLUMAS NATL FOREST	07/28/60	0.70	Plumas	DAVIDSON MINE SPRING
A019628	12646	8305	U S PLUMAS NATL FOREST	07/28/60	0.30	Plumas	SQUAW CANYON SPRING
A020852	13951	8617	U S PLUMAS NATL FOREST	07/12/62	1.60	Plumas	UNSP

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
A021295	14364	8995	U S PLUMAS NATL FOREST	05/29/63	0.20	Plumas	BLAKELESS SPRING #2
A021296	14365	8982	U S PLUMAS NATL FOREST	05/29/63	0.80	Plumas	CHASE ENCLOSURE SPRING #2
A021297	14366	8996	U S PLUMAS NATL FOREST	05/29/63	0.80	Plumas	CHASE ENCLOSURE SPRING #1
A021304	14367	8968	U S PLUMAS NATL FOREST	05/29/63	0.80	Plumas	BULSON SPRING NO 3
A021305	14368	8969	U S PLUMAS NATL FOREST	05/29/63	0.80	Plumas	BULSON SPRING NO 2
A021306	14369	8970	U S PLUMAS NATL FOREST	05/29/63	0.80	Plumas	BULSON SPRING NO 1
A021307	14370	8971	U S PLUMAS NATL FOREST	05/29/63	0.60	Plumas	BLAKELESS SPRING NO 4
A021308	14371	8972	U S PLUMAS NATL FOREST	05/29/63	0.30	Plumas	BLAKELESS SPRING NO 1
A021312	14372	8984	U S PLUMAS NATL FOREST	05/29/63	0.50	Plumas	BIG BUCK SPRING
A021313	14373	9004	U S PLUMAS NATL FOREST	05/29/63	1.70	Plumas	HEADQUARTERS SPRING #1, HEADQUARTERS SPRINGS #2&3
A021314	14244	8997	U S PLUMAS NATL FOREST	05/29/63	0.80	Plumas	TROSI CANYON SPRING
A021316	14374	8998	U S PLUMAS NATL FOREST	05/29/63	1.50	Plumas	BIG PINE SPRING
A021317	14375	8999	U S PLUMAS NATL FOREST	05/29/63	0.40	Plumas	CEDAR CANYON SPRING
A022187	15225	8986	U S PLUMAS NATL FOREST	06/10/65	0.10	Plumas	UNST
A024263	16728	10955	U S PLUMAS NATL FOREST	12/19/72	9.00	Plumas	UNSP
A026877	18796		U S PLUMAS NATL FOREST	06/17/81	42.00	Plumas	DOTTA CANYON
			U S PLUMAS NATL FOREST Total		720.60		
A019565	12818	9877	USA-USDA FOREST SERVICE	01/02/09	0.80	Plumas	UNNAMED SPRING
			USA-USDA FOREST SERVICE Total		0.80		
A020529	13891	9187	VERDA F LEE FAMILY DATED 4/11/2001	12/18/61	54.00	Plumas	UNSP
			VERDA F LEE FAMILY DATED 4/11/2001 Total		54.00		
A028992	20339		WALLACE FAMILY TRUST	03/20/87	184.00	Sierra	SIERRA VALLEY CHANNELS
			WALLACE FAMILY TRUST Total		184.00		
A011316	7110	3738	WAYNE RANKIN	05/20/53	108.60	Plumas	BERRY CREEK
			WAYNE RANKIN Total		108.60		
A014113	11518		Yuba County Water District	12/28/50	330,861.98	Butte, Sutter, Plumas	SOUTH FORK FEATHER RIVER, LOST CREEK, FEATHER RIVER

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
			Yuba County Water District Total		330,861.98		
			Grand Total		11,862,602.48		

Yuba River - Post-1914 Appropriative Water Rights

Application ID	Permit ID	License ID	Water Right Type	Status	Holder Name	Date	Face Amt	County	Source
A003126	1371	1140	Appropriative	Licensed	ALBERT P STIEFEL	11/08/22	87.10	Butte	UNST, WYMAN RAVINE
					ALBERT P STIEFEL Total		87.10		
A016725	10685	6660	Appropriative	Licensed	ALLEGHANY COUNTY WATER DISTRICT	04/18/02	12.00	Sierra	UNSP
					ALLEGHANY COUNTY WATER DISTRICT Total		12.00		
A016724	10441	7079	Appropriative	Licensed	ALLEN C UPTON	11/08/55	1.00	Butte	WYANDOTTE CREEK
					ALLEN C UPTON Total		1.00		
A028395	20887		Appropriative	Permitted	ALLEN F MOORE	02/22/85	3.00	Yuba	DRY CREEK, UNSP
					ALLEN F MOORE Total		3.00		
A025086	17517	11958	Appropriative	Licensed	ANANDA CHURCH OF SELF REALIZATION	06/16/76	43.20	Nevada	UNST
A028680	20373		Appropriative	Permitted	ANANDA CHURCH OF SELF REALIZATION	12/24/85	29.30	Nevada	UNST
					ANANDA CHURCH OF SELF REALIZATION Total		72.50		
A024824	17031	13124	Appropriative	Licensed	ANDERSON AND ANDERSON INC	06/25/75	25.00	Nevada	UNST
A027748	19166	13125	Appropriative	Licensed	ANDERSON AND ANDERSON INC	05/05/83	1.00	Nevada	UNST
					ANDERSON AND ANDERSON INC Total		26.00		
A028403	20927		Appropriative	Permitted	ANNA MAY ROSE	03/07/85	2.00	Yuba	DRY CREEK, UNST
					ANNA MAY ROSE Total		2.00		
A030234	21008		Appropriative	Permitted	AUBURN SKI CLUB INC	03/15/93	122.00	Nevada	UPPER CASTLE CREEK
					AUBURN SKI CLUB INC Total		122.00		
A025584	17400	11440	Appropriative	Licensed	Bank of America	11/29/77	9.60	Yuba	UNST
					Bank of America Total		9.60		
A006099	3220	1080	Appropriative	Licensed	BENJAMIN N BORSOFF	10/19/28	17.90	Yuba	EAST BRANCH RICH GULCH
					BENJAMIN N BORSOFF Total		17.90		
A018175	11802	6611	Appropriative	Licensed	BERNICE ROSENLOF	06/10/58	12.50	Nevada	UNST
					BERNICE ROSENLOF Total		12.50		
A019562	12917	7493	Appropriative	Licensed	BILL AABERG	07/20/60	0.30	Sierra	UNST
					BILL AABERG Total		0.30		
A024530	17274	11238	Appropriative	Licensed	BILLY G CAROTHERS	01/21/74	10.00	Nevada	SWEETLAND CREEK
					BILLY G CAROTHERS Total		10.00		
A020521	13657	8703	Appropriative	Licensed	BITNEY SPRINGS LLC	12/11/61	14.00	Nevada	UNST
					BITNEY SPRINGS LLC Total		14.00		
A026408	18310	12153	Appropriative	Licensed	BOB LATTA	06/06/80	0.80	Sierra	HOWARD CREEK, NORTH YUBA RIVER
					BOB LATTA Total		0.80		

Application ID	Permit ID	License ID	Water Right Type	Status	Holder Name	Date	Face Amt	County	Source
A005590	2913	814	Appropriative	Licensed	BRADLEY T SHARPE	07/01/27	2.20	Yuba	WEST BRANCH RICH GULCH
A005677	2914	815	Appropriative	Licensed	BRADLEY T SHARPE	09/07/27	18.10	Yuba	WEST BRANCH RICH GULCH
A006096	3218	1084	Appropriative	Licensed	BRADLEY T SHARPE	10/19/28	1.00	Yuba	WEST BRANCH RICH GULCH
A006097	3219	1085	Appropriative	Licensed	BRADLEY T SHARPE	10/19/28	17.90	Yuba	WEST BRANCH RICH GULCH
					BRADLEY T SHARPE Total		39.20		
A020485	13927	8368	Appropriative	Licensed	Brian Brackbill	11/08/61	0.60	Sierra	Unnamed Stream
					Brian Brackbill Total		0.60		
A019560	12915	7492	Appropriative	Licensed	BRIAN G JACOBS	07/20/60	0.20	Sierra	UNST
					BRIAN G JACOBS Total		0.20		
A008986	5083	2182	Appropriative	Licensed	BROWNS VALLEY IRRIGATION DISTRICT	03/01/41	2,171.90	Yuba	TENNESSEE CREEK
A013130	8649	13608	Appropriative	Licensed	BROWNS VALLEY IRRIGATION DISTRICT	08/31/05	20,000.00	Yuba	DRY CREEK
A013873	9703	13609	Appropriative	Licensed	BROWNS VALLEY IRRIGATION DISTRICT	08/31/05	31,900.00	Yuba	DRY CREEK
A023757	16792	13610	Appropriative	Licensed	BROWNS VALLEY IRRIGATION DISTRICT	08/31/05	11,000.00	Yuba	DRY CREEK
					BROWNS VALLEY IRRIGATION DISTRICT Total		65,071.90		
A023135	15964	10995	Appropriative	Licensed	BRUCE K JORDAN	09/18/68	0.90	Nevada	UNSP
					BRUCE K JORDAN Total		0.90		
A024293	16636	10700	Appropriative	Licensed	BRUCE L RAYNER	01/30/73	1.80	Nevada	MOSQUITO CREEK
					BRUCE L RAYNER Total		1.80		
A029103	20530	13712	Appropriative	Licensed	CAL-WESTERN RECONVEYANCE CORPORATION	05/09/07	6.70	Butte	ROBINSON RAVINE
					CAL-WESTERN RECONVEYANCE CORPORATION Total		6.70		
A013870	8369	4804	Appropriative	Licensed	CALIF DEPT OF FORESTRY AND FIRE PROTECTION	07/27/50	2.40	Nevada	UNSP
					CALIF DEPT OF FORESTRY AND FIRE PROTECTION Total		2.40		
A020427	13564	7019	Appropriative	Licensed	CAROL BROOKS	10/05/61	0.60	Sierra	UNSP
					CAROL BROOKS Total		0.60		
A016874	10804	9323	Appropriative	Licensed	CAROL B DARDICK	01/31/56	21.40	Nevada	UNST
					CAROL B DARDICK Total		21.40		
A019282	12436	7169	Appropriative	Licensed	CATHOLIC YOUTH ORGANIZATION	03/04/60	3.40	Yuba	UNSP
					CATHOLIC YOUTH ORGANIZATION Total		3.40		
A024183	16604	10883	Appropriative	Licensed	CHARLES FOWLER	09/15/72	0.10	Nevada	LEFT OVER SPRING
					CHARLES FOWLER Total		0.10		
A024559	16997	13267	Appropriative	Licensed	CHARLES A JOHNSON	02/21/74	2.20	Nevada	UNSP

Application ID	Permit ID	License ID	Water Right Type	Status	Holder Name	Date	Face Amt	County	Source
					CHARLES A JOHNSON Total		2.20		
A028191	20013		Appropriative	Permitted	CHEROKEE NEVADA CORPORATION	11/21/94	1,445.00	Sierra	UNST
					CHEROKEE NEVADA CORPORATION Total		1,445.00		
A019561	12916	7540	Appropriative	Licensed	CHRISTIAN HUNTINGTON	07/20/60	0.20	Sierra	UNST
					CHRISTIAN HUNTINGTON Total		0.20		
A014960	9302	7082	Appropriative	Licensed	Christopher W Miller	08/12/52	0.40	Placer	UNSP
					Christopher W Miller Total		0.40		
A026117	18434	12293	Appropriative	Licensed	CITY OF NEVADA CITY	10/17/79	53.70	Nevada	LITTLE DEER CREEK, UNST
					CITY OF NEVADA CITY Total		53.70		
A021158	14239	9010	Appropriative	Licensed	CONSTANCE C CLOVER	02/13/63	1.00	Sierra	UNSP
					CONSTANCE C CLOVER Total		1.00		
A005880	3102	2172	Appropriative	Licensed	COUGHLAN FAMILY RANCH	04/16/28	1,013.60	Nevada	BONNIE RAVINE, GLENNON RAVINE, ROBERTS CREEK
					COUGHLAN FAMILY RANCH Total		1,013.60		
A023111	15803	10206	Appropriative	Licensed	CRAIG LABADIE	08/13/68	0.80	Sierra	UNST
					CRAIG LABADIE Total		0.80		
A004731	2393	735	Appropriative	Licensed	CYRUS M ROLLINS	08/12/25	2.40	Sierra	UNSP
A006120	3232	1309	Appropriative	Licensed	CYRUS M ROLLINS	11/13/28	1.70	Sierra	UNST
					CYRUS M ROLLINS Total		4.10		
A023082	15977	10901	Appropriative	Licensed	DAN T THOMPSON	07/10/68	10.20	Nevada	KENTUCKY RAVINE
					DAN T THOMPSON Total		10.20		
A021554	14793	9832	Appropriative	Licensed	DANIEL MASON	11/27/63	18.00	Nevada	FRENCH CORRAL CREEK
					DANIEL MASON Total		18.00		
A021672	14830	9700	Appropriative	Licensed	DANIEL J GUYER	03/05/64	140.00	Sierra	UNST
					DANIEL J GUYER Total		140.00		
A017285	11045	7214	Appropriative	Licensed	DAVE KING	09/20/56	37.00	Nevada	KENTUCKY RAVINE
					DAVE KING Total		37.00		
A019710	12873	10129	Appropriative	Licensed	David Grenell	08/24/60	1.10	Sierra	THOMAS ELLIS SPRING #3, THOMAS ELLIS SPRING #4
					David Grenell Total		1.10		
A023514	16108	10245	Appropriative	Licensed	DAVID HERSHBERGER	05/20/70	0.30	Nevada	UNSP
A026065	17908	12157	Appropriative	Licensed	DAVID HERSHBERGER	08/14/79	0.60	Nevada	UNSP
					DAVID HERSHBERGER Total		0.90		
A019025	12515	7832	Appropriative	Licensed	DAVID RUMSEY	10/09/59	0.20	Sierra	UNSP
					DAVID RUMSEY Total		0.20		
A020313	13946	8660	Appropriative	Licensed	DAVID WALSH	07/21/61	0.20	Sierra	UNST
					DAVID WALSH Total		0.20		
A022928	15954	10996	Appropriative	Licensed	DAVID B JORDON	10/13/67	0.90	Nevada	UNSP
					DAVID B JORDON Total		0.90		
A027876	19125	12696	Appropriative	Licensed	DAVID B PEDERSON	09/15/83	1.40	Yuba	UNST
					DAVID B PEDERSON Total		1.40		
A016558	11367	8127	Appropriative	Licensed	DAVID C BREWER	08/29/55	4.20	Nevada	LITTLE ROCK CREEK
					DAVID C BREWER Total		4.20		

Application ID	Permit ID	License ID	Water Right Type	Status	Holder Name	Date	Face Amt	County	Source
A022898	15669	11110	Appropriative	Licensed	DAVID K DAVISON	08/28/67	4.70	Sierra	HUNGRY MOUTH CANYON
					DAVID K DAVISON Total		4.70		
A025105	17076	11251	Appropriative	Licensed	DAVID W MARKS	07/19/76	11.00	Nevada	KENTUCKY RAVINE
					DAVID W MARKS Total		11.00		
A021598	14416	8825	Appropriative	Licensed	DAWN B VINJE	01/15/64	18.00	Yuba	UNST
					DAWN B VINJE Total		18.00		
A019390	12911	8810	Appropriative	Licensed	DENISE STEBLER	04/26/60	1.60	Sierra	ROCK CREEK
					DENISE STEBLER Total		1.60		
A022566	15575	9896	Appropriative	Licensed	DIANE W ROLLINS	04/14/72	20.00	Sierra	DRURY RAVINE
					DIANE W ROLLINS Total		20.00		
A010009	5687	4866	Appropriative	Licensed	DICKEY EXPLORATION COMPANY	09/23/40	97.00	Sierra	WET RAVINE
					DICKEY EXPLORATION COMPANY Total		97.00		
A023535	16409	11027	Appropriative	Licensed	DIRK C REED	06/24/70	15.70	Nevada	UNST, WILLOW VALLEY CREEK
					DIRK C REED Total		15.70		
A030332	21118		Appropriative	Permitted	DONNER SUMMIT PUBLIC UTILITY DISTRICT	02/08/94	664.00	Nevada	LAKE ANGELA
					DONNER SUMMIT PUBLIC UTILITY DISTRICT Total		664.00		
A025719	17610	12075	Appropriative	Licensed	DOROTHEA SELBY	04/17/78	13.50	Yuba	UNST
					DOROTHEA SELBY Total		13.50		
A028988	20947		Appropriative	Permitted	Dorothy Pencik	03/16/87	24.00	Sierra	OAK VALLEY CREEK
					Dorothy Pencik Total		24.00		
A020808	13929	8700	Appropriative	Licensed	DOROTHY L VENDLEY	07/19/68	9.20	Nevada	SPRING CREEK
					DOROTHY L VENDLEY Total		9.20		
A009827	5663	2650	Appropriative	Licensed	DOWNIEVILLE PUBLIC UTILITY DISTRICT	05/15/01	114.00	Sierra	PAULEY CREEK
					DOWNIEVILLE PUBLIC UTILITY DISTRICT Total		114.00		
A026227	17973	11822	Appropriative	Licensed	DUANE FRED LEE	02/21/80	2.60	Nevada	UNST
					DUANE FRED LEE Total		2.60		
A022735	15630	10005	Appropriative	Licensed	DUANE T NICHOLSON	03/05/73	4.50	Yuba	UNST
					DUANE T NICHOLSON Total		4.50		
A020146	13371	8148	Appropriative	Licensed	DWAYNE M DOBBINS	05/24/61	0.20	Nevada	UNSP
					DWAYNE M DOBBINS Total		0.20		
A024876	17136	11423	Appropriative	Licensed	EDWARD CARTER	09/10/75	2.20	Yuba	UNST
					EDWARD CARTER Total		2.20		
A020291	13386	9922	Appropriative	Licensed	ELLEN DAVIS	05/12/72	102.00	Yuba	LITTLE DRY CREEK
					ELLEN DAVIS Total		102.00		
A015415	9591	5978	Appropriative	Licensed	Eric Christopher Dunisch	07/16/53	0.40	Placer	UNSP
					Eric Christopher Dunisch Total		0.40		
A013594	7966	4185	Appropriative	Licensed	ERMA B BELLETT	02/20/50	61.00	Nevada	UNST

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A013772	8313	4184	Appropriative	Licensed	ERMA B BELLETT	06/05/50	19.00	Nevada	UNST
					ERMA B BELLETT Total		80.00		
A019723	13031	9257	Appropriative	Licensed	ERNEST LOCATELLI	08/31/60	6.50	Sierra	MINE TUNNEL
					ERNEST LOCATELLI Total		6.50		
A020340	13854	8677	Appropriative	Licensed	Estate of Luella Debruin	08/02/61	4.90	Nevada	FRENCH CORRAL CREEK, UNST
A022900	15557	10027	Appropriative	Licensed	Estate of Luella Debruin	09/01/67	5.30	Nevada	UNST
					Estate of Luella Debruin Total		10.20		
A003332	1725	3267	Appropriative	Licensed	FAR VIEW ENTERPRISES INC	03/27/23	191.90	Butte	KINGS CREEK, LINCOLN HOUSE RAVINE
A016151	10611	7713	Appropriative	Licensed	FAR VIEW ENTERPRISES INC	11/23/54	50.00	Butte	LINCOLN HOUSE RAVINE
					FAR VIEW ENTERPRISES INC Total		241.90		
A017887	11400	6918	Appropriative	Licensed	FELLOWSHIP OF FRIENDS, INC	11/20/57	2.40	Yuba	UNST
A022518	15590	9584	Appropriative	Licensed	FELLOWSHIP OF FRIENDS, INC	07/06/66	3.20	Yuba	UNST
A025865	17749	13546	Appropriative	Licensed	FELLOWSHIP OF FRIENDS, INC	07/17/03	40.00	Yuba	WOODS CREEK
A027042	19277	13547	Appropriative	Licensed	FELLOWSHIP OF FRIENDS, INC	07/17/03	16.00	Yuba	UNST
A027043	19278	13548	Appropriative	Licensed	FELLOWSHIP OF FRIENDS, INC	07/17/03	42.00	Yuba	WOODS CREEK
					FELLOWSHIP OF FRIENDS, INC Total		103.60		
A007217	4420	2197	Appropriative	Licensed	FLORENCE B VON PLATEN	03/28/32	9.50	Nevada	UNXX
					FLORENCE B VON PLATEN Total		9.50		
A020310	13945	8349	Appropriative	Licensed	FORREST THOMAS	07/19/61	0.60	Sierra	UNSP
					FORREST THOMAS Total		0.60		
A010186	5823	2957	Appropriative	Licensed	FORSYTHE FAMILY TRUST	04/18/41	3.40	Sierra	UNSP
					FORSYTHE FAMILY TRUST Total		3.40		
A019007	12872	10128	Appropriative	Licensed	FRANCIS B PLANT	09/29/59	1.80	Sierra	SPRING #3, THOMAS ELLIS SPRING #1, THOMAS ELLIS SPRING #2, UNSP
					FRANCIS B PLANT Total		1.80		
A028922	20946		Appropriative	Permitted	Frank Pencik	10/20/86	6.00	Sierra	OAK VALLEY CREEK
					Frank Pencik Total		6.00		
A016792B	10815	008072B	Appropriative	Licensed	FRANK A MACHI	12/06/85	4.70	Nevada	UNST
					FRANK A MACHI Total		4.70		
A023956	16404	12058	Appropriative	Licensed	FRANKLIN JONES	12/30/71	0.60	Nevada	UNST

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					FRANKLIN JONES Total		0.60		
A012154	7067	7040	Appropriative	Licensed	Gary J. Howsley	11/14/47	120.10	Yuba	LITTLE DRY CREEK
					Gary J. Howsley Total		120.10		
A019827	14390	9729	Appropriative	Licensed	GARY POOR	04/08/71	5.30	Sierra	UNST
					GARY POOR Total		5.30		
A009765	5532	4921	Appropriative	Licensed	GARY ZOLLDAN	11/09/39	1.50	Sierra	HARDY SPRING
					GARY ZOLLDAN Total		1.50		
A014371	9978	5645	Appropriative	Licensed	GARY D SMITH	06/27/51	2,903.80	Yuba	FRENCH DRY CREEK
					GARY D SMITH Total		2,903.80		
A017407	11040	6917	Appropriative	Licensed	GARY W DE MAR	12/26/56	72.50	Sierra	ARIZONA TUNNEL SPRING
					GARY W DE MAR Total		72.50		
A022567	15585	9649	Appropriative	Licensed	GEORGE KOOLERY	09/02/66	1.90	Sierra	UNSP
					GEORGE KOOLERY Total		1.90		
A022341	15153	9652	Appropriative	Licensed	GEORGINE TOMASI	11/23/65	0.80	Nevada	UNST
					GEORGINE TOMASI Total		0.80		
A023893	16447	10718	Appropriative	Licensed	GERALD BROOKS	10/07/71	16.00	Nevada	OWL CREEK
					GERALD BROOKS Total		16.00		
A002696	1200	511	Appropriative	Licensed	GOLD LAKE HOLDINGS LLC	12/21/21	3.00	Sierra	UNCR
					GOLD LAKE HOLDINGS LLC Total		3.00		
A028147	19447		Appropriative	Permitted	GREENE ACRES PROPERTY OWNERS ASSOCIATION	06/04/84	14.00	Sierra	UNSP
					GREENE ACRES PROPERTY OWNERS ASSOCIATION Total		14.00		
A026763	18953	12672	Appropriative	Licensed	GREGORY G KSANDER	03/25/81	0.20	Sierra	UNSP
					GREGORY G KSANDER Total		0.20		
A023470	16259	10568	Appropriative	Licensed	GREGORY L COMBS	03/19/70	5.40	Nevada	UNST
					GREGORY L COMBS Total		5.40		
A015100	9828	5683	Appropriative	Licensed	GUS NORTON	12/01/52	0.80	Sierra	UNST
					GUS NORTON Total		0.80		
A026703	18532	12361	Appropriative	Licensed	Heidi Biber	02/03/81	1.20	Nevada	UNST
					Heidi Biber Total		1.20		
A014962	9304	5295	Appropriative	Licensed	HELENE M WULBERN REVOCABLE TRUST 11/21/02	08/12/52	0.20	Placer	UNSP
					HELENE M WULBERN REVOCABLE TRUST 11/21/02 Total		0.20		
A014390A	008798A	007078A	Appropriative	Licensed	HENRY C LITTLE	07/31/92	20.00	Butte	WYANDOTTE CREEK
					HENRY C LITTLE Total		20.00		
A020243	13943	8370	Appropriative	Licensed	Hilary Winslow	06/01/61	0.60	Sierra	UNSP
					Hilary Winslow Total		0.60		
A030265	20863		Appropriative	Permitted	HOLT FAMILY TRUST	07/07/93	7.00	Sierra	UNST
					HOLT FAMILY TRUST Total		7.00		
A026949	18911	12397	Appropriative	Licensed	HUEY JOHNSON	08/10/81	0.20	Nevada	UNST
					HUEY JOHNSON Total		0.20		

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A028682	20102		Appropriative	Permitted	HUTCH H HUTCHISON	12/26/85	0.50	Nevada	UNSP
					HUTCH H HUTCHISON Total		0.50		
A010716	6336	3002	Appropriative	Licensed	IRVING N CHRISTENSEN	10/05/43	7.80	Sierra	UNSP
A019279	12546	7168	Appropriative	Licensed	IRVING N CHRISTENSEN	03/04/60	4.50	Sierra	UNSP
					IRVING N CHRISTENSEN Total		12.30		
A011257	6539	3342	Appropriative	Licensed	JACK E BERNDT	01/10/46	4.30	Sierra	UNSP, UNST
					JACK E BERNDT Total		4.30		
A014991	9201	5305	Appropriative	Licensed	JAMES NEWMAN	08/22/52	2.20	Nevada	UNST
					JAMES NEWMAN Total		2.20		
A012118	7160	3884	Appropriative	Licensed	James & Aileen Stevens Revocable Trust	10/03/47	15.00	Yuba	LITTLE DRY CREEK
A014946	9652	5084	Appropriative	Licensed	James & Aileen Stevens Revocable Trust	07/31/52	11.00	Yuba	LITTLE DRY CREEK
					James & Aileen Stevens Revocable Trust Total		26.00		
A019647	12870	8606	Appropriative	Licensed	JAMES K CHRISTENSEN	08/04/60	27.80	Sierra	EMPIRE SPRING
					JAMES K CHRISTENSEN Total		27.80		
A018804	12160	8625	Appropriative	Licensed	JAMES L MOHAN	06/17/59	1.00	Yuba	MOONSHINE CREEK
					JAMES L MOHAN Total		1.00		
A010181	6026	2944	Appropriative	Licensed	James M & Aileen Stevens Rev Tr	04/09/41	98.70	Yuba	LITTLE DRY CREEK
					James M & Aileen Stevens Rev Tr Total		98.70		
A026522	18513	12362	Appropriative	Licensed	JAMES NELSON DEGLANDON	09/11/80	24.00	Nevada	UNST
					JAMES NELSON DEGLANDON Total		24.00		
A026282	18202	12016	Appropriative	Licensed	JAMES R CUMMINS	04/09/80	6.10	Yuba	UNST
					JAMES R CUMMINS Total		6.10		
A021865	14988	8879	Appropriative	Licensed	JAMES S AVILLA	08/05/64	0.30	Placer	UNSP
					JAMES S AVILLA Total		0.30		
A010839	6383	3431	Appropriative	Licensed	Jana Burgess-Henry	07/15/44	29.00	Yuba	WAGNER CREEK
					Jana Burgess-Henry Total		29.00		
A013342	8218	4055	Appropriative	Licensed	Janie Kouch	09/08/49	1.20	Yuba	SOUTH HONCUT CREEK
					Janie Kouch Total		1.20		
A024799	17750	12294	Appropriative	Licensed	JAY CORY	04/14/75	0.20	Sierra	UNSP
					JAY CORY Total		0.20		
A021644	14628	9333	Appropriative	Licensed	JENISE J WARDEN	02/13/64	0.40	Nevada	UNSP
					JENISE J WARDEN Total		0.40		
A010856	6542	3299	Appropriative	Licensed	JERRY DON ELLSWORTH	03/14/01	57.00	Sierra	FIDDLE CREEK
					JERRY DON ELLSWORTH Total		57.00		
A025403	17354	11466	Appropriative	Licensed	JESSIE C TROST	06/23/77	0.10	Yuba	UNST
					JESSIE C TROST Total		0.10		
A020770	14744	9239	Appropriative	Licensed	JO HAMILTON	05/10/62	2.00	Nevada	UNSP (2)
					JO HAMILTON Total		2.00		
A021970	14989	8881	Appropriative	Licensed	JOAN M HANSON	11/23/64	1.00	Placer	UNSP
					JOAN M HANSON Total		1.00		
A025503	18013	13383	Appropriative	Licensed	JOE W ALEXANDER	09/12/77	49.90	Yuba	UNST
A026515A	018442A	13384	Appropriative	Licensed	JOE W ALEXANDER	02/05/92	5.20	Yuba	UNST

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A026515B	018422B	13385	Appropriative	Licensed	JOE W ALEXANDER	02/05/92	6.00	Yuba	UNST
					JOE W ALEXANDER Total		61.10		
A006057	3283	2041	Appropriative	Licensed	JOHN BARKER	09/17/28	5.10	Sierra	UNSP
					JOHN BARKER Total		5.10		
A025542	17408	11250	Appropriative	Licensed	JOHN FARACE	10/27/77	1.80	Yuba	KEYSTONE CREEK
					JOHN FARACE Total		1.80		
A018696	12090	7389	Appropriative	Licensed	JOHN A PARKER	05/07/59	0.20	Sierra	UNST
					JOHN A PARKER Total		0.20		
A013656	8167	5234	Appropriative	Licensed	JOHN H LUNDIN	03/28/50	1.60	Yuba	UNST
					JOHN H LUNDIN Total		1.60		
A026073	18076	12085	Appropriative	Licensed	JOHN R POWERS III & JANEY H POWERS REVOC TRUST DATED 9/6/00	08/24/79	4.20	Nevada	UNST
					JOHN R POWERS III & JANEY H POWERS REVOC TRUST DATED 9/6/00 Total		4.20		
A017288	10935	6019	Appropriative	Licensed	JOHN T SMEE	09/21/56	0.10	Sierra	UNST
					JOHN T SMEE Total		0.10		
A010173	5777	4026	Appropriative	Licensed	JOSEPH E MARCANTONIO	03/29/41	36.50	Sierra	SLATE CASTLE RAVINE
A018484	11894	6979	Appropriative	Licensed	JOSEPH E MARCANTONIO	01/21/59	0.50	Sierra	SLATE CASTLE CREEK
					JOSEPH E MARCANTONIO Total		37.00		
A012700	7530	3719	Appropriative	Licensed	JULI SHAPIRO-ABDEEN	09/15/48	25.00	Nevada	UNST
					JULI SHAPIRO-ABDEEN Total		25.00		
A016732	11900	6537	Appropriative	Licensed	JUNE BURCHAM WILHELM	11/10/55	0.50	Nevada	UNXX
					JUNE BURCHAM WILHELM Total		0.50		
A019448	13768	8041	Appropriative	Licensed	KATHARINE SPIERS	05/24/60	42.00	Yuba	UNST
					KATHARINE SPIERS Total		42.00		
A018914	12417	7415	Appropriative	Licensed	Katherine Greene	08/14/59	17.00	Yuba	GARDEN RAVINE
					Katherine Greene Total		17.00		
A020792	14164	8897	Appropriative	Licensed	KATHLEEN H GOLDEN	05/25/62	0.20	Sierra	UNSP
					KATHLEEN H GOLDEN Total		0.20		
A014740	9017	5273	Appropriative	Licensed	KEITH L DOLAR	04/04/52	85.30	Butte	UNST
					KEITH L DOLAR Total		85.30		
A026245	18702	12528	Appropriative	Licensed	KEN BURKINDINE	03/04/80	0.40	Sierra	UNST
					KEN BURKINDINE Total		0.40		
A027819	19238	12680	Appropriative	Licensed	KEVIN HOMAN	08/04/83	2.00	Nevada	UNST
					KEVIN HOMAN Total		2.00		
A008330	4661	1928	Appropriative	Licensed	KIM HEMSTALK	05/04/35	5.00	Sierra	COYOTE RAVINE
					KIM HEMSTALK Total		5.00		
A023315	16073		Appropriative	Permitted	KINGVALE PROPERTY OWNERS & WATER USERS INC	07/18/69	20.00	Nevada	FOCHETTI SPRING, LOLA MONTEZ SPRING, S P SPRING
					KINGVALE PROPERTY OWNERS & WATER USERS INC Total		20.00		
A026074	18088		Appropriative	Permitted	LA PORTE PINES COUNTRY CLUB	08/24/79	55.00	Plumas	UNSP, UNSP(2), UNST

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A027273	18597		Appropriative	Permitted	LA PORTE PINES COUNTRY CLUB	09/17/02	54.80	Plumas	UNSP
					LA PORTE PINES COUNTRY CLUB Total		109.80		
A004494	2081	781	Appropriative	Licensed	LAKE VERA MUTUAL WATER COMPANY	03/06/25	70.00	Nevada	ROCK CREEK
A005719	2979	782	Appropriative	Licensed	LAKE VERA MUTUAL WATER COMPANY	10/13/27	729.90	Nevada	ROCK CREEK
					LAKE VERA MUTUAL WATER COMPANY Total		799.90		
A023047	15779	10779	Appropriative	Licensed	LAKE WILDWOOD ASSOCIATION	05/17/68	3,840.00	Nevada	DEER CREEK
					LAKE WILDWOOD ASSOCIATION Total		3,840.00		
A007657	4239	6379	Appropriative	Licensed	LANCE BARLEAN	08/28/33	3.40	Yuba	UNSP
					LANCE BARLEAN Total		3.40		
A028134	20886	13842	Appropriative	Licensed	LEAH M STOCKER	11/08/11	5.00	Yuba	UNST
					LEAH M STOCKER Total		5.00		
A018396	11929	7012	Appropriative	Licensed	LEONARD C FUQUA	11/05/58	0.20	Sierra	COLD SPRING
					LEONARD C FUQUA Total		0.20		
A029180	20522		Appropriative	Permitted	LINDA BATES	03/19/02	5.00	Sierra	GRIZZLY GULCH
					LINDA BATES Total		5.00		
A026605	18765	13817	Appropriative	Licensed	LINDA BIRGE	01/05/11	45.00	Nevada	UNST
					LINDA BIRGE Total		45.00		
A024857	17681	12173	Appropriative	Licensed	LOUIS CLIFFORD LESTER SR	08/14/75	14.50	Nevada	UNST
					LOUIS CLIFFORD LESTER SR Total		14.50		
A012025	7313	6960	Appropriative	Licensed	LOWELL G ROBINSON	08/05/47	0.30	Sierra	UNSP
					LOWELL G ROBINSON Total		0.30		
A022801	15654	10430	Appropriative	Licensed	MAPLE GROVE MUTUAL WATER COMPANY	06/05/67	1.10	Sierra	CEDAR SPRING
A023795	16373		Appropriative	Permitted	MAPLE GROVE MUTUAL WATER COMPANY	06/02/71	10.00	Sierra	UNSP, WIXON SPRING
					MAPLE GROVE MUTUAL WATER COMPANY Total		11.10		
A006834	3665	1878	Appropriative	Licensed	MARIE BERTILLION COLLINS	11/19/30	0.70	Sierra	UNSP
A024808	16940	11499	Appropriative	Licensed	MARIE BERTILLION COLLINS	05/07/75	0.70	Sierra	UNSP
A026189	18266		Appropriative	Permitted	MARIE BERTILLION COLLINS	01/08/99	2.00	Sierra	UNSP
					MARIE BERTILLION COLLINS Total		3.40		
A018779	12139	8117	Appropriative	Licensed	MARIE M LANDERS	06/09/59	0.30	Sierra	UNSP
					MARIE M LANDERS Total		0.30		
A013399	8022	3796	Appropriative	Licensed	MARIN COUNCIL BOY SCOUT TRUST FUND #2	10/13/49	42.50	Nevada	CHUBB LAKE
					MARIN COUNCIL BOY SCOUT TRUST FUND #2 Total		42.50		
A014959	9301	5983	Appropriative	Licensed	MARK MOORE	08/12/52	0.40	Placer	UNSP
					MARK MOORE Total		0.40		
A015345	9575	5185	Appropriative	Licensed	MARK ROTH	06/09/58	0.10	Placer	UNSP

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					MARK ROTH Total		0.10		
A018079	11547	6800	Appropriative	Licensed	MARTIN FAMILY TRUST	04/02/58	3.70	Nevada	UNST
					MARTIN FAMILY TRUST Total		3.70		
A027000	18773	13792	Appropriative	Licensed	MAURICE ALTSHULER	05/28/09	20.00	Nevada	UNST
A030728	21195	13793	Appropriative	Licensed	MAURICE ALTSHULER	05/28/09	6.00	Nevada	UNST
					MAURICE ALTSHULER Total		26.00		
A021251	14195	9944	Appropriative	Licensed	MICHAEL CIAFARDONI	04/22/63	17.00	Nevada	UNST
					MICHAEL CIAFARDONI Total		17.00		
A025891	17758	11770	Appropriative	Licensed	MICHAEL K SCHARF	12/26/78	1.70	Nevada	UNST
					MICHAEL K SCHARF Total		1.70		
A009750	5462	3069	Appropriative	Licensed	MILTON R HOLSTROM	10/13/39	726.00	Sierra	EMPIRE CREEK, UNSP
					MILTON R HOLSTROM Total		726.00		
A024730	17134	11755	Appropriative	Licensed	Modern Building Inc.	12/20/74	25.00	Butte	UNST
					Modern Building Inc. Total		25.00		
A001270	2082	12795	Appropriative	Licensed	NEVADA IRRIGATION DISTRICT	07/10/91	130,701.50	Nevada	CANYON CREEK, FALL CREEK, JACKSON CREEK, TEXAS CREEK, TRAP CREEK
A001614	1481		Appropriative	Permitted	NEVADA IRRIGATION DISTRICT	01/08/20	60,000.00	Nevada	DEER CREEK
A001615	5801	8808	Appropriative	Licensed	NEVADA IRRIGATION DISTRICT	01/08/20	36,496.40	Nevada	DEER CREEK, SOUTH FORK DEER CREEK
A002276	2085	12797	Appropriative	Licensed	NEVADA IRRIGATION DISTRICT	03/25/21	60,000.00	Nevada, Sierra	MIDDLE YUBA RIVER
A005193	13770		Appropriative	Permitted	NEVADA IRRIGATION DISTRICT	09/08/26	50,000.00	Nevada, Sierra	MIDDLE YUBA RIVER (@ MILTON DAM), MIDDLE YUBA RIVER (@JACKSON MEADOWS DAM)
A006702	5807	12800	Appropriative	Licensed	NEVADA IRRIGATION DISTRICT	06/16/30	4,889.30	Nevada	CLEAR CREEK, FALL CREEK, TRAP CREEK
A008180	5815		Appropriative	Permitted	NEVADA IRRIGATION DISTRICT	11/27/34	207,894.90	Nevada	CLEAR CREEK, FALL CREEK, RUCKER CREEK, TEXAS CREEK, TRAP CREEK
A020017	13772		Appropriative	Permitted	NEVADA IRRIGATION DISTRICT	03/06/61	101,160.00	Nevada	SOUTH YUBA RIVER
					NEVADA IRRIGATION DISTRICT Total		651,142.10		
A014961	9303	6158	Appropriative	Licensed	NORMAN R PICKLES	08/12/52	0.40	Placer	UNSP
					NORMAN R PICKLES Total		0.40		
A013957	11516		Appropriative	Permitted	North Yuba Water District	08/18/58	145,084.30	Plumas, Yuba	SLATE CREEK
					North Yuba Water District Total		145,084.30		

Application ID	Permit ID	License ID	Water Right Type	Status	Holder Name	Date	Face Amt	County	Source
A013959	8944	4700	Appropriative	Licensed	O'Brien Ranch LLC	09/21/50	983.80	Butte, Yuba	SOUTH HONCUT CREEK
					O'Brien Ranch LLC Total		983.80		
A018565	12005	6754	Appropriative	Licensed	OLIVER G MILHOUS	03/03/59	20.00	Nevada	UNST
					OLIVER G MILHOUS Total		20.00		
A000481	203	368	Appropriative	Licensed	ORIGINAL SIXTEEN TO ONE MINE, INC	07/31/24	724.00	Sierra	BUCKEYE RAVINE
A001193	562	121	Appropriative	Licensed	ORIGINAL SIXTEEN TO ONE MINE, INC	02/25/19	362.00	Sierra	UNSP
					ORIGINAL SIXTEEN TO ONE MINE, INC Total		1,086.00		
A013689	8312	3836	Appropriative	Licensed	OSHA B READER	04/14/50	49.60	Sierra	UNST
A018928	12203	6983	Appropriative	Licensed	OSHA B READER	08/20/59	1.70	Sierra	UNSP
					OSHA B READER Total		51.30		
A011120	6599	3392	Appropriative	Licensed	OSTROM FAMILY TRUST	07/27/45	12.00	Sierra	UNSP
A011501	6713	3393	Appropriative	Licensed	OSTROM FAMILY TRUST	08/07/46	38.20	Sierra	UNSP
A017135	10850	6922	Appropriative	Licensed	OSTROM FAMILY TRUST	06/14/56	0.20	Sierra	UNSP
A017137	10852	5981	Appropriative	Licensed	OSTROM FAMILY TRUST	06/14/56	0.10	Sierra	UNSP
A018782	12221		Appropriative	Permitted	OSTROM FAMILY TRUST	10/02/01	40.10	Sierra	ANDERSON SPRING
A023778	16372		Appropriative	Permitted	OSTROM FAMILY TRUST	05/04/71	24.10	Sierra	UNSP, WIXON SPRING
					OSTROM FAMILY TRUST Total		114.70		
A024165	16758	11081	Appropriative	Licensed	PACIFIC EDGE INC	08/30/72	9.00	Yuba	UNST
					PACIFIC EDGE INC Total		9.00		
A015542	9622	5189	Appropriative	Licensed	PAUL F BUKENHOFER	09/17/53	72.50	Yuba	UNST
					PAUL F BUKENHOFER Total		72.50		
A020823	13820	8729	Appropriative	Licensed	PAULA M SCHROEDER	06/20/62	0.60	Sierra	UNSP
					PAULA M SCHROEDER Total		0.60		
A018176	11803	8201	Appropriative	Licensed	PHILIP PERSONENI	06/10/58	91.70	Nevada	SHADY CREEK
					PHILIP PERSONENI Total		91.70		
A024842	17048	11439	Appropriative	Licensed	PHILIP J SIMMONS	07/22/75	1.00	Sierra	UNST
					PHILIP J SIMMONS Total		1.00		
A009617	5497	2705	Appropriative	Licensed	PONTA, MELVIN J & MARCELLA M 1984 REVOCABLE TRUST	09/26/44	39.80	Sierra	WOODRUFF CREEK
A011994	7054	3526	Appropriative	Licensed	PONTA, MELVIN J & MARCELLA M 1984 REVOCABLE TRUST	07/16/47	1.60	Sierra	UNSP
					PONTA, MELVIN J & MARCELLA M 1984 REVOCABLE TRUST Total		41.40		
A027638	18933	12446	Appropriative	Licensed	R MARILYN WILSON	01/24/83	2.00	Nevada	KENTUCKY RAVINE
					R MARILYN WILSON Total		2.00		
A018368	11988	8848	Appropriative	Licensed	RAENNE A KALFSBEEK	10/10/58	3.70	Yuba	GOLDEN GATE RAVINE
					RAENNE A KALFSBEEK Total		3.70		
A008343	4680	1903	Appropriative	Licensed	RAINBOW HOLDING COMPANY, LTD	05/25/35	112.90	Placer	UNSP
					RAINBOW HOLDING COMPANY, LTD Total		112.90		
A025997	18129	12158	Appropriative	Licensed	RAMON HERNANDEZ	05/16/79	15.00	Yuba	UNST
					RAMON HERNANDEZ Total		15.00		
A017934	11550	6977	Appropriative	Licensed	RAY COLAIZZI	01/06/58	0.80	Sierra	INDEPENDENCE CREEK

Application ID	Permit ID	License ID	Water Right Type	Status	Holder Name	Date	Face Amt	County	Source
					RAY COLAIZZI Total		0.80		
A022395	15508	10302	Appropriative	Licensed	REGULAR BAPTIST CAMP INCORPORATED	02/18/66	87.00	Sierra	PILOT LAKE (AKA DELAHUNTY LAKE)
A022396	15220	11011	Appropriative	Licensed	REGULAR BAPTIST CAMP INCORPORATED	09/19/02	3.20	Sierra	UNSP (3)
					REGULAR BAPTIST CAMP INCORPORATED Total		90.20		
A018212	11725	9140	Appropriative	Licensed	RENTIER INCORPORATED	07/09/58	0.70	Sierra	UNST
					RENTIER INCORPORATED Total		0.70		
A018279	11926	7127	Appropriative	Licensed	RICHARD L MILLER	08/21/58	0.20	Sierra	UNSP
					RICHARD L MILLER Total		0.20		
A017797	11267	7196	Appropriative	Licensed	RICHARD W WALKER	08/22/57	1.70	Placer	UNST
					RICHARD W WALKER Total		1.70		
A027542	18885	12513	Appropriative	Licensed	RICHARDS LAND & CATTLE CO	09/30/82	12.00	Yuba	WOODS CREEK
A027603	18884	13380	Appropriative	Licensed	RICHARDS LAND & CATTLE CO	12/03/82	49.00	Yuba	WOODS CREEK
					RICHARDS LAND & CATTLE CO Total		61.00		
A019559	12914	7539	Appropriative	Licensed	ROBERT CARLSTROEM	07/20/60	0.20	Sierra	UNST
					ROBERT CARLSTROEM Total		0.20		
A021496	14525	9634	Appropriative	Licensed	ROBERT A HELLER	10/09/63	1.10	Sierra	UNXX
					ROBERT A HELLER Total		1.10		
A026640	18874		Appropriative	Permitted	ROBERT A ROWE	12/02/80	3.20	Nevada	KENTUCKY RAVINE
					ROBERT A ROWE Total		3.20		
A016792A	10815	008072A	Appropriative	Licensed	ROBERT L RYAN	12/06/85	9.40	Nevada	UNST
					ROBERT L RYAN Total		9.40		
A014951	10084	5848	Appropriative	Licensed	ROBERTA D'ARCY	08/06/52	113.10	Yuba	DRY CREEK
					ROBERTA D'ARCY Total		113.10		
A018674	12824	8179	Appropriative	Licensed	ROCHELLE A FLEMING	04/28/59	0.30	Sierra	UNST
					ROCHELLE A FLEMING Total		0.30		
A021562	14484	8801	Appropriative	Licensed	ROGER P VAN CRAEYNEST	12/04/63	2.70	Sierra	UNSP
					ROGER P VAN CRAEYNEST Total		2.70		
A026809	18475	12287	Appropriative	Licensed	RONALD GUILD	04/29/81	4.00	Yuba	PRAIRIE CREEK
					RONALD GUILD Total		4.00		
A027976	19244	12656	Appropriative	Licensed	RONALD L GOODSPEED	02/08/84	0.30	Nevada	UNST
					RONALD L GOODSPEED Total		0.30		
A018286	11774	7006	Appropriative	Licensed	ROSS JACOBS	08/26/58	0.20	Sierra	UNST
					ROSS JACOBS Total		0.20		

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A026365	18355	12070	Appropriative	Licensed	ROY BRAATZ	05/19/80	3.30	Nevada	UNST
					ROY BRAATZ Total		3.30		
A020263	13977	10086	Appropriative	Licensed	ROY RAMEY	06/13/61	24.20	Nevada	WEST BRANCH GOLD RUN CREEK
					ROY RAMEY Total		24.20		
A008984	5142	2367	Appropriative	Licensed	RUBY DEVELOPMENT COMPANY	06/02/37	241.10	Sierra	ROCK CREEK
					RUBY DEVELOPMENT COMPANY Total		241.10		
A024904	17224	11479	Appropriative	Licensed	RUBY J RICKARD	10/17/75	2.00	Nevada	UNSP
					RUBY J RICKARD Total		2.00		
A018252	11757	7003	Appropriative	Licensed	SEGHEZZI INC	03/20/64	51.70	Nevada	UNST
					SEGHEZZI INC Total		51.70		
A020309	13944	8350	Appropriative	Licensed	SHAWN BEACHAMP	07/19/61	0.60	Sierra	UNSP
					SHAWN BEACHAMP Total		0.60		
A021727	14700	9328	Appropriative	Licensed	SHERMAN D WINSHIP	04/07/64	15.00	Nevada	UNST
					SHERMAN D WINSHIP Total		15.00		
A021417	14529	9226	Appropriative	Licensed	SIBLEY HANSEN	08/02/63	0.10	Sierra	SMALL SPRING
					SIBLEY HANSEN Total		0.10		
A006286	3316	2427	Appropriative	Licensed	SIERRA CLUB	05/13/29	2.80	Nevada	ZERO SPRING
A008465	4945	2628	Appropriative	Licensed	SIERRA CLUB	10/05/35	5.60	Nevada	UNSP
					SIERRA CLUB Total		8.40		
A020890	14177	9068	Appropriative	Licensed	SIERRA PACIFIC INDUSTRIES	08/06/62	5.60	Sierra	UNSP, UNST
					SIERRA PACIFIC INDUSTRIES Total		5.60		
A026028	18161	12301	Appropriative	Licensed	SOPER COMPANY	06/18/79	2.50	Nevada	UNST
					SOPER COMPANY Total		2.50		
A026067	18454	11796	Appropriative	Licensed	STARDUSTER LAKE ASSOCIATION	08/17/79	27.00	Nevada	UNST
					STARDUSTER LAKE ASSOCIATION Total		27.00		
A023591	16215	10645	Appropriative	Licensed	STEPHEN MAKI	08/24/70	2.30	Nevada	UNST
					STEPHEN MAKI Total		2.30		
A028615	20873		Appropriative	Permitted	STEVE MEHALAKIS	11/08/85	20.00	Yuba	UNST
A028616	20874		Appropriative	Permitted	STEVE MEHALAKIS	11/08/85	656.00	Yuba	UNST
					STEVE MEHALAKIS Total		676.00		
A016659	10458	6570	Appropriative	Licensed	Steven A Beckwitt	10/10/55	7.00	Nevada	UNCR
					Steven A Beckwitt Total		7.00		
A028564	20071	13055	Appropriative	Licensed	STEVEN NIGHTINGALE	09/26/85	0.40	Sierra	UNST
					STEVEN NIGHTINGALE Total		0.40		
A030074	20797		Appropriative	Permitted	SUGAR BOWL CORPORATION	06/15/95	136.00	Placer	LAKE MARY

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A030359	20798		Appropriative	Permitted	SUGAR BOWL CORPORATION	06/15/95	136.00	Placer	LAKE MARY
					SUGAR BOWL CORPORATION Total		272.00		
A017808	11602	6617	Appropriative	Licensed	SUSAN TRIMBLE SILVEY	08/30/57	0.30	Nevada	UNSP, UNST
					SUSAN TRIMBLE SILVEY Total		0.30		
A022135	15294	9724	Appropriative	Licensed	SUSAN M FORD	04/30/65	6.00	Sierra	UNSP
					SUSAN M FORD Total		6.00		
A028187	20186		Appropriative	Permitted	SUSAN T TOWNSEND	07/10/84	35.00	Nevada	OWL CREEK
					SUSAN T TOWNSEND Total		35.00		
A017798	11268	6932	Appropriative	Licensed	SUSANNAH SCHROLL	08/22/57	0.90	Placer	UNST
					SUSANNAH SCHROLL Total		0.90		
A010980	6391	3171	Appropriative	Licensed	Terry Mitchell Riley	02/13/45	17.00	Yuba	MOONSHINE CREEK
					Terry Mitchell Riley Total		17.00		
A021079	14144	9865	Appropriative	Licensed	THE KRUMP LIMITED PARTNERSHIP	12/11/62	29.00	Nevada	NORTH CREEK
					THE KRUMP LIMITED PARTNERSHIP Total		29.00		
A011106	6583	4849	Appropriative	Licensed	THOMAS DE JONGHE	07/13/45	19.70	Sierra	UNSP, VAN JOAN CREEK
A018663	12077	6842	Appropriative	Licensed	THOMAS DE JONGHE	04/24/59	796.40	Sierra	SAN JUAN CANYON
					THOMAS DE JONGHE Total		816.10		
A009651	5425	2777	Appropriative	Licensed	THOMAS A JEKYLL	06/30/39	5.60	Yuba	MOONSHINE CREEK
					THOMAS A JEKYLL Total		5.60		
A028126	20885		Appropriative	Permitted	THOMAS R POPE	04/30/84	7.00	Yuba	UNST
					THOMAS R POPE Total		7.00		
A018395	11928	7011	Appropriative	Licensed	TIMOTHY WALKER	11/05/58	0.20	Sierra	COLD SPRING
					TIMOTHY WALKER Total		0.20		
A017142	10833	6907	Appropriative	Licensed	TREVOR D ROBBINS	06/20/56	2.60	Nevada	UNST
					TREVOR D ROBBINS Total		2.60		
A014930	9266	5083	Appropriative	Licensed	TRI-LODGE ASSOCIATION	07/28/52	16.80	Nevada	LYTTON CREEK
					TRI-LODGE ASSOCIATION Total		16.80		
A015246	9585	4864	Appropriative	Licensed	TROY L JONES	03/19/53	2.30	Nevada	UNSP
					TROY L JONES Total		2.30		
A022265	15651	13721	Appropriative	Licensed	TSCHOPP MUTUAL WATER COMPANY	05/30/07	8.40	Sierra	UNSP, WIXON SPRING
					TSCHOPP MUTUAL WATER COMPANY Total		8.40		
A018581	11987	7507	Appropriative	Licensed	TYE ROMMEL	03/10/59	0.10	Sierra	UNST
					TYE ROMMEL Total		0.10		
A006563	3462	4000	Appropriative	Licensed	U S FOREST SERVICE	02/13/30	0.40	Sierra	UNSP
A007608	4266	1863	Appropriative	Licensed	U S FOREST SERVICE	07/05/33	1.80	Sierra	UNSP

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A007691	4232	1864	Appropriative	Licensed	U S FOREST SERVICE	09/28/33	0.40	Sierra	GENTLE ANNIE SPRING
A007767	4269	1865	Appropriative	Licensed	U S FOREST SERVICE	11/27/33	0.30	Sierra	UNSP
A008493	4684	2139	Appropriative	Licensed	U S FOREST SERVICE	11/13/35	6.20	Sierra	JERRETT SPRING
A009561	5364	2480	Appropriative	Licensed	U S FOREST SERVICE	04/19/39	8.40	Sierra	BAKER SPRING
A010038	5700	4893	Appropriative	Licensed	U S FOREST SERVICE	10/17/40	5.60	Placer	SUMMIT SPRING NO 1
A010153	5788	2659	Appropriative	Licensed	U S FOREST SERVICE	03/22/41	1.10	Nevada	LOGAN SPRING
A010154	5789	2660	Appropriative	Licensed	U S FOREST SERVICE	03/22/41	1.40	Nevada	BIG LICK SPRINGS
A010155	5790	2661	Appropriative	Licensed	U S FOREST SERVICE	03/22/41	1.00	Nevada	DEMPSEY SPRINGS
A010156	5791	4888	Appropriative	Licensed	U S FOREST SERVICE	03/22/41	9.20	Nevada	WHITE CLOUD SPRINGS
A010158	5793	2662	Appropriative	Licensed	U S FOREST SERVICE	03/22/41	1.40	Nevada	COLEMAN SPRINGS
A010159	5794	4175	Appropriative	Licensed	U S FOREST SERVICE	03/22/41	0.60	Nevada	SKILLMAN FLAT SPRING
A010160	5795	2663	Appropriative	Licensed	U S FOREST SERVICE	03/22/41	0.60	Nevada	DEMORY SPRING
A010161	5796	2664	Appropriative	Licensed	U S FOREST SERVICE	03/22/41	1.40	Nevada	UPPER DERBEC SPRING
A010162	5797	2665	Appropriative	Licensed	U S FOREST SERVICE	03/22/41	9.80	Nevada	SNOWTENT SPRING
A010163	5798	2666	Appropriative	Licensed	U S FOREST SERVICE	03/22/41	2.90	Nevada	DERBEC SPRINGS
A010164	5799	2667	Appropriative	Licensed	U S FOREST SERVICE	03/22/41	4.40	Nevada	WILLOW SPRINGS
A010446	6018	2891	Appropriative	Licensed	U S FOREST SERVICE	05/06/42	3.10	Nevada	THIMBLEBERRY CREEK
A010447	6019	2892	Appropriative	Licensed	U S FOREST SERVICE	05/06/42	3.70	Nevada	JUNCTION HOUSE SPRING
A010448	6020	4895	Appropriative	Licensed	U S FOREST SERVICE	05/06/42	1.10	Nevada	GROUSE RIDGE SPRING NO 3
A010449	6021	3057	Appropriative	Licensed	U S FOREST SERVICE	05/06/42	0.20	Nevada	MOGONIGAL SPRING
A010451	6023	2894	Appropriative	Licensed	U S FOREST SERVICE	05/06/42	3.40	Nevada	BEAR TRAP CREEK
A010452	6024	3058	Appropriative	Licensed	U S FOREST SERVICE	05/06/42	0.20	Nevada	GROUSE RIDGE SPRING NO 1
A010453	6025	3921	Appropriative	Licensed	U S FOREST SERVICE	05/06/42	0.60	Nevada	GROUSE RIDGE SPRING NO 2

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A010496	6091	2895	Appropriative	Licensed	U S FOREST SERVICE	07/15/42	0.90	Nevada	MOBLEY HOMESTEAD SPRING NO 1
A010497	6092	2896	Appropriative	Licensed	U S FOREST SERVICE	07/15/42	4.70	Nevada	HOLDEN SPRING
A010500	6095	2898	Appropriative	Licensed	U S FOREST SERVICE	07/15/42	1.80	Nevada	UNSP
A010502	6099	2899	Appropriative	Licensed	U S FOREST SERVICE	07/15/42	3.20	Nevada	MOBLEY HOMESTEAD SPRING NO 2
A010503	6100	2900	Appropriative	Licensed	U S FOREST SERVICE	07/15/42	4.10	Nevada	INDIAN SPRING
A010506	6103	2902	Appropriative	Licensed	U S FOREST SERVICE	07/15/42	0.90	Nevada	UPPER WOOLSEY SPRING
A010634	6150	2903	Appropriative	Licensed	U S FOREST SERVICE	05/01/43	2.20	Sierra	HALLS RANCH SPRING
A010637	6153	2905	Appropriative	Licensed	U S FOREST SERVICE	05/01/43	2.20	Sierra	WILD PLUM SPRING
A010639	6155	2907	Appropriative	Licensed	U S FOREST SERVICE	05/01/43	1.60	Sierra	DEADWOOD SPRING
A010640	6156	2908	Appropriative	Licensed	U S FOREST SERVICE	05/01/43	2.20	Sierra	GOLD LAKE SPRING
A010642	6158	2910	Appropriative	Licensed	U S FOREST SERVICE	05/01/43	1.50	Sierra	SADDLEBACK SPRING
A011382	6627	7752	Appropriative	Licensed	U S FOREST SERVICE	04/23/46	0.60	Nevada	RED MOUNTAIN SPRING NO 1
A012054	7080	3979	Appropriative	Licensed	U S FOREST SERVICE	08/21/47	210.30	Sierra	BEAR CREEK
A012104	7107	5532	Appropriative	Licensed	U S FOREST SERVICE	09/24/47	5.00	Sierra	HASKELL CREEK
A012105	7197	4210	Appropriative	Licensed	U S FOREST SERVICE	09/24/47	0.10	Sierra	GLEASON SPRING
A012108	7198	8987	Appropriative	Licensed	U S FOREST SERVICE	09/24/47	6.10	Sierra	CARVIN CREEK, UNSP
A012734	7577	4944	Appropriative	Licensed	U S FOREST SERVICE	10/07/48	17.90	Placer	UNSP
A013626	8115	5514	Appropriative	Licensed	U S FOREST SERVICE	03/10/50	8.20	Sierra	GRASSY LAKE CREEK
A013627	8116	4873	Appropriative	Licensed	U S FOREST SERVICE	03/10/50	12.20	Sierra	ORGAN CREEK
A014368	9086	4981	Appropriative	Licensed	U S FOREST SERVICE	06/27/51	0.10	Sierra	INDEPENDENCE RAVINE
A014369	8833	5423	Appropriative	Licensed	U S FOREST SERVICE	06/27/51	1.60	Sierra	FIDDLE CREEK
A014399	8880	5114	Appropriative	Licensed	U S FOREST SERVICE	07/19/51	2.00	Nevada	RATTLESNAKE CREEK
A014400	8830	6972	Appropriative	Licensed	U S FOREST SERVICE	07/19/51	0.60	Nevada	JACKSON CREEK

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A016642	10775	6162	Appropriative	Licensed	U S FOREST SERVICE	09/30/55	0.90	Sierra	CARVIN CREEK
A017236	14333	9873	Appropriative	Licensed	U S FOREST SERVICE	08/13/56	4,320.00	Nevada	WEAVER LAKE
A017827	11555	6959	Appropriative	Licensed	U S FOREST SERVICE	09/19/57	0.90	Sierra	UNSP (2)
A017867	11386	8642	Appropriative	Licensed	U S FOREST SERVICE	10/31/57	4.00	Nevada	UNSP
A018294	11777	7651	Appropriative	Licensed	U S FOREST SERVICE	08/28/58	0.20	Nevada	MARSH TRACT SPRING
A018744	13212	8632	Appropriative	Licensed	U S FOREST SERVICE	05/28/59	130.00	Sierra	UNST
A018745	13213	8633	Appropriative	Licensed	U S FOREST SERVICE	05/28/59	90.00	Sierra	PACKER CREEK
A018746	13214	8634	Appropriative	Licensed	U S FOREST SERVICE	05/28/59	380.00	Sierra	SALMON CREEK
A018747	13215	8635	Appropriative	Licensed	U S FOREST SERVICE	05/28/59	282.20	Sierra	SARDINE CREEK
A018748	13216	8983	Appropriative	Licensed	U S FOREST SERVICE	05/28/59	350.00	Sierra	SAWMILL CREEK
A018749	13217	8636	Appropriative	Licensed	U S FOREST SERVICE	05/28/59	250.00	Sierra	SALMON CREEK
A021130	14147	8582	Appropriative	Licensed	U S FOREST SERVICE	01/22/63	2.20	Sierra	UNSP
A021420	14530	8940	Appropriative	Licensed	U S FOREST SERVICE	08/06/63	0.20	Sierra	UNSP
A023124	15805	9651	Appropriative	Licensed	U S FOREST SERVICE	09/05/68	0.30	Sierra	UNSP
A028413	19713	13031	Appropriative	Licensed	U S FOREST SERVICE	03/29/85	0.80	Sierra	UNSP
					U S FOREST SERVICE Total		6,170.90		
A024067	16490	11008	Appropriative	Licensed	WALTER BALDAIN	05/12/72	8.00	Yuba	UNST
					WALTER BALDAIN Total		8.00		
A022419	15278	9703	Appropriative	Licensed	WASHINGTON COUNTY WATER DISTRICT	03/11/66	48.00	Nevada	HENDERSON RAVINE
					WASHINGTON COUNTY WATER DISTRICT Total		48.00		
A016823	10823	7089	Appropriative	Licensed	WAYNE L HARSHBARGER	01/09/56	35.00	Nevada	UNST
					WAYNE L HARSHBARGER Total		35.00		
A018170	11648	7666	Appropriative	Licensed	WILLIAM C DOUB II	06/05/58	1.10	Yuba	LITTLE WILLOW CREEK
					WILLIAM C DOUB II Total		1.10		
A026642	18723		Appropriative	Permitted	WILLIAM H CLEMENS	12/03/80	3.00	Nevada	RAPP RAVINE
					WILLIAM H CLEMENS Total		3.00		
A011355	6661	3358	Appropriative	Licensed	WILLIAM R SMITH	03/28/46	0.60	Sierra	JIM CROW CANYON

Application ID	Permit ID	License ID	Water Right Type	Status	Holder Name	Date	Face Amt	County	Source
					WILLIAM R SMITH Total		0.60		
A002197	1154	435	Appropriative	Licensed	YUBA COUNTY WATER AGENCY	02/11/21	511,784.30	Yuba	NORTH YUBA RIVER
A003026	1354	436	Appropriative	Licensed	YUBA COUNTY WATER AGENCY	09/07/22	10,000.00	Yuba	NORTH YUBA RIVER
A005004	2604	777	Appropriative	Licensed	YUBA COUNTY WATER AGENCY	04/30/26	15,000.00	Yuba	NORTH YUBA RIVER
A005632	15026		Appropriative	Permitted	YUBA COUNTY WATER AGENCY	07/30/27	1,159,000.00	Yuba	NORTH YUBA RIVER, YUBA RIVER
A009516	6106	3050	Appropriative	Licensed	YUBA COUNTY WATER AGENCY	03/01/39	72,397.80	Yuba	NORTH YUBA RIVER
A010282	8330	5544	Appropriative	Licensed	YUBA COUNTY WATER AGENCY	09/12/41	5,335.00	Yuba	NORTH YUBA RIVER
A015204	15027		Appropriative	Permitted	YUBA COUNTY WATER AGENCY	03/28/66	246,000.00	Yuba	NORTH YUBA RIVER, YUBA RIVER
A015574	15030		Appropriative	Permitted	YUBA COUNTY WATER AGENCY	03/28/66	514,000.00	Nevada, Yuba	MIDDLE YUBA RIVER, NORTH YUBA RIVER, OREGON CREEK, YUBA RIVER
A029837	20595		Appropriative	Permitted	YUBA COUNTY WATER AGENCY	10/11/90	21,719.30	Yuba	DEADWOOD CREEK, OWL GULCH
					YUBA COUNTY WATER AGENCY Total		2,555,236.40		
A002978	1270	12984	Appropriative	Licensed	YUBA COUNTY WATER DISTRICT	08/12/22	6,060.00	Yuba	DRY CREEK
A013957	11516		Appropriative	Licensed	YUBA COUNTY WATER DISTRICT	09/20/50	145,082.64	Plumas, Yuba	NORTH YUBA RIVER, YUBA RIVER
					YUBA COUNTY WATER DISTRICT Total		151,142.64		
A011596	7086	4699	Appropriative	Licensed	YUBA INVESTMENT COMPANY	10/28/46	2,558.70	Yuba	DRY CREEK
					YUBA INVESTMENT COMPANY Total		2,558.70		
A026914	18489	12619	Appropriative	Licensed	YUBA RIVER RECREATION GROUP INC	07/13/81	2.60	Nevada	HUMBUG CREEK
					YUBA RIVER RECREATION GROUP INC Total		2.60		
					Grand Total		3,595,920.74		

Bear River - Post-1914 Appropriative Water Rights

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
A029052	20786	13687	ANNE K SOUSA	12/13/06	5.80	Nevada	UNST
			ANNE K SOUSA Total		5.80		
A029455	20562		ARTHUR W ARMSTRONG	3/28/89	7.00	Nevada	IRON CROSS CREEK, ROCK CREEK
			ARTHUR W ARMSTRONG Total		7.00		
A025897	18040	11864	BEN R RAWE	1/5/79	0.30	Nevada	WOLF CREEK
			BEN R RAWE Total		0.30		
A026042	17969	11895	Bethel Church Nevada County	7/5/79	1.50	Nevada	UNST
			Bethel Church Nevada County Total		1.50		
A019535	12763	7754	BETTY THOMAS	7/11/60	20.00	Nevada	UNST
			BETTY THOMAS Total		20.00		
A015964	10090	7264	BLEAU 1989 REVOCABLE TRUST DATED 12/22/89	5/5/65	14.80	Nevada	UNST
			BLEAU 1989 REVOCABLE TRUST DATED 12/22/89 Total		14.80		
A027768	19029	12402	BOB J BALDWIN	6/7/83	2.40	Nevada	UNST
			BOB J BALDWIN Total		2.40		
A000959	743	385	CAMP FAR WEST IRRIGATION DISTRICT	4/1/18	4,832.10	Yuba	BEAR RIVER
A002881	2089	2266	CAMP FAR WEST IRRIGATION DISTRICT	6/13/22	5,000.00	Yuba	BEAR RIVER
A003843	2090	2267	CAMP FAR WEST IRRIGATION DISTRICT	2/11/24	3,592.20	Yuba	BEAR RIVER
A010190	5852	2740	CAMP FAR WEST IRRIGATION DISTRICT	4/28/41	5,000.00	Yuba	BEAR RIVER
			CAMP FAR WEST IRRIGATION DISTRICT Total		18,424.30		
A021821	14841	9992	CITY OF GRASS VALLEY	6/18/64	4.00	Nevada	RHODE ISLAND RAVINE
A025601	17893		CITY OF GRASS VALLEY	12/16/77	2,200.00	Nevada	UNXX
			CITY OF GRASS VALLEY Total		2,204.00		
A029097	20492	13344	COX-HARTLEY FAMILY 1993 TRUST	8/17/87	17.00	Nevada	LONG RAVINE
			COX-HARTLEY FAMILY 1993 TRUST Total		17.00		
A026932	18555	12337	CRAIG FERRARI	7/27/81	1.30	Nevada	LONG RAVINE
A029177	20384	13514	CRAIG FERRARI	1/26/88	3.30	Nevada	LONG RAVINE
			CRAIG FERRARI Total		4.60		
A020794	14711	10153	DANIEL HALE	5/28/62	8.30	Nevada	UNSP, UNST
			DANIEL HALE Total		8.30		
A017495	11042	5812	DARKHORSE GOLF CLUB LLC	3/5/57	9.00	Nevada	UNST
A027767	19028	12401	DARKHORSE GOLF CLUB LLC	6/7/83	1.90	Nevada	UNST
			DARKHORSE GOLF CLUB LLC Total		10.90		
A026161	18143	12136	DAVID MCFARLANE	1/3/80	0.10	Nevada	UNSP
			DAVID MCFARLANE Total		0.10		
A015282	9761	4714	DAVID L FERGUSON	4/7/53	15.00	Nevada	INDIAN RAVINE
			DAVID L FERGUSON Total		15.00		
A025099	16957	11240	DENNIS ACMOODY	7/14/76	0.70	Placer	CAMPBELL CREEK
			DENNIS ACMOODY Total		0.70		
A023012	15728	10361	Dept of Fish and Game	3/27/68	44.00	Yuba	UNST
A023013	15729	10387	Dept of Fish and Game	3/27/68	9.60	Nevada	UNST
A023014	15730	10388	Dept of Fish and Game	3/27/68	21.00	Yuba	UNST

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
A024601	16798	11216	Dept of Fish and Game	5/2/74	3.00	Yuba	UNST
A024641	16797	11212	Dept of Fish and Game	4/22/82	5.10	Yuba	UNST
			Dept of Fish and Game Total		82.70		
A021495	14411	9027	DONALD L DAY	10/9/63	9.20	Nevada	UNST
			DONALD L DAY Total		9.20		
A027513	18935	12432	DORIS L MINARD	9/13/82	3.10	Nevada	UNST
			DORIS L MINARD Total		3.10		
A021843	14973	9263	ELIZABETH STREATER	7/10/64	0.10	Nevada	UNSP
			ELIZABETH STREATER Total		0.10		
A017858	11509	6590	GARY M LAUGHLIN	10/23/57	0.80	Nevada	UNSP (2)
			GARY M LAUGHLIN Total		0.80		
A027958	19299	12783	GLADYS MARTINES	1/25/84	3.00	Nevada	UNST
A029895	20705		GLADYS MARTINES	1/25/91	27.00	Nevada	UNST
			GLADYS MARTINES Total		30.00		
A023070	16276	11076	GREGORY W BOCK	6/18/68	52.30	Nevada	UNST
			GREGORY W BOCK Total		52.30		
A014179	8713	4076	HERRMANN GOTTFIELD	3/7/51	21.30	Nevada	UNST
			HERRMANN GOTTFIELD Total		21.30		
A017539	11052	6926	HIDDEN MEADOW RANCH	4/3/57	91.80	Nevada	UNCR
			HIDDEN MEADOW RANCH Total		91.80		
A015879	10532	5520	IKE GOMEZ	5/19/54	18.30	Nevada	LONG HOLLOW
			IKE GOMEZ Total		18.30		
A028605	20716		JACK F ANDERSEN	10/28/85	6.50	Nevada	SOUTH WOLF CREEK, UNST
			JACK F ANDERSEN Total		6.50		
A018371	11846	8036	JAMES C PAGE	10/14/58	90.80	Placer	UNST
A025408	18090	11807	JAMES C PAGE	6/28/77	29.00	Placer	UNST
			JAMES C PAGE Total		119.80		
A030915	21141		JAMES M SILLER	1/2/03	89.00	Yuba	VINEYARD CREEK
			JAMES M SILLER Total		89.00		
A025582	17443	11469	Jape Holley Taylor	11/29/77	15.00	Nevada	UNST
			Jape Holley Taylor Total		15.00		
A030508	20929		JAY BETZ	11/21/95	56.00	Nevada	ROCK CREEK, UNST
			JAY BETZ Total		56.00		
A025502	17606	12279	JAY VICE	9/7/77	9.40	Nevada	MEYER RAVINE
			JAY VICE Total		9.40		
A017437	11015	7742	JEFFREY L FINK	1/28/57	3.50	Nevada	UNST
			JEFFREY L FINK Total		3.50		
A029100	20553	13829	Jim A Nevins	1/11/11	8.40	Placer	UNST
			Jim A Nevins Total		8.40		
A024814	17265	11749	JOHN C HUSMANN	5/23/75	0.50	Nevada	UNST
			JOHN C HUSMANN Total		0.50		
A014896	9165	4969	JOSEPH D LITCHFIELD	7/8/52	10.00	Nevada	UNST
			JOSEPH D LITCHFIELD Total		10.00		
A025493	17730	12042	JOSHUA L WITTLER	8/29/77	21.00	Nevada	INDIAN SPRINGS CREEK, UNST

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
			JOSHUA L WITTLER Total		21.00		
A028102	19386	12709	Judy Bauer	4/4/84	4.00	Nevada	UNST
			Judy Bauer Total		4.00		
A017942B	11413	008536B	LADSON I GEDDINGS	10/14/81	9.80	Nevada	LONG HOLLOW RAVINE
			LADSON I GEDDINGS Total		9.80		
A019830	13852	8657	LAKE MANAGEMENT COMMITTEE	10/27/60	35.00	Nevada	BUTLER CREEK
			LAKE MANAGEMENT COMMITTEE Total		35.00		
A017258	11462	6296	LAKE OF THE PINES ASSN INC	8/27/56	17.00	Nevada	RAGSDALE CREEK
A022535	15355	9675	LAKE OF THE PINES ASSN INC	7/27/66	4,150.00	Nevada	MAGNOLIA CREEK
			LAKE OF THE PINES ASSN INC Total		4,167.00		
A018214	11635	6752	LCB PROPERTIES LLC	7/11/58	55.80	Nevada	LONG HOLLOW RAVINE
			LCB PROPERTIES LLC Total		55.80		
A022821A		009610A	Louis BARTOLUCCI	5/6/02	21.00	Nevada	UNST
A023549A		010658A	Louis BARTOLUCCI	12/14/98	14.00	Nevada	UNST
			Louis BARTOLUCCI Total		35.00		
A025375	17757	11924	LUELLA BURTON	6/1/77	23.00	Placer	UNST
A028660	19898	13032	LUELLA BURTON	12/13/85	10.00	Placer	UNST
			LUELLA BURTON Total		33.00		
A017863	11331	9020	MARTIN P & BARBARA C BRUMM JOINT LIVING TRUST	10/25/57	26.80	Nevada	UNST
			MARTIN P & BARBARA C BRUMM JOINT LIVING TRUST Total		26.80		
A017918	11685	10988	MELBA C SMITH	12/17/57	53.00	Nevada	WOLF CREEK
			MELBA C SMITH Total		53.00		
A027040	18782	12458	MICHAEL J BONELLI	10/13/81	14.50	Nevada	UNST
			MICHAEL J BONELLI Total		14.50		
A028348	19601	12817	MICHAEL K SCHARF	12/4/84	3.90	Placer	UNST
			MICHAEL K SCHARF Total		3.90		
A031298	21148		MICHAEL S DICKEY	5/15/03	49.00	Nevada	UNST
			MICHAEL S DICKEY Total		49.00		
A028630	20005	13060	MIKE BASICH	12/2/85	0.10	Placer	CAMPBELL CREEK
			MIKE BASICH Total		0.10		
A019749C		008012C	MOREHEAD LAND LLC	10/13/00	402.40	Nevada, Sutter	EAST BORROW PIT OF SUTTER BYPASS, POODLE CREEK, UNST
			MOREHEAD LAND LLC Total		402.40		
A002652A	5803	10350	NEVADA IRRIGATION DISTRICT	11/22/21	12,500.00	Nevada, Placer	BEAR RIVER
A006229	5804	8809	NEVADA IRRIGATION DISTRICT	3/26/29	50,936.30	Placer	BEAR RIVER
A002652B	11626		NEVADA IRRIGATION DISTRICT	11/22/21	65,000.00	Placer	BEAR RIVER
			NEVADA IRRIGATION DISTRICT Total		128,436.30		
A023107	16058	10594	PATRICK D BRYAN	8/7/68	9.20	Nevada	UNST
			PATRICK D BRYAN Total		9.20		
A028561	19808	12977	PAUL R SEIDER	9/20/85	1.50	Nevada	SOUTH WOLF CREEK
			PAUL R SEIDER Total		1.50		

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
A026684	18972	12398	PINE LAKE ASSOCIATION	1/13/81	45.00	Nevada	UNST
			PINE LAKE ASSOCIATION Total		45.00		
A025922A	17889	11925	PITTS FAMILY TRUST	3/11/86	18.00	Nevada	UNST
			PITTS FAMILY TRUST Total		18.00		
A017912	11641	7101	RICHARD L BARBER	12/11/57	5.60	Placer	UNSP (2)
A021867	15251	9546	RICHARD L BARBER	8/10/64	358.30	Placer	LITTLE BEAR CREEK, UNST
			RICHARD L BARBER Total		363.90		
A020105	13690	7762	RICHARD P O'NEIL	5/1/61	2.50	Nevada	WOLF CREEK
			RICHARD P O'NEIL Total		2.50		
A021473	14619	8876	ROBERT FORD	9/23/63	0.90	Nevada	UNST
			ROBERT FORD Total		0.90		
A025962	17954	12055	ROBERT C ERDMANN	4/3/79	5.00	Nevada	UNST
			ROBERT C ERDMANN Total		5.00		
A025922B	17889	11926	Robert M Rourke	3/11/86	5.30	Nevada	UNST
			Robert M Rourke Total		5.30		
A003995	1847	1612	ROBERT N CAIN	5/20/24	40.00	Nevada	MAGNOLIA CREEK
A015607	9697	5685	ROBERT N CAIN	11/10/53	91.10	Nevada	MAGNOLIA CREEK
			ROBERT N CAIN Total		131.10		
A017942A	11413	008536A	ROBERT P WADMAN	10/14/81	48.30	Nevada	LONG HOLLOW RAVINE
			ROBERT P WADMAN Total		48.30		
A024624	18166	12199	ROBIN BURKE	4/27/87	8.80	Placer	UNST
			ROBIN BURKE Total		8.80		
A023550	16229	12355	RODRIC ANDERSON	7/10/70	8.00	Nevada	UNST
			RODRIC ANDERSON Total		8.00		
A025226	17450	12339	ROGER C PATTERSON	1/3/77	92.00	Placer	UNST
			ROGER C PATTERSON Total		92.00		
A031859			RON BINGAMAN	10/20/10	2,172.00	Nevada	
A030973	21073		RON BINGAMAN	10/14/99	2,172.00	Nevada	UNST (AKA WOLF HANNAMAN RANDOM DITCH)
			RON BINGAMAN Total		4,344.00		
A026072	18034	11907	RONALD F BURKHARDT	8/24/79	18.00	Nevada	UNST
			RONALD F BURKHARDT Total		18.00		
A017767	11458	8624	Ryan R Say	8/12/57	4.80	Nevada	UNST
			Ryan R Say Total		4.80		
A025492	17729	11941	SARAH JOELSON	8/29/77	15.00	Nevada	INDIAN SPRINGS CREEK
			SARAH JOELSON Total		15.00		
A026100	18035	11880	SCOTT C JASPAR	9/28/79	2.40	Nevada	UNST
			SCOTT C JASPAR Total		2.40		
A019003	12858	7437	SETH NOTO	9/25/59	1.10	Nevada	UNST
			SETH NOTO Total		1.10		
A023549B		010658B	SHARON EARHART	12/14/98	8.00	Nevada	UNST
			SHARON EARHART Total		8.00		
A026876	19442	12618	SHEILA ST GERMAIN	6/17/81	5,166.00	Nevada	UNST
			SHEILA ST GERMAIN Total		5,166.00		

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
A024984	16847	11190	SMITH & SMITH RANCH, A PARTNERSHIP	1/29/76	3.00	Nevada	UNST
A027152	18851	12679	SMITH & SMITH RANCH, A PARTNERSHIP	12/17/81	2.40	Nevada	UNST
			SMITH & SMITH RANCH, A PARTNERSHIP Total		5.40		
A010221	14871	11120	SOUTH SUTTER WATER DISTRICT	5/15/81	130,745.10	Yuba	BEAR RIVER
A014804	11297	11118	SOUTH SUTTER WATER DISTRICT	5/12/52	139,534.80	Yuba	BEAR RIVER
			SOUTH SUTTER WATER DISTRICT Total		270,279.90		
A014773B	9106	006560B	SPRING VALLEY HOMEOWNERS ASSOCIATION	12/10/82	24.00	Placer	UNST
A020632	13760	8381	SPRING VALLEY HOMEOWNERS ASSOCIATION	3/1/62	52.00	Placer	UNST
A025139	17584	13120	SPRING VALLEY HOMEOWNERS ASSOCIATION	8/31/76	4.70	Placer	UNST
			SPRING VALLEY HOMEOWNERS ASSOCIATION Total		80.70		
A017430	11047	6954	STEVE KOTHE	1/23/57	84.90	Nevada	RAGSDALE CREEK
			STEVE KOTHE Total		84.90		
A022382	15366	10099	THE LAKEWOOD ASSOCIATION INC	2/4/66	486.00	Nevada	DRY CREEK
			THE LAKEWOOD ASSOCIATION INC Total		486.00		
A026160	18323	12118	THOMAS S VAN HORNE	12/31/79	3.10	Nevada	UNSP
A027695	19793	12934	THOMAS S VAN HORNE	3/23/83	11.90	Nevada	UNST
			THOMAS S VAN HORNE Total		15.00		
A010150	5785	2656	U S FOREST SERVICE	3/22/41	0.50	Nevada	KING WOOLFORD SPRING
A010439	6011	2888	U S FOREST SERVICE	5/6/42	0.70	Nevada	FOWLER SPRING
A010504	6101	4977	U S FOREST SERVICE	7/15/42	10.50	Nevada	MULE SPRING
			U S FOREST SERVICE Total		11.70		
A025211	17449	12756	UNITED AUBURN INDIAN DEVELOPMENT CORP	12/13/76	49.90	Placer	UNST
			UNITED AUBURN INDIAN DEVELOPMENT CORP Total		49.90		
A028170	19598	13007	William Scott	6/25/84	0.10	Nevada	UNST
			William Scott Total		0.10		
A028138	19417		WILLIAM M DONNELLY JR	5/23/84	2.00	Nevada	UNST
			WILLIAM M DONNELLY JR Total		2.00		
			Grand Total		436,025.40		

American River - Post-1914 Appropriative Water Rights

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
A010397	5958	3042	AL RENKER	3/11/1942	0.10	El Dorado	SOUTH FORK AMERICAN RIVER
			AL RENKER Total		0.10		
A007905	4344	1801	ALBERT E CASH	4/12/1934	0.20	El Dorado	BULL CREEK
			ALBERT E CASH Total		0.20		
A027366	19846		ALBERT R DAVIDSON	6/21/1982	30.00	El Dorado	UNST
			ALBERT R DAVIDSON Total		30.00		
A016894	11321	7150	ALLEN E NEWTON	2/14/1956	18.20	Placer	UNST
			ALLEN E NEWTON Total		18.20		
A013849	8397	5518	ALLEN FAMILY TRUST	7/17/1950	53.30	Placer	UNST
			ALLEN FAMILY TRUST Total		53.30		
A026457	18473	12786	American River Conservancy	7/15/1980	49.00	El Dorado	GRANITE CREEK
			American River Conservancy Total		49.00		
A013296	8191	6304	ANN BATEY	8/15/1949	137.00	El Dorado	INDIAN CREEK
			ANN BATEY Total		137.00		
A029219	20482		ANTHONY J FREITAS	4/7/1988	21.20	El Dorado	JOHNTOWN CREEK
			ANTHONY J FREITAS Total		21.20		
A027928	19263	12703	APPLE MOUNTAIN LP	12/7/1983	11.80	El Dorado	SOUTH CANYON, UNST
			APPLE MOUNTAIN LP Total		11.80		
A011184	6479	3390	ARDEN HALL	10/16/1945	0.10	El Dorado	SOUTH FORK AMERICAN RIVER
			ARDEN HALL Total		0.10		
A011516	6699	3383	ARTHUR S DEAN	8/15/1946	36.20	El Dorado	UNSP
			ARTHUR S DEAN Total		36.20		
A021648	14938	11111	AUBURN LAKE TRAILS PROPERTY OWNERS ASSOC	2/21/1964	34.00	El Dorado	MAINE BAR CANYON
A023556	16296	11112	AUBURN LAKE TRAILS PROPERTY OWNERS ASSOC	7/14/1970	20.00	El Dorado	MAINE BAR CANYON
A026410	18279	12013	AUBURN LAKE TRAILS PROPERTY OWNERS ASSOC	6/10/1980	14.00	El Dorado	MAINE BAR CANYON
			AUBURN LAKE TRAILS PROPERTY OWNERS ASSOC Total		68.00		
A011817	6920	6045	BAKER FAMILY TRUST 1999	4/8/1947	13.70	El Dorado	HANGTOWN CREEK
A011850	6959	3357	BAKER FAMILY TRUST 1999	5/1/1947	3.40	El Dorado	HANGTOWN CREEK
			BAKER FAMILY TRUST 1999 Total		17.10		
A019125	12391	7458	BARBARA ELLEN HOLLAND	12/8/1959	5.30	El Dorado	UNSP, UNST
			BARBARA ELLEN HOLLAND Total		5.30		
A020256B	13189	9778	BARBAREE JERNIGAN	5/5/1971	2.20	El Dorado	WHITE ROCK CREEK
			BARBAREE JERNIGAN Total		2.20		
A017420	11173	6289	BEADLE LIVING TRUST DATED SEPTEMBER 12,1995	1/11/1957	5.90	Placer	UNST
			BEADLE LIVING TRUST DATED SEPTEMBER 12,1995 Total		5.90		
A027752	19827		BEAR STATE WATER WORKS	5/10/1983	37.00	El Dorado	UNSP
			BEAR STATE WATER WORKS Total		37.00		
A021855	14852	9503	BENJAMIN KEH	7/20/1964	4.00	Placer	MINERS RAVINE
			BENJAMIN KEH Total		4.00		
A022037	15105	9621	Berry Patty LLC	2/4/1965	2.20	El Dorado	UNSP (2)
			Berry Patty LLC Total		2.20		
A018182	11853	6484	BERTABELLE STEAD	6/13/1958	0.50	El Dorado	NEW WORLD TUNNEL
			BERTABELLE STEAD Total		0.50		
A014263	8672	4696	BISHOP FAMILY TRUST	4/20/1951	0.30	El Dorado	UNSP

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A015346	9640	7253	BISHOP FAMILY TRUST	5/18/1953	0.40	El Dorado	UNSP
A016123	10244	10898	BISHOP FAMILY TRUST	11/4/1954	2.20	El Dorado	UNSP
A018515	13834	10899	BISHOP FAMILY TRUST	2/3/1959	1.20	El Dorado	UNSP
			BISHOP FAMILY TRUST Total		4.10		
A010731	6307	5449	BLACK ROCK RANCH	11/17/1943	715.10	El Dorado	HASTINGS CREEK (AKA BLACK ROCK CREEK)
A013123	7488	5450	BLACK ROCK RANCH	5/31/1949	52.00	El Dorado	HASTING CREEK (AKA BLACK ROCK CREEK)
A019943	13983	9915	BLACK ROCK RANCH	1/31/1961	104.60	El Dorado	BLACK ROCK CREEK
			BLACK ROCK RANCH Total		871.70		
A023438	16059	10241	BLUE CANYON PROPERTIES INC	1/16/1970	15.00	Placer	UNST
			BLUE CANYON PROPERTIES INC Total		15.00		
A004365	2048	1112	BORIS T YEN	12/15/1924	2.80	El Dorado	EVANS CREEK
			BORIS T YEN Total		2.80		
A025841	17711	12427	BRETTE MARK GREEN	10/3/1978	1.30	El Dorado	UNST
			BRETTE MARK GREEN Total		1.30		
A016974	10644	5862	Brian P Tucker	3/28/1956	9.60	Placer	UNDR
			Brian P Tucker Total		9.60		
A006999	2797	1419	BRIAN K BRAY	7/7/1931	0.30	El Dorado	UNST
			BRIAN K BRAY Total		0.30		
A014138	8583	4878	BURNS LIVING TRUST	1/22/1951	0.20	El Dorado	BULL CREEK
A020543	13567	9133	BURNS LIVING TRUST	12/29/1961	0.40	El Dorado	UNSP (3)
			BURNS LIVING TRUST Total		0.60		
A013971	8391	6961	BYRON D SHER	9/29/1950	76.00	El Dorado	UNXX
			BYRON D SHER Total		76.00		
A004868	2458	945	BYRON W BACCHI IRREVOCABLE TRUST, THE	12/19/1925	36.20	El Dorado	NORTH INDIAN CREEK
			BYRON W BACCHI IRREVOCABLE TRUST, THE Total		36.20		
A013766	8755	5825	C A JONES	5/31/1950	12.00	El Dorado	NORTON RAVINE
			C A JONES Total		12.00		
A021806	15127	9611	CARDWELL R CURREN	6/8/1964	4.70	El Dorado	WEST FORK SAWMILL CREEK
			CARDWELL R CURREN Total		4.70		
A022052	15107	9622	CAROL BERCIER	2/24/1965	1.00	El Dorado	UNSP (2)
			CAROL BERCIER Total		1.00		
A005806	3036	1071	CAROL WARD	1/16/1928	79.60	Placer	ANTELOPE CREEK
A009500	5335	3137	CAROL WARD	1/31/1939	90.30	Placer	ANTELOPE CREEK
			CAROL WARD Total		169.90		
A007586	4189	3154	CECIL L WESTEL JR	6/14/1933	5.00	El Dorado	LONG CANYON
			CECIL L WESTEL JR Total		5.00		
A026475	18404	12899	CHARLES DAVIS	7/28/1980	0.30	Placer	UNST
			CHARLES DAVIS Total		0.30		
A023990	16722	10947	CHARLES D BRADARIC	3/7/1972	4.50	Placer	UNST
			CHARLES D BRADARIC Total		4.50		
A018053	11628	10069	CHARLES K MCCLATCHY	3/17/1958	6.00	El Dorado	UNST
			CHARLES K MCCLATCHY Total		6.00		
A026380	19259		CHI WEST INC	5/22/1980	72,397.80	El Dorado	ROCK CREEK
A027353	19260		CHI WEST INC	6/4/1982	67,478.70	El Dorado	ROCK CREEK
			CHI WEST INC Total		139,876.50		
A023939	16492	11032	CHRIS BEAUCHAMP	12/6/1971	3.90	El Dorado	UNST
			CHRIS BEAUCHAMP Total		3.90		

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A018929	12275	10064	CHRISTIAN CHURCHES OF N CALIF-W NEVADA	8/20/1959	12.30	Placer	UNSP
			CHRISTIAN CHURCHES OF N CALIF-W NEVADA Total		12.30		
A025097	17594	11694	CINDY WHITE	7/9/1976	0.60	El Dorado	UNST
			CINDY WHITE Total		0.60		
A012149	7201	4847	CITY OF PLACERVILLE	11/4/1947	10.00	El Dorado	UNST
A014708	9209	6282	CITY OF PLACERVILLE	3/11/1952	6.60	El Dorado	BIG CANYON CREEK
			CITY OF PLACERVILLE Total		16.60		
A001853	859	1070	CITY OF SACRAMENTO	5/29/1920	2.10	El Dorado	SAYLES CANYON
A012140	11358		CITY OF SACRAMENTO	10/29/1947	271,739.50	Sacramento	AMERICAN RIVER
A012321	11359		CITY OF SACRAMENTO	2/13/1948	443,478.50	El Dorado	BRUSH CREEK, SILVER CREEK, SOUTH FORK SILVER CREEK
A016060	11361		CITY OF SACRAMENTO	5/7/1958	95,108.80	Sacramento	AMERICAN RIVER
A012622	11360		CITY OF SACRAMENTO	10/30/2000	966,174.80	El Dorado	BRUSH CREEK, GERLE CREEK, LOON LAKE, ROCKBOUND LAKE, RUBICON RIVER, SILVER CREEK, SOUTH FORK RUBICON RIVER
			CITY OF SACRAMENTO Total		1,776,503.70		
A004062	1853	1434	CITY OF STOCKTON	9/21/1939	12.20	Amador	UNCR
A007952	4514	2248	CITY OF STOCKTON	5/25/1934	0.40	Amador	UNCR
			CITY OF STOCKTON Total		12.60		
A025809	17623	12579	CLARENCE DILTS	8/21/1978	2.40	El Dorado	UNSP
			CLARENCE DILTS Total		2.40		
A019791	12964	8081	CLARIS GOULART	10/4/1960	62.40	Placer	UNST
			CLARIS GOULART Total		62.40		
A029657			COUNTY OF SAN JOAQUIN	2/9/1990	147,000.00		
			COUNTY OF SAN JOAQUIN Total		147,000.00		
A017398	10943	6893	Dale Capper	12/17/1956	31.00	El Dorado	UNST
			Dale Capper Total		31.00		
A019975	13230	10022	DALE B COOK	3/16/1973	14.70	El Dorado	UNST
			DALE B COOK Total		14.70		
A024427	16890	11259	DANIEL E LITTLE	8/3/1973	2.80	El Dorado	UNST
			DANIEL E LITTLE Total		2.80		
A013521	8424	4467	Daniel J Peterson	12/27/1949	145.00	El Dorado	UNST
			Daniel J Peterson Total		145.00		
A024575	16850	11161	DARREL PEARSON	3/21/1974	2.90	El Dorado	KELLEY CREEK
			DARREL PEARSON Total		2.90		
A017571B	11120	9732	DAVE TOGNETTI	4/25/1957	4.10	Placer	ANTELOPE CREEK
			DAVE TOGNETTI Total		4.10		
A005704	3038	1884	DAVID B BARTHOLOMEW	9/30/1927	0.30	El Dorado	UNSP (2)
			DAVID B BARTHOLOMEW Total		0.30		
A017571A	11120	9731	DAVID C MOORE	4/25/1957	3.90	Placer	ANTELOPE CREEK
			DAVID C MOORE Total		3.90		
A005024	2663	857	DAVID HAYNES MERING	5/18/1926	0.30	El Dorado	UNSP
			DAVID HAYNES MERING Total		0.30		
A012462	7434	3529	DAVID W GIRARD	4/6/1948	4.00	El Dorado	CHUNK RAVINE
			DAVID W GIRARD Total		4.00		
A016289	10247	5507	David William Barton	3/18/1955	14.60	Placer	UNSP
			David William Barton Total		14.60		
A026778	19076	12620	DE ANZA PLACER GOLD MINING COMPANY	4/6/1981	9.80	Placer	PAGGE CREEK

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A027566	19829	13841	DE ANZA PLACER GOLD MINING COMPANY	11/8/2011	215.20	Placer	NORTH FORK FORBES CREEK
A029364	20777	13844	DE ANZA PLACER GOLD MINING COMPANY	12/9/2011	11.20	Placer	PAGGE CREEK
			DE ANZA PLACER GOLD MINING COMPANY Total		236.20		
A021763	15075	8882	DEAN P A ELBERT	5/6/1964	9.00	El Dorado	THIRD OTTER CREEK
			DEAN P A ELBERT Total		9.00		
A011689	6706	5205	DEER HILLS PROPERTY OWNERS ASSN	1/9/1947	45.00	El Dorado	UNST
			DEER HILLS PROPERTY OWNERS ASSN Total		45.00		
A016995	11491	7992	DENNIS R DALTON	4/9/1956	3.00	Placer	UNST
			DENNIS R DALTON Total		3.00		
A018211B	11657	9367	DIAMANTE DEVELOPMENT LLC	7/9/1958	0.50	El Dorado	UNSP
A022791	15500	10062	DIAMANTE DEVELOPMENT LLC	5/18/1967	0.30	El Dorado	UNST
			DIAMANTE DEVELOPMENT LLC Total		0.80		
A009134	5059	3790	DIANE COSGROVE	10/2/1937	0.10	El Dorado	COLD STREAM
			DIANE COSGROVE Total		0.10		
A021857	15201	10018	DIANE W BUCHHOLZ	7/20/1964	16.00	El Dorado	BEAR CREEK
			DIANE W BUCHHOLZ Total		16.00		
A028208A	019433A	13035	DIANNA NEWBORN	3/8/1991	5.50	El Dorado	UNST
A029958	20856	13724	DIANNA NEWBORN	6/6/2007	14.50	El Dorado	UNST
			DIANNA NEWBORN Total		20.00		
A004357	2047	1348	DINO E ANDREOTTI	12/9/1924	1.80	El Dorado	UNCR
A022596	15410	9637	DINO E ANDREOTTI	9/30/1966	0.20	El Dorado	UNST
			DINO E ANDREOTTI Total		2.00		
A026436	18729	12676	DOBBAS RANCH	6/30/1980	0.50	El Dorado	UNSP
A026438	18731	12677	DOBBAS RANCH	6/30/1980	0.40	El Dorado	UNSP
			DOBBAS RANCH Total		0.90		
A005413	2955	3008	DON K AND J A TAYLOR, TRUSTEES	4/11/1927	137.60	Placer	RED RAVINE (AKA BUCKEYE RAVINE)
			DON K AND J A TAYLOR, TRUSTEES Total		137.60		
A023032	15758	10314	Donald Ray Neal	4/19/1968	12.60	Placer	UNST
			Donald Ray Neal Total		12.60		
A014328	9289	5017	DONALD DEAN HUTCHISON	5/29/1951	43.90	Placer	ANTELOPE CREEK
			DONALD DEAN HUTCHISON Total		43.90		
A012598	7431	4049	DONALD G RHODES	7/19/1948	2.50	El Dorado	UNSP
A018559	12063	8421	DONALD G RHODES	2/26/1959	2.50	El Dorado	UNST
			DONALD G RHODES Total		5.00		
A013752	8200	4756	DONALD W FIELDS	5/23/1950	4.10	El Dorado	WEBER CREEK
			DONALD W FIELDS Total		4.10		
A009952	5622	2563	DONNA MCTAGGART	7/12/1940	0.20	El Dorado	PYRAMID CREEK
			DONNA MCTAGGART Total		0.20		
A024705	17798	12232	DOROTHY A MARTIN	11/6/1974	1.80	El Dorado	WHITE ROCK CREEK
			DOROTHY A MARTIN Total		1.80		
A028159	20087	13231	DOUGLAS A NICKELL	6/12/1984	0.10	Placer	UNSP
			DOUGLAS A NICKELL Total		0.10		
A030352	20882		DOUGLAS B VEERKAMP	4/14/1994	88.00	El Dorado	UNST
			DOUGLAS B VEERKAMP Total		88.00		
A021696	14623	9202	Douglas R. Gingerich	3/17/1964	20.00	Placer	UNST
			Douglas R. Gingerich Total		20.00		
A018590	13585	8107	DRONE GRANT INVESTMENT GROUP	3/12/1959	61.30	El Dorado, Placer	DEVILS CANYON CREEK
			DRONE GRANT INVESTMENT GROUP Total		61.30		

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A024514C	16976	11411	DWIGHT R DENTON	1/25/1984	6.00	El Dorado	SWEETWATER CREEK
A024514D	16976	11412	DWIGHT R DENTON	1/25/1984	20.00	El Dorado	SWEETWATER CREEK
A027630	18901	12613	DWIGHT R DENTON	1/13/1983	9.00	El Dorado	SWEETWATER CREEK
A027703	19034	12615	DWIGHT R DENTON	4/4/1983	5.00	El Dorado	SWEETWATER CREEK
			DWIGHT R DENTON Total		40.00		
A025711	17843	12515	ECHO LANE INVESTORS	4/6/1978	110.00	El Dorado	INDIAN CREEK
			ECHO LANE INVESTORS Total		110.00		
A013369	8403	5210	EDWARD MACKAY	9/28/1949	9.50	El Dorado	UNCR
			EDWARD MACKAY Total		9.50		
A026573	19066	12660	EDWARD L PURKEY	10/8/1980	1.40	El Dorado	UNST
			EDWARD L PURKEY Total		1.40		
A012475	7386	3889	EDWARD P AKIN	4/14/1948	40.00	El Dorado	UNST
			EDWARD P AKIN Total		40.00		
A001692	1053	2184	EL DORADO IRRIGATION DISTRICT	3/25/2008	1,125.00	El Dorado	NORTH FORK WEBER CREEK
			EL DORADO IRRIGATION DISTRICT Total		1,125.00		
A019532	13536	8231	ELAINE BARKER	7/8/1960	1.20	Placer	UNST
			ELAINE BARKER Total		1.20		
A012875	7654	4021	ELISABETH MILLER	12/23/1948	25.00	El Dorado	COLD SPRINGS CREEK
A014603	8953	5587	ELISABETH MILLER	12/14/1951	15.00	El Dorado	UNST
			ELISABETH MILLER Total		40.00		
A022364	15320	9022	ELIZABETH CRONIN	1/13/1966	0.10	El Dorado	UNST
			ELIZABETH CRONIN Total		0.10		
A011628	6789	3206	ELIZABETH A NILES	11/18/1946	0.80	El Dorado	UNSP
			ELIZABETH A NILES Total		0.80		
A018541	12027	9676	EMIGRANT GAP MUTUAL WATER CO	2/19/1959	73.00	Placer	BLUE CANYON CREEK, UNST
			EMIGRANT GAP MUTUAL WATER CO Total		73.00		
A024535	17217	11424	ERLINE M MELLO	1/25/1974	16.00	El Dorado	COLOMA CANYON CREEK
			ERLINE M MELLO Total		16.00		
A011523B	6700	005447B	Estate of Rudolf K. Sachau	8/21/1946	36.40	Placer	UNSP
A025016	17647	11750	Estate of Rudolf K. Sachau	3/5/1976	1.00	Placer	UNSP
			Estate of Rudolf K. Sachau Total		37.40		
A026825	18611	12395	ESTHER E TOWNZEN	5/11/1981	2.10	El Dorado	UNST
			ESTHER E TOWNZEN Total		2.10		
A019826	12972	9337	EUGENE FILEV	10/24/1960	2.00	El Dorado	UNSP (3)
			EUGENE FILEV Total		2.00		
A006431	3395	1287	EUGENE LANGENBACH	9/10/1929	0.10	El Dorado	UNST
			EUGENE LANGENBACH Total		0.10		
A016037	10068	5822	EUGENE A WILSON	9/8/1954	1.40	El Dorado	UNST
			EUGENE A WILSON Total		1.40		
A025631	17347	11246	EUGENE H MEYER	1/3/1978	0.20	El Dorado	BURNT SHANTY CREEK
			EUGENE H MEYER Total		0.20		
A000548	258	176	EVELYN T WICKS	12/28/1916	53.70	Placer	SECRET RAVINE
			EVELYN T WICKS Total		53.70		
A012318	7162	4341	EVERETT B DYER III	2/11/1948	2.00	El Dorado	SOUTH FORK TENNESSEE CREEK
			EVERETT B DYER III Total		2.00		
A019553	12930	7751	FARHAD MORTAZAVI	7/18/1960	1.70	Placer	UNST
			FARHAD MORTAZAVI Total		1.70		
A016544	10554	6167	FAY F CARVER	8/23/1955	1.60	Placer	UNST
			FAY F CARVER Total		1.60		
A018211A	11657	9366	FAY LOUIE LIVING REVOCABLE TRUST OF 5/11/01	7/9/1958	10.00	El Dorado	GREEN SPRING CREEK

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A022226	15448	9324	FAY LOUIE LIVING REVOCABLE TRUST OF 5/11/01	7/16/1965	17.00	El Dorado	GREEN SPRINGS CREEK
			FAY LOUIE LIVING REVOCABLE TRUST OF 5/11/01 Total		27.00		
A031074	21172		FLA Roseville LP	8/5/2005	49.00	Placer	UNST
			FLA Roseville LP Total		49.00		
A018551	13584	9959	FORESTHILL PUBLIC UTILITY DISTRICT	2/24/1959	81.00	Placer	MILL CREEK
A021945	15375		FORESTHILL PUBLIC UTILITY DISTRICT	10/22/1964	24,075.80	Placer	NORTH SHIRTTAIL CANYON
A024596	16644	13038	FORESTHILL PUBLIC UTILITY DISTRICT	4/22/1974	166.80	Placer	MILL CREEK
			FORESTHILL PUBLIC UTILITY DISTRICT Total		24,323.60		
A012131	7200	5976	FOUR CORNERS LANDOWNERS ASSOC	10/16/1947	587.00	El Dorado	JACOBS CREEK
			FOUR CORNERS LANDOWNERS ASSOC Total		587.00		
A007776	4364	2233	FRANCINE MARQUIS	12/5/1933	0.40	El Dorado	UNST
			FRANCINE MARQUIS Total		0.40		
A029955	20661		FRANCIS P ALLEN TRUST	5/15/1991	2.50	El Dorado	PEACOCK RAVINE
			FRANCIS P ALLEN TRUST Total		2.50		
A006540	3509	1119	FRANK D MORILLAS	1/20/1930	61.10	Placer	SECRET RAVINE
			FRANK D MORILLAS Total		61.10		
A020339	13427	8239	FRANK P ROMANO	8/2/1961	3.40	El Dorado	UNSP
			FRANK P ROMANO Total		3.40		
A024683	17146	11477	FRED H RUSSELL III	8/30/1974	6.00	El Dorado	UNST
			FRED H RUSSELL III Total		6.00		
A011588A	6729	003374A	FREDERICK R MCLAREN	9/20/1982	8.80	El Dorado	INDIAN CREEK
A011588B	6729	003374B	FREDERICK R MCLAREN	9/20/1982	8.80	El Dorado	INDIAN CREEK
A011588C02	6729	003374C02	FREDERICK R MCLAREN	12/13/1985	75.70	El Dorado	INDIAN CREEK
A016368A	10290	008701A	FREDERICK R MCLAREN	9/20/1982	3.80	El Dorado	INDIAN CREEK
A016368B	10290	008701B	FREDERICK R MCLAREN	9/20/1982	3.80	El Dorado	INDIAN CREEK
A016368C02	10290	008701C02	FREDERICK R MCLAREN	12/13/1985	43.60	El Dorado	INDIAN CREEK
			FREDERICK R MCLAREN Total		144.50		
A003405	2329	2053	GAEL M BARSOTTI	5/18/1923	188.40	El Dorado	BRUSH CANYON
A020305	14796	9696	GAEL M BARSOTTI	7/18/1961	70.20	El Dorado	BRUSH CANYON
A020306	14797	9679	GAEL M BARSOTTI	7/18/1961	70.20	El Dorado	BRUSH CANYON
A020307	14798	9680	GAEL M BARSOTTI	7/18/1961	70.20	El Dorado	BRUSH CANYON
			GAEL M BARSOTTI Total		399.00		
A026060	18050	11935	GAIL IRENE WHITE	8/8/1979	0.40	Placer	UNST
			GAIL IRENE WHITE Total		0.40		
A007013	3806	1699	GALE A MCGUIRE	7/20/1931	0.30	El Dorado	BULL CREEK
			GALE A MCGUIRE Total		0.30		
A018657	12072	6495	GARY T MATSON	4/21/1959	9.00	El Dorado	UNST
			GARY T MATSON Total		9.00		
A018158	11644	8402	GEOFF H JOHNSON	5/26/1958	72.20	El Dorado	UNSP, UNST
			GEOFF H JOHNSON Total		72.20		
A015252	9538	7761	George Popescu	3/24/1953	15.00	El Dorado	KELLEY CREEK
			George Popescu Total		15.00		
A015522	10016	7542	George & Geri Grant LP	9/2/1953	36.20	Placer	OWL CREEK, UNST
			George & Geri Grant LP Total		36.20		
A002458	1632	486	GEORGE A FARIS	7/27/1921	0.40	El Dorado	UNSP (2)
			GEORGE A FARIS Total		0.40		
A016763	10509	5508	GEORGE A LAY	12/5/1955	11.00	Placer	UNDR
			GEORGE A LAY Total		11.00		

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A022996	15659	10207	GEORGE ANGELO TSAKOPOULOS	2/28/1968	15.00	Sacramento	ALDER CREEK
			GEORGE ANGELO TSAKOPOULOS Total		15.00		
A018004	11546	8163	GEORGE L COX	2/18/1958	36.70	Placer	UNST
A021211	14210	8855	GEORGE L COX	3/29/1963	8.60	Placer	UNST
			GEORGE L COX Total		45.30		
A013131	7830	3813	GEORGE W SHRIVER	6/2/1949	0.20	El Dorado	SOUTH FORK AMERICAN RIVER
			GEORGE W SHRIVER Total		0.20		
A005644A	12827		GEORGETOWN DIVIDE PUBLIC UTILITY DISTRICT	3/24/2000	74,347.90	El Dorado	PILOT CREEK
A016212	11304		GEORGETOWN DIVIDE PUBLIC UTILITY DISTRICT	3/24/2000	20,000.00	El Dorado	BACON CANYON, BRANCH OF FIRST CANYON OTTER CREEK, BRANCH OF SECOND CANYON OTTER CREEK, BRANCH OF THIRD CANYON OTTER CREEK, DEEP CANYON, PILOT CREEK, UNXX, UNXX (2)
A016688	11306		GEORGETOWN DIVIDE PUBLIC UTILITY DISTRICT	10/24/1955	20,363.90	El Dorado	ONION CREEK
			GEORGETOWN DIVIDE PUBLIC UTILITY DISTRICT Total		114,711.80		
A018487	11895	7157	GERALD E HAWKINS	1/23/1959	8.10	El Dorado	UNSP
			GERALD E HAWKINS Total		8.10		
A002944	1193	296	Gerald R Decamp	7/26/1922	0.30	El Dorado	COLD STREAM
			Gerald R Decamp Total		0.30		
A007305	3982	1701	GILBERT A ALBIANI	6/27/1932	0.20	El Dorado	UNSP
			GILBERT A ALBIANI Total		0.20		
A018566	11912	6634	GLEN EASTMAN	3/4/1959	0.90	El Dorado	UNSP, UNST
			GLEN EASTMAN Total		0.90		
A015804	9984	8171	GORDON J VICINI	3/30/1954	98.80	El Dorado	BURNT SHANTY CREEK, UNST
			GORDON J VICINI Total		98.80		
A011588C01	6729	003374C01	GREENSTONE COUNTRY OWNER'S ASSOC	12/13/1985	101.80	El Dorado	INDIAN CREEK
A016368C01	10290	008701C01	GREENSTONE COUNTRY OWNER'S ASSOC	12/13/1985	210.90	El Dorado	INDIAN CREEK
A026722	18583	12463	GREENSTONE COUNTRY OWNER'S ASSOC	2/20/1981	30.00	El Dorado	UNST
A026815	18584	12461	GREENSTONE COUNTRY OWNER'S ASSOC	5/1/1981	1.70	El Dorado	UNST
A026816	18585	12599	GREENSTONE COUNTRY OWNER'S ASSOC	5/1/1981	3.80	El Dorado	UNST
A026817	18586	12600	GREENSTONE COUNTRY OWNER'S ASSOC	5/1/1981	39.00	El Dorado	UNST
A026818	18587	12462	GREENSTONE COUNTRY OWNER'S ASSOC	5/1/1981	4.10	El Dorado	UNST
			GREENSTONE COUNTRY OWNER'S ASSOC Total		391.30		
A003793	1743	590	GREGORY D HAWES	1/10/1924	0.60	El Dorado	COLD STREAM
			GREGORY D HAWES Total		0.60		
A015043	9282	6572	GREGORY M WATSON	10/7/1952	5.00	Placer	UNST
			GREGORY M WATSON Total		5.00		
A016508	10555	5837	GREGORY W PAINTER	10/22/1959	0.10	El Dorado	UNSP (2)
			GREGORY W PAINTER Total		0.10		
A027615	18865	12406	HARLEY DELANO	12/20/1982	0.90	El Dorado	UNST
			HARLEY DELANO Total		0.90		
A026099	18080	11266	HENRIETTA DENNIS	9/27/1979	1.30	El Dorado	UNSP
			HENRIETTA DENNIS Total		1.30		
A006797	3653	1400	HENRIK KAM	9/17/1930	0.20	El Dorado	FORNI CREEK
			HENRIK KAM Total		0.20		
A014439	8850	4857	HENRY TEICHERT	8/23/1951	3.00	Placer	UNXX

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A015338	9553	5071	HENRY TEICHERT	5/12/1953	20.00	Placer	GRAPEVINE RAVINE
			HENRY TEICHERT Total		23.00		
A013839	8361	5452	HENRY WALTHER	7/6/1950	38.00	Placer	UNST
A015077	9273	5687	HENRY WALTHER	11/5/1952	16.00	Placer	UNST
			HENRY WALTHER Total		54.00		
A013419	7692	5430	HIDDEN VALLEY COMMUNITY ASSOC	10/26/1949	165.50	Placer	MINERS RAVINE
A014525	8892	5431	HIDDEN VALLEY COMMUNITY ASSOC	10/16/1951	57.30	Placer	MINERS RAVINE, UNST
			HIDDEN VALLEY COMMUNITY ASSOC Total		222.80		
A012364	8127	4118	JACALYN GAY WINJE	2/27/1948	12.30	El Dorado	UNST
			JACALYN GAY WINJE Total		12.30		
A024351A	017135A	12736	JACK E DEL CONTE	4/27/1990	1.40	Sacramento	LINDA CREEK
			JACK E DEL CONTE Total		1.40		
A008756	4822	2431	JACK R WEAVER	8/8/1936	0.20	El Dorado	UNSP
			JACK R WEAVER Total		0.20		
A025930	17740	11751	JAMES HART	2/28/1979	15.00	El Dorado	UNST
			JAMES HART Total		15.00		
A014370	8994	5229	JAMES PETRIKIN	6/27/1951	50.70	Placer	DIRTY FACE RAVINE
			JAMES PETRIKIN Total		50.70		
A025854	17735	12594	JAMES A CROFF	10/13/1978	6.80	El Dorado	UNST
			JAMES A CROFF Total		6.80		
A007294	3973	1684	JAMES A WATT	6/16/1932	0.20	Alpine	UNSP
			JAMES A WATT Total		0.20		
A009643	5394	2489	JAMES D & JANIS L ALDEA REVOKABLE TRUST	6/26/1939	0.10	El Dorado	UNST
A010477	6004	2967	JAMES D & JANIS L ALDEA REVOKABLE TRUST	6/12/1942	0.30	El Dorado	UNST
			JAMES D & JANIS L ALDEA REVOKABLE TRUST Total		0.40		
A028184	19584	12693	JAMES D MCLAIN	7/6/1984	0.30	El Dorado	UNST
			JAMES D MCLAIN Total		0.30		
A028474	19727	13389	JAMES G CLARK	6/12/1985	0.50	El Dorado	UNST
			JAMES G CLARK Total		0.50		
A012124	7129	6648	JAMES W ARNOLD	10/8/1947	14.00	El Dorado	NORTON RAVINE
			JAMES W ARNOLD Total		14.00		
A019052A	12310	10056	JAMI MANDEL	10/29/1959	7.10	Placer	UNST
			JAMI MANDEL Total		7.10		
A023041	15939	11075	JANICE M SUTHERLAND	5/10/1968	45.00	El Dorado, Placer	CLIPPER CREEK, UNST
			JANICE M SUTHERLAND Total		45.00		
A004597B		000948B	JASON CARDINET	8/20/2004	16.30	Placer	AUBURN RAVINE
			JASON CARDINET Total		16.30		
A004781	2403	943	JEFF LITTLE	9/24/1925	0.40	El Dorado	SOUTH FORK AMERICAN RIVER
			JEFF LITTLE Total		0.40		
A020490	13614	8160	JEFF WEAVER	11/10/1961	1.40	El Dorado	MOSQUITO CREEK
			JEFF WEAVER Total		1.40		
A010751	6237	3966	JEFFREY TILFORD	1/18/1944	149.30	Placer	UNST
A014545	9004	5160	JEFFREY TILFORD	11/1/1951	21.20	Placer	UNXX
			JEFFREY TILFORD Total		170.50		
A022817	15561	11707	JEFFREY C OLSON	6/14/1967	23.00	El Dorado	MARTEL CREEK, UNST
			JEFFREY C OLSON Total		23.00		
A013542	8041	4134	JEFFREY R LEONG	1/18/1950	85.30	Placer	UNCR
			JEFFREY R LEONG Total		85.30		
A014884	9127	8123	JEFFREY S HUBER	7/1/1952	12.00	Placer	CAPS RAVINE

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			JEFFREY S HUBER Total		12.00		
A005601	2905	1003	JEREMIAH FLYNN	7/11/1927	0.30	El Dorado	UNSP
			JEREMIAH FLYNN Total		0.30		
A013502	8031	4853	Jerome Vickrey	12/7/1949	0.80	El Dorado	UNST
			Jerome Vickrey Total		0.80		
A024109	16523	10713	JERRY DUNCAN	7/6/1972	9.00	Placer	UNST
			JERRY DUNCAN Total		9.00		
A019185	12425	7817	JERRY JOHNSON	1/18/1960	35.00	Placer	UNST
			JERRY JOHNSON Total		35.00		
A019392	13781	8664	JERRY W BALLEW	4/26/1960	2.80	El Dorado	UNSP
			JERRY W BALLEW Total		2.80		
A025855	17736	11800	JOANNE K BATEMAN	10/13/1978	15.00	El Dorado	UNST
			JOANNE K BATEMAN Total		15.00		
A012156	7142	3777	JOHN BRIGGS	11/17/1947	10.00	El Dorado	UNST
			JOHN BRIGGS Total		10.00		
A015662	9733	6523	JOHN METROPULOS III	12/28/1953	5.30	El Dorado	SOUTH FORK AMERICAN RIVER
			JOHN METROPULOS III Total		5.30		
A009199	5174	2571	John A. Cunningham	12/3/1937	0.10	El Dorado	COLD STREAM
			John A. Cunningham Total		0.10		
A011813	6852	4317	JOHN C SUNDIN	4/4/1947	1.10	El Dorado	CHUNK CREEK
			JOHN C SUNDIN Total		1.10		
A020259	13374	8114	JOHN E MARLOW	6/12/1961	16.20	El Dorado	UNST
A020514	13836	10791	JOHN E MARLOW	12/5/1961	15.60	El Dorado	UNST
			JOHN E MARLOW Total		31.80		
A007662	4251	1980	JOHN H PETERSON	9/6/1933	0.20	El Dorado	UNSP
			JOHN H PETERSON Total		0.20		
A021802	14569	9251	JOHN P HENDERSON	5/29/1964	28.00	El Dorado	IRISH CREEK
			JOHN P HENDERSON Total		28.00		
A018157	11643	8687	John Ryan Neil	5/26/1958	185.30	El Dorado	UNST
			John Ryan Neil Total		185.30		
A017223	11314	6248	JOHN T LUKKONEN	8/9/1956	266.50	Placer	SAILORS RAVINE
			JOHN T LUKKONEN Total		266.50		
A002190	1003	510	JON KNUDSEN	11/16/1948	87.00	Placer	CAPS RAVINE
			JON KNUDSEN Total		87.00		
A023302	15955	11159	JOSEPH MALONEY	7/2/1969	14.70	El Dorado	UNST
			JOSEPH MALONEY Total		14.70		
A030402	20968	13804	JOSEPH M KEATING	4/6/2010	14.00	El Dorado	UNST
			JOSEPH M KEATING Total		14.00		
A012999	7757	4363	JOSEPH S LANZA	3/24/1949	173.80	El Dorado	FISH CREEK
			JOSEPH S LANZA Total		173.80		
A018684	12034	7387	JOSH L WILSON JR	4/30/1959	3.40	Placer	UNSP
			JOSH L WILSON JR Total		3.40		
A025560	17345	12476	KARL HEMPFLING	11/10/1977	4.00	El Dorado	UNST
A025567	17346	11420	KARL HEMPFLING	11/15/1977	2.40	El Dorado	UNST
			KARL HEMPFLING Total		6.40		
A012240	7239	6374	KATHERINE A TUTTLE	1/13/1948	70.00	El Dorado	WHITE ROCK CANYON
			KATHERINE A TUTTLE Total		70.00		
A025728	17560	12394	KEN JOSEPH	3/17/1989	1.10	El Dorado	UNST
			KEN JOSEPH Total		1.10		
A024875	16908	13688	KENNETH PIMENTEL	12/13/2006	2.50	El Dorado	BRUSHY CANYON

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			KENNETH PIMENTEL Total		2.50		
A013616	8147	3839	KENNETH SAYLOR	3/6/1950	0.20	El Dorado	UNST
			KENNETH SAYLOR Total		0.20		
A027651	19312		KENNETH WILSON	2/10/1983	8,398.10	El Dorado	CANYON CREEK
			KENNETH WILSON Total		8,398.10		
A006685	3565	1290	KENNETH J MAGRI	5/21/1930	0.30	El Dorado	UNCR
			KENNETH J MAGRI Total		0.30		
A018579	11931	7229	KENNETH J TURTON	3/30/1965	15.00	Placer	MORMON RAVINE
			KENNETH J TURTON Total		15.00		
A012885	7656	4479	KENNETH S HILL	12/29/1948	36.00	El Dorado	UNST
			KENNETH S HILL Total		36.00		
A013146	7822	3824	KEVIN CAIRNS	6/9/1949	0.20	El Dorado	EVANS CREEK
			KEVIN CAIRNS Total		0.20		
A010212	5851	3524	KIRKWOOD MOUNTAIN RESORT LLC	5/28/1941	0.20	Alpine	UNSP
A030062	20851		KIRKWOOD MOUNTAIN RESORT LLC	2/7/1992	250.00	Alpine	CAPLES LAKE
A030453	20852		KIRKWOOD MOUNTAIN RESORT LLC	6/8/1995	250.00	Alpine	CAPLES LAKE
			KIRKWOOD MOUNTAIN RESORT LLC Total		500.20		
A010484	6044	3289	KRISTAN OTTO	6/26/1942	0.10	El Dorado	SOUTH FORK AMERICAN RIVER
			KRISTAN OTTO Total		0.10		
A008623	4765	3541	KYBURZ MUTUAL WATER COMPANY	3/30/1936	1.10	El Dorado	SOUTH FORK AMERICAN RIVER
A026486	18511		KYBURZ MUTUAL WATER COMPANY	8/7/1980	146.00	El Dorado	UNST, UNST (2)
			KYBURZ MUTUAL WATER COMPANY Total		147.10		
A013718	8159	4471	LAGUNA HOMEOWNERS ASSOCIATION	5/3/1950	10.00	Placer	UNST
			LAGUNA HOMEOWNERS ASSOCIATION Total		10.00		
A016650	10445	7204	LAKEVIEW HILLS COMMUNITY ASSOCIATION	3/10/1965	113.60	Placer	CARROLL CREEK, MINERS RAVINE
			LAKEVIEW HILLS COMMUNITY ASSOCIATION Total		113.60		
A012040	7093	4445	LARANE INVESTMENTS	8/13/1947	18.00	Placer	GRAPEVINE RAVINE
			LARANE INVESTMENTS Total		18.00		
A025667	17805	11717	LARISA LYSAK	2/2/1978	0.90	Placer	UNST
			LARISA LYSAK Total		0.90		
A021888	15625	10773	Larry Bowser	8/31/1964	2.10	Placer	UNST
			Larry Bowser Total		2.10		
A018617	12314	7997	LARRY JONES	3/31/1959	7.80	Placer	UNST
			LARRY JONES Total		7.80		
A024514A	16976	11409	LARRY R GOULDEN	1/25/1984	12.00	El Dorado	UNST
			LARRY R GOULDEN Total		12.00		
A007316	4014	1942	LAWRENCE E SWENSON	7/8/1932	0.10	El Dorado	UNST
			LAWRENCE E SWENSON Total		0.10		
A021225	14566	10002	LAWRENCE L CABODI	4/8/1963	2.20	El Dorado	UNSP
			LAWRENCE L CABODI Total		2.20		
A008356	4626	1933	LAWRENCE T WELDEN	6/11/1935	0.10	El Dorado	UNSP
			LAWRENCE T WELDEN Total		0.10		
A028467	19739		LEE A CHIUSANO	6/4/1985	2.80	El Dorado	UNST
			LEE A CHIUSANO Total		2.80		
A025315	17212	11457	LEE F SMITH	3/31/1977	7.00	El Dorado	TENNESSEE CREEK
			LEE F SMITH Total		7.00		
A020840	13791	8411	LEO E FINNERAN	7/3/1962	4.00	El Dorado	UNCR
			LEO E FINNERAN Total		4.00		
A013519	8104	5414	LEON M GASTALDI	12/27/1949	83.00	El Dorado	UNST

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			LEON M GASTALDI Total		83.00		
A013292	7867	3787	LEV V RIKOFF	8/11/1949	0.30	El Dorado	UNSP
			LEV V RIKOFF Total		0.30		
A002011	937	152	LEZLIE ELAINE DORSETT	9/18/1920	0.20	El Dorado	UNSP
			LEZLIE ELAINE DORSETT Total		0.20		
A026523	18777	12447	LINDA D WALDECK	9/11/1980	0.30	Placer	UNST
			LINDA D WALDECK Total		0.30		
A019325	12555	8113	LINDA R MURRAY	3/24/1960	9.00	Placer	UNST
			LINDA R MURRAY Total		9.00		
A021407	14357	8866	LINZY L COTHAM JR	7/24/1963	26.60	El Dorado	UNST
			LINZY L COTHAM JR Total		26.60		
A019825	12971	8225	Lionell Williams Trust	10/24/1960	4.50	El Dorado	UNSP
			Lionell Williams Trust Total		4.50		
A013318	7868	3788	LOIS PENMAN	8/29/1949	0.30	El Dorado	UNSP
			LOIS PENMAN Total		0.30		
A018512	12002	7506	LORI JANOWSKI	1/29/1959	25.00	El Dorado	UNCR
A030239	20915		LORI JANOWSKI	3/23/1993	6.00	El Dorado	UNST
			LORI JANOWSKI Total		31.00		
A029223	20717	13677	LOUIS W HEBERT	11/27/2006	1.20	Placer	UNST
			LOUIS W HEBERT Total		1.20		
A013612	8402	3842	LUCILLE HONIG	3/1/1950	10.00	El Dorado	DUTCH MARY RAVINE
			LUCILLE HONIG Total		10.00		
A003910	1970	586	LYDIA BACA	3/18/1924	0.10	El Dorado	UNSP
			LYDIA BACA Total		0.10		
A026406	18219	12068	MARC ALLISON	6/6/1980	0.20	Placer	UNST
			MARC ALLISON Total		0.20		
A019764	12790	7667	MARCIA C TAFFY WARNER	9/30/1960	19.00	El Dorado	MOSQUITO CREEK
			MARCIA C TAFFY WARNER Total		19.00		
A014410	9394	5598	MARK FOSTER	7/30/1951	29.20	Placer	SECRET RAVINE
			MARK FOSTER Total		29.20		
A011258B	6528	9363	MARK HANNUM	1/10/1946	11.80	Placer	UNST
			MARK HANNUM Total		11.80		
A026934	18880	12449	MARTHA J CROWL	7/30/1981	0.60	Placer	UNST
			MARTHA J CROWL Total		0.60		
A010344	5940	3071	Mary Hillabrand	12/12/1941	0.10	El Dorado	UNSP
			Mary Hillabrand Total		0.10		
A008163	4500	3553	MARY WOOD	11/20/1934	3.40	El Dorado	UNSP
			MARY WOOD Total		3.40		
A007070	3919	1555	Mary Leslie Rev. Trust	9/1/1931	0.10	El Dorado	UNST
			Mary Leslie Rev. Trust Total		0.10		
A020796	13838	8489	MELINDA S LAU	5/29/1962	149.50	El Dorado	SHENOGLE CREEK
			MELINDA S LAU Total		149.50		
A019880	13228	10465	MHC TT, INC.	12/16/1960	152.00	Placer	KELLY CREEK
A021480	14567	10466	MHC TT, INC.	10/1/1963	44.00	Placer	KELLY CREEK
			MHC TT, INC. Total		196.00		
A009026	5162	2557	MICHAEL HICKOX	6/28/1937	0.20	El Dorado	UNST
			MICHAEL HICKOX Total		0.20		
A027979	19335	12741	Michael K Baughman	2/17/1984	6.00	Placer	UNST
			Michael K Baughman Total		6.00		
A014244	9003	4648	Michael K Baughman	4/10/1951	161.30	Placer	UNXX

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			Michael K Baughman Total		161.30		
A026057	17953	12833	MICHAEL KIM	7/30/1979	30.00	El Dorado	UNST
			MICHAEL KIM Total		30.00		
A018653	12245	7914	MICHAEL MCCARTY	4/20/1959	3.80	Placer	UNST
			MICHAEL MCCARTY Total		3.80		
A009463	5323	2485	MICHAEL CARL VISMAN	8/4/1942	543.00	El Dorado	COON GULCH
			MICHAEL CARL VISMAN Total		543.00		
A014620	9007	5860	MICHAEL R POSEHN	1/15/1952	1.00	Placer	UNST
			MICHAEL R POSEHN Total		1.00		
A030430	20999		Michael W Dennis	11/22/1994	10.00	Placer	UNST
			Michael W Dennis Total		10.00		
A017382	10898	7668	Michelle D. Menard	12/7/1956	19.00	El Dorado	UNST
			Michelle D. Menard Total		19.00		
A020086	13353	9954	MICHIGAN BLUFF MUTUAL WATER COMPANY	4/13/1961	2.50	Placer	UNXX
A020653	13784	9955	MICHIGAN BLUFF MUTUAL WATER COMPANY	3/14/1962	8.10	Placer	UNSP
A024997	17213	11598	MICHIGAN BLUFF MUTUAL WATER COMPANY	2/18/1976	8.10	Placer	UNSP
A027642	19719	13254	MICHIGAN BLUFF MUTUAL WATER COMPANY	1/31/1983	3.40	Placer	UNSP (AKA BOHEA MINE TUNNEL)
			MICHIGAN BLUFF MUTUAL WATER COMPANY Total		22.10		
A024514B	16976	11410	MIKE LEMIRE	1/25/1984	10.00	El Dorado	SWEETWATER CREEK
A027602	18877	12443	MIKE LEMIRE	4/25/1989	7.00	El Dorado	SWEETWATER CREEK
			MIKE LEMIRE Total		17.00		
A026427	18499	13619	MINERS COVE HOMEOWNERS ASSOCIATION	11/21/2005	15.00	Placer	MINERS RAVINE
			MINERS COVE HOMEOWNERS ASSOCIATION Total		15.00		
A021616	14965	9252	MINERS RAVINE ESTATES HOMEOWNERS ASSOCIATION	1/24/1964	21.00	Placer	MINERS RAVINE
			MINERS RAVINE ESTATES HOMEOWNERS ASSOCIATION Total		21.00		
A017414	12359	7015	MITCHELL D HOPE	3/20/1964	25.50	Placer	MINERS RAVINE
			MITCHELL D HOPE Total		25.50		
A011264	6934	10829	MT RALSTON PROPERTIES ASSN INC	8/2/2005	13.20	El Dorado	TAMARACK CREEK
A015623	10214	10830	MT RALSTON PROPERTIES ASSN INC	8/2/2005	6.00	El Dorado	TAMARACK CREEK
A026577	18519	12457	MT RALSTON PROPERTIES ASSN INC	8/2/2005	23.60	El Dorado	UNSP
			MT RALSTON PROPERTIES ASSN INC Total		42.80		
A018485	12089	9025	N JON NELSON	1/21/1959	3.10	El Dorado	CHINA CREEK
			N JON NELSON Total		3.10		
A009358	5288	2246	NANCY BAUER	7/29/1938	0.10	El Dorado	UNST
			NANCY BAUER Total		0.10		
A011097	6445	3024	NANCY BALCH-PRICE FISCHER	7/5/1945	0.10	Alpine	UNSP
			NANCY BALCH-PRICE FISCHER Total		0.10		
A004027	1878	893	NANCY E DOLCINI	6/14/1924	0.70	El Dorado	UNSP
			NANCY E DOLCINI Total		0.70		
A006529	5805	4403	NEVADA IRRIGATION DISTRICT	1/9/1930	3,411.60	Placer	AUBURN RAVINE
A008177	5812	12801	NEVADA IRRIGATION DISTRICT	11/27/1934	1,580.00	Placer	UNST (AKA WILSON CRK)
			NEVADA IRRIGATION DISTRICT Total		4,991.60		
A019872	13025	8108	New Forestry, LLC	12/9/1960	3.70	Placer	UNSP
			New Forestry, LLC Total		3.70		
A017207	10885	8289	NIKOLAI BARADIN	8/3/1956	35.00	El Dorado	UNST
			NIKOLAI BARADIN Total		35.00		

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A025424	17385	12027	NORMA JEAN SCHNEIDER	7/11/1977	2.10	El Dorado	UNST
A025425	17386	11497	NORMA JEAN SCHNEIDER	7/11/1977	2.00	El Dorado	UNST
			NORMA JEAN SCHNEIDER Total		4.10		
A025144	19837	13175	NORTH CANYON LAKE ASSOCIATION	9/10/1976	35.00	El Dorado	NORTH CANYON CREEK
			NORTH CANYON LAKE ASSOCIATION Total		35.00		
A014794	9291	9738	NORTH FORK ASSOCIATION	5/5/1952	22.00	Placer	FREEMAN CREEK
			NORTH FORK ASSOCIATION Total		22.00		
A011836	6927	4243	NORTHERN CALIFORNIA CONFERENCE ASSOC OF 7TH DAY ADVENTISTS	4/22/1947	13.00	El Dorado	MOUND SPRINGS CREEK
A013592	8214	4244	NORTHERN CALIFORNIA CONFERENCE ASSOC OF 7TH DAY ADVENTISTS	2/20/1950	20.00	El Dorado	MOUND SPRINGS CREEK
			NORTHERN CALIFORNIA CONFERENCE ASSOC OF 7TH DAY ADVENTISTS Total		33.00		
A004219	2598	941	ORENO J TONARELLI	9/17/1924	0.20	El Dorado	COLD STREAM
			ORENO J TONARELLI Total		0.20		
A026078	17930	11863	ORVILLE F SLINGSBY	8/28/1979	0.30	Placer	UNST
			ORVILLE F SLINGSBY Total		0.30		
A026633	18492	12411	OSCAR R CAMPBELL JR	11/25/1980	0.20	El Dorado	UNST
			OSCAR R CAMPBELL JR Total		0.20		
A014229	8620	6653	OUR LADY OF THE OAKS, A CALIF CORP	4/5/1951	63.00	Placer	UNST
			OUR LADY OF THE OAKS, A CALIF CORP Total		63.00		
A004597A		000948A	PATRIC JAMES HILLENBRAND LIVING TRUST	8/20/2004	21.00	Placer	AUBURN RAVINE
			PATRIC JAMES HILLENBRAND LIVING TRUST Total		21.00		
A021423	14598	8781	PATRICIA MCCORMICK	8/8/1963	0.20	El Dorado	STATION CREEK
			PATRICIA MCCORMICK Total		0.20		
A016326	11492	7303	Patty A Hooper	6/9/1965	318.60	Placer	UNST (2)
			Patty A Hooper Total		318.60		
A013994	8520	5323	PATTY BERRY	10/13/1950	2.50	El Dorado	UNSP
A022051	15106	9620	PATTY BERRY	2/24/1965	0.60	El Dorado	UNSP (2)
A022053	15108	9625	PATTY BERRY	2/24/1965	0.10	El Dorado	UNSP (2)
			PATTY BERRY Total		3.20		
A020326	13199	9365	Paul Perron	7/26/1961	23.00	Placer	UNST
			Paul Perron Total		23.00		
A006842	3735	1467	PAUL HEWES	12/6/1930	0.90	El Dorado	FORNI CREEK
			PAUL HEWES Total		0.90		
A017571C	11120	9733	PAUL NIPPERT	4/25/1957	4.10	Placer	ANTELOPE CREEK
			PAUL NIPPERT Total		4.10		
A024146	16670	10954	PAUL THOMASSON	8/17/1972	2.00	El Dorado	OTTER CREEK
			PAUL THOMASSON Total		2.00		
A004344	2305	1423	Paul A Zanetta	4/10/1934	18.10	El Dorado	MILL CREEK
			Paul A Zanetta Total		18.10		
A025973	17940	11867	PAUL S BURNS	4/16/1979	0.10	Placer	UNST
			PAUL S BURNS Total		0.10		
A013160	8316	4332	PAULA S DWELLY	6/17/1949	11.60	Placer	LIVE OAK RAVINE (AKA LIVE OAK CREEK)
			PAULA S DWELLY Total		11.60		
A007018	3808	1837	PAULINE RODGERS	7/25/1931	0.30	El Dorado	UNSP
			PAULINE RODGERS Total		0.30		
A016327	11493	7912	PETE JENSON	4/7/1967	32.00	Placer	UNST

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			PETE JENSON Total		32.00		
A018858	12718	7828	PETER M LA TONA	7/15/1959	2.30	Placer	MINERS RAVINE
			PETER M LA TONA Total		2.30		
A001923	843	352	PETER N BERBOHM	5/12/1924	30.30	Placer	SAILORS RAVINE
			PETER N BERBOHM Total		30.30		
A003982	1791	1111	PETER R BOHLEY	5/8/1924	2.70	El Dorado	EVANS CREEK
A022299	15076	10250	PETER R BOHLEY	10/1/1965	0.20	El Dorado	EVANS CREEK
			PETER R BOHLEY Total		2.90		
A013576	8457	4797	PILOT HILL ESTATES HOMEOWNERS ASSOC	2/9/1950	57.00	El Dorado	UNST
			PILOT HILL ESTATES HOMEOWNERS ASSOC Total		57.00		
A018085	13856		PLACER COUNTY WATER AGENCY	4/7/1958	839,438.40	Placer, Sacramento	DUNCAN CANYON, MIDDLE FORK AMERICAN RIVER, NORTH FORK AMERICAN RIVER, RUBICON RIVER
A018087	13858		PLACER COUNTY WATER AGENCY	4/8/1958	451,592.40	Placer, Sacramento	MIDDLE FORK AMERICAN RIVER, NORTH FORK AMERICAN RIVER, NORTH FORK LONG CANYON, RUBICON RIVER, SOUTH FORK LONG CANYON
			PLACER COUNTY WATER AGENCY Total		1,291,030.80		
A003887A		001093A	PLASSE HOMESTEAD WATER ASSOCIATION	1/29/2003	1.10	Amador	UNSP, UNST
			PLASSE HOMESTEAD WATER ASSOCIATION Total		1.10		
A003887B		001093B	PLASSE'S MEADOW GROUP LLC	1/29/2003	1.90	Amador	UNSP, UNST
			PLASSE'S MEADOW GROUP LLC Total		1.90		
A018095	11572	10371	QUINTETTE SERVICE	4/17/1958	9.30	El Dorado	CRYSTAL SPRING
			QUINTETTE SERVICE Total		9.30		
A019052B	12310	10057	R W VELON	7/20/2004	7.10		
			R W VELON Total		7.10		
A013520	8423	3833	RALPH MILLER	12/27/1949	40.00	El Dorado	UNST
			RALPH MILLER Total		40.00		
A026940	18496	12409	Randolph G Wilson	8/4/1981	1.00	El Dorado	UNST
			Randolph G Wilson Total		1.00		
A006801	3746	1802	RAYMOND BENDER	9/20/1930	0.30	El Dorado	UNSP
			RAYMOND BENDER Total		0.30		
A018189	11652	6789	RAYMOND KRINGEL	6/10/1963	1.70	El Dorado	UNST
			RAYMOND KRINGEL Total		1.70		
A006414	3366	1803	RAYMOND A YOUNG	8/19/1929	0.10	El Dorado	UNSP
			RAYMOND A YOUNG Total		0.10		
A013644	8219	5979	RAYMOND BEST PATCHEN	3/22/1950	110.00	El Dorado	MANHATTAN CREEK
			RAYMOND BEST PATCHEN Total		110.00		
A006410	3669	1904	RAYMOND W LARSEN	8/16/1929	362.00	El Dorado	SOUTH FORK BRUSH CANYON
			RAYMOND W LARSEN Total		362.00		
A019633	12835	7725	RICHARD E. FREY	8/1/1960	42.50	Placer	UNST
			RICHARD E. FREY Total		42.50		
A007647	4207	1652	RICHARD FIELLEN	8/14/1933	1.10	El Dorado	ROCKY CANYON
			RICHARD FIELLEN Total		1.10		
A013829	8347	4092	RICHARD C PAYNE & RUTH L PAYNE FAMILY TRUST	7/5/1950	0.10	El Dorado	UNSP

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			RICHARD C PAYNE & RUTH L PAYNE FAMILY TRUST Total		0.10		
A012184	7096	3602	RICHARD E AKIN	12/3/1947	29.20	El Dorado	UNST
			RICHARD E AKIN Total		29.20		
A008698	4803	2471	RICHARD K JONES	6/8/1936	0.10	El Dorado	UNST
			RICHARD K JONES Total		0.10		
A002262	938	491	RICHARD L GALLAGHER	3/15/1921	1.20	El Dorado	COLD STREAM
			RICHARD L GALLAGHER Total		1.20		
A028122	19361	12714	RICHARD SCOTT HEER	4/26/1984	3.00	El Dorado	UNST
			RICHARD SCOTT HEER Total		3.00		
A019328	12673	7810	RICK MANICA	3/28/1960	21.00	El Dorado	OTTER CREEK
			RICK MANICA Total		21.00		
A001778	819	789	RICK MASSIE	4/17/1975	27.00	Placer	CLOVER VALLEY CREEK
			RICK MASSIE Total		27.00		
A014377	8812	4865	Robert Aichele	6/28/1951	0.10	El Dorado	ROCKY CANYON
			Robert Aichele Total		0.10		
A009728	5617	2573	ROBERT BRUCIA	9/18/1939	0.10	El Dorado	STATION CREEK
			ROBERT BRUCIA Total		0.10		
A020627A	13629	008487A	ROBERT DEITZ II	8/13/1992	4.50	El Dorado	UNST
			ROBERT DEITZ II Total		4.50		
A024672	16897	11435	ROBERT B JORDAN	8/16/1974	14.90	El Dorado	JOHNTOWN CREEK
			ROBERT B JORDAN Total		14.90		
A024888	17819	12469	ROBERT D BERGTHOLD	9/29/1975	1.00	Placer	MINERS RAVINE
			ROBERT D BERGTHOLD Total		1.00		
A011142	6453	3354	ROBERT E JONES	5/24/1963	0.10	El Dorado	SOUTH FORK AMERICAN RIVER
			ROBERT E JONES Total		0.10		
A013740	8740	5312	Robert E Woodward, Jr	5/15/1950	33.00	Placer	UNST
			Robert E Woodward, Jr Total		33.00		
A024948	16889	11244	ROBERT H AND ERIKA L ANDERSON REVOCABLE TRUST	12/3/1975	4.30	El Dorado	UNST
			ROBERT H AND ERIKA L ANDERSON REVOCABLE TRUST Total		4.30		
A012181	7152	4478	ROBERT H POWELL	12/1/1947	7.00	El Dorado	UNST
			ROBERT H POWELL Total		7.00		
A025495	17339	13232	ROBERT I RIDGWAY	9/2/1977	1.40	El Dorado	UNST
			ROBERT I RIDGWAY Total		1.40		
A025453	17375	12048	ROBERT N DUPRIEST	8/10/1977	0.40	Placer	UNST
			ROBERT N DUPRIEST Total		0.40		
A006263	3318	1122	ROBERT P STANLEY	4/20/1929	0.10	El Dorado	UNSP
			ROBERT P STANLEY Total		0.10		
A020018	13096	7970	Roberta Kanter	3/6/1961	1.00	Placer	UNST
			Roberta Kanter Total		1.00		
A020827	13966	9648	RODNEY PIMENTAL	6/22/1962	5.00	El Dorado	UNST
			RODNEY PIMENTAL Total		5.00		
A028821	19942	13743	ROGER E TURNER	10/31/2007	1.30	Placer	DRY CREEK
			ROGER E TURNER Total		1.30		
A008951	4960	2152	ROLF W MORROW	4/22/1937	0.10	El Dorado	UNSP
			ROLF W MORROW Total		0.10		
A003934	1848	2369	RONALD JAVOR	3/31/1924	0.40	El Dorado	UNSP
			RONALD JAVOR Total		0.40		

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A007387	4140	1820	RONALD E MINER	9/23/1932	0.20	El Dorado	UNSP
			RONALD E MINER Total		0.20		
A003496	1509	488	RONALD J BELL	7/2/1923	0.30	El Dorado	UNSP
			RONALD J BELL Total		0.30		
A017173	11536	6987	RONALD J COLEMAN	7/12/1956	25.50	Placer	UNST
			RONALD J COLEMAN Total		25.50		
A012463	7383	3771	RONALD N HUSTON	4/7/1948	24.00	El Dorado	INDIAN CREEK, UNST
			RONALD N HUSTON Total		24.00		
A021171	14326	9258	RONALD ROSS CLOVER	2/27/1963	1.70	Placer	SECRET RAVINE
			RONALD ROSS CLOVER Total		1.70		
A013233	7831	10052	ROSE ANN GUTIERREZ	7/13/1949	121.00	El Dorado	PILOT CREEK
A023937	16494	11030	ROSE ANN GUTIERREZ	12/6/1971	19.00	El Dorado	PILOT CREEK
A023938	16493	11031	ROSE ANN GUTIERREZ	12/6/1971	16.00	El Dorado	UNST
			ROSE ANN GUTIERREZ Total		156.00		
A021876	14859	9227	RSC DEVELOPMENT CORPORATION	8/24/1964	57.10	Placer	DUTCH RAVINE
			RSC DEVELOPMENT CORPORATION Total		57.10		
A023903	16642	10803	RYAN ENNIS	10/22/1971	0.90	El Dorado	UNSP
			RYAN ENNIS Total		0.90		
A025122	16986	11267	S360 Granite Lakes LLC	8/2/1976	10.00	Placer	UNST
			S360 Granite Lakes LLC Total		10.00		
A008011	4474	2509	SACRAMENTO MOUNTAINEERS	7/5/1934	1.00	El Dorado	UNSP
			SACRAMENTO MOUNTAINEERS Total		1.00		
A025316	17145	11453	SACRAMENTO VALLEY TEEN CHALLENGE INC	3/31/1976	6.00	Placer	UNST
			SACRAMENTO VALLEY TEEN CHALLENGE INC Total		6.00		
A026969	18764	13757	Saeed Zarakani	3/20/2008	3.00	Placer	UNST
			Saeed Zarakani Total		3.00		
A026137	18210	12245	SALLY MARKSTEIN	11/19/1979	1.40	Placer	UNST
			SALLY MARKSTEIN Total		1.40		
A005830	4009	6324	San Juan Water District	2/11/1928	4,581.90	Placer	NORTH FORK AMERICAN RIVER
			San Juan Water District Total		4,581.90		
A022515	15318	9950	SCHOENNAUER FAMILY PARTNERSHIP	6/30/1966	12.00	El Dorado	RINGOLD CREEK
			SCHOENNAUER FAMILY PARTNERSHIP Total		12.00		
A011917	7176	10135	SCHUBIN RANCH LP	6/5/1947	83.00	El Dorado	UNST
A013663	8222	10134	SCHUBIN RANCH LP	3/30/1950	150.00	El Dorado	UNST
A014778	9141	10136	SCHUBIN RANCH LP	4/25/1952	90.00	El Dorado	UNST
			SCHUBIN RANCH LP Total		323.00		
A003321	1554	5488	SCIOTS TRACT CABIN OWNERS ASSN	3/23/1923	15.60	El Dorado	CODY CREEK
			SCIOTS TRACT CABIN OWNERS ASSN Total		15.60		
A005683	3035	1201	SCOTT E ADAMS	9/7/1927	0.10	El Dorado	UNSP
			SCOTT E ADAMS Total		0.10		
A018320	11778	6978	SCOTT KRIGER	9/16/1958	1.30	El Dorado	CHINA CREEK
			SCOTT KRIGER Total		1.30		
A007340	4026	2295	Sharon Warden	8/6/1932	0.10	El Dorado	UNSP
A007341	4027	1584	Sharon Warden	8/6/1932	0.10	El Dorado	UNSP
			Sharon Warden Total		0.20		
A010325	5939	3291	SHARON L CAMERON	11/21/1941	0.10	El Dorado	UNSP
A020256A	13189	9779	SHARON L CAMERON	5/5/1971	2.60	El Dorado	WHITE ROCK CREEK
			SHARON L CAMERON Total		2.70		

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A028993	20394	13325	SHIRLAND LAKEVIEW ESTATES HOMEOWNERS ASSOC	3/24/1987	6.60	Placer	UNST
			SHIRLAND LAKEVIEW ESTATES HOMEOWNERS ASSOC Total		6.60		
A018955	12217	8621	SHIRLIE ROBERTS	9/1/1959	9.70	El Dorado	JOHNTOWN CREEK
			SHIRLIE ROBERTS Total		9.70		
A020601	14248		SIERRA LAKES COUNTY WATER DISTRICT	1/3/1964	1,177.00	Placer	ICE LAKES
			SIERRA LAKES COUNTY WATER DISTRICT Total		1,177.00		
A019114	12541	9031	SIERRA PACIFIC INDUSTRIES	12/2/1959	1.10	El Dorado	ONION CREEK
			SIERRA PACIFIC INDUSTRIES Total		1.10		
A028208B	019433B	13036	SILVER SPRINGS LLC	3/8/1991	0.50	El Dorado	UNST
			SILVER SPRINGS LLC Total		0.50		
A019119	12388	9032	SLEEPY HOLLOW OWNERS ASSOCIATION	12/3/1959	47.50	El Dorado	UNST
			SLEEPY HOLLOW OWNERS ASSOCIATION Total		47.50		
A010012	5671	7195	SOUTHFORK PARTNERSHIP	9/24/1940	23.00	Placer	BADGER RAVINE, UNST
			SOUTHFORK PARTNERSHIP Total		23.00		
A012180	7151	4477	STAR-CREST LUMBER, INC	12/1/1947	49.00	El Dorado	UNST
A013257	8373	4480	STAR-CREST LUMBER, INC	7/25/1949	7.70	El Dorado	UNST
			STAR-CREST LUMBER, INC Total		56.70		
A025310	17844	11713	STEPHEN HOFFMAN	3/29/1977	4.50	El Dorado	UNST
			STEPHEN HOFFMAN Total		4.50		
A006080	3181	2038	STEPHEN RULAND	10/3/1928	0.10	El Dorado	UNSP
			STEPHEN RULAND Total		0.10		
A021185	14483	10075	STEPHEN C MARIANOS	3/8/1963	6.00	El Dorado	WEBER CREEK
			STEPHEN C MARIANOS Total		6.00		
A025380	17876	12386	STEPHEN W BEAM	6/2/1977	0.60	El Dorado	UNST
			STEPHEN W BEAM Total		0.60		
A006549	3477	1888	STEVEN BENNETTS	2/4/1930	20.40	El Dorado	EMIGRANT RAVINE CREEK
			STEVEN BENNETTS Total		20.40		
A019922	13052	9923	STEVEN FORD	1/17/1961	3.20	El Dorado	UNST
			STEVEN FORD Total		3.20		
A015298	9533	5660	STONEWORTH INC	4/17/1953	73.30	Placer	SOUTH FORK DRY CREEK
A018752	12366	7519	STONEWORTH INC	5/29/1959	152.00	Placer	SOUTH FORK DRY CREEK
			STONEWORTH INC Total		225.30		
A020144	13369	8089	Susan McElhone	5/23/1961	0.10	Placer	UNST
			Susan McElhone Total		0.10		
A016885	10910	7612	SUSAN A FREDERICKS	2/8/1956	15.00	El Dorado	UNST
A021232	14404	10098	SUSAN A FREDERICKS	4/10/1963	7.20	El Dorado	UNST
			SUSAN A FREDERICKS Total		22.20		
A025340	17257	11601	Susan D Hobbs	4/22/1977	8.00	El Dorado	UNST
			Susan D Hobbs Total		8.00		
A026023	18081	11847	SWANSBORO COUNTRY PROPERTY OWNERS ASSOCIATION INC	6/13/1979	23.00	El Dorado	UNST
A026024	18082	11928	SWANSBORO COUNTRY PROPERTY OWNERS ASSOCIATION INC	6/13/1979	40.50	El Dorado	UNST
A026025	18083	11848	SWANSBORO COUNTRY PROPERTY OWNERS ASSOCIATION INC	6/13/1979	17.00	El Dorado	REDBIRD CREEK

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A026026	18084	11984	SWANSBORO COUNTRY PROPERTY OWNERS ASSOCIATION INC	6/13/1979	7.10	El Dorado	UNST
A026027	18085	11849	SWANSBORO COUNTRY PROPERTY OWNERS ASSOCIATION INC	6/13/1979	40.00	El Dorado	UNST
A028792	20056	13240	SWANSBORO COUNTRY PROPERTY OWNERS ASSOCIATION INC	2/3/1986	9.00	El Dorado	UNST
			SWANSBORO COUNTRY PROPERTY OWNERS ASSOCIATION INC Total		136.60		
A009269	5187	2694	SWORD & SANDALS INC	4/13/1938	0.60	El Dorado	UNCR
			SWORD & SANDALS INC Total		0.60		
A024351B	017135B	13157	TANYA M BOYD	4/27/1990	0.80	Sacramento	LINDA CREEK
			TANYA M BOYD Total		0.80		
A008791	4877	3191	TAYLOR T WHEELER	9/14/1936	0.10	El Dorado	UNSP
			TAYLOR T WHEELER Total		0.10		
A022478	15551	10769	TERENCE A HALL	5/27/1966	15.00	El Dorado	EMPIRE CREEK
			TERENCE A HALL Total		15.00		
A029233	20340		TERRIL R LUKENS EXEMPTION TRUST & LUKEN SURVIVOR'S TRUST UDT	4/19/1988	181.00	Placer	UNSP
			TERRIL R LUKENS EXEMPTION TRUST & LUKEN SURVIVOR'S TRUST UDT Total		181.00		
A007036	3799	1416	Terry D. Herringshaw	8/10/1931	0.20	El Dorado	UNSP
			Terry D. Herringshaw Total		0.20		
A011055	6442	3324	THE BRUCE & PAT BLAIKIE FAMILY TRUST DATED 5/20/1993	5/22/1945	0.20	El Dorado	SOUTH FORK AMERICAN RIVER
			THE BRUCE & PAT BLAIKIE FAMILY TRUST DATED 5/20/1993 Total		0.20		
A022465	15447	9913	The Pepper Family Trust	5/13/1966	1.50	El Dorado	BURNT SHANTY CREEK
			The Pepper Family Trust Total		1.50		
A006440	3396	1549	THE RITO S CASTANON FAMILY TRUST	9/18/1929	0.10	El Dorado	UNST
			THE RITO S CASTANON FAMILY TRUST Total		0.10		
A020627D	13629	008487D	THOMAS WALTERS	8/13/1992	25.20	El Dorado	UNST
			THOMAS WALTERS Total		25.20		
A020627B	13629	008487B	THOMAS E WALTERS	8/13/1992	1.30	El Dorado	UNST
			THOMAS E WALTERS Total		1.30		
A026981	19271	12888	THOMAS L PIATANESI	9/2/1981	7.00	El Dorado	UNST
			THOMAS L PIATANESI Total		7.00		
A017411	11024	6810	THOMAS S VAN HORNE	12/27/1956	17.00	Placer	UNST
			THOMAS S VAN HORNE Total		17.00		
A004510	2315	776	TIFFANY HOLBROOK	3/19/1925	6.50	El Dorado	UNSP
			TIFFANY HOLBROOK Total		6.50		
A017108	11013	7716	TIMBERLAKE ESTATES HOMEOWNERS ASSOC	5/29/1956	12.00	Placer	UNST
			TIMBERLAKE ESTATES HOMEOWNERS ASSOC Total		12.00		
A007788	4294	1674	TIMOTHY B COLLINS	12/26/1933	0.20	El Dorado	UNSP
			TIMOTHY B COLLINS Total		0.20		
A022062	15099	9129	TIMOTHY J MANDELLA	3/1/1965	0.40	El Dorado	UNSP (2)
			TIMOTHY J MANDELLA Total		0.40		
A006817	3718	1906	TONY PLANCHON	10/8/1930	0.20	El Dorado	UNST
			TONY PLANCHON Total		0.20		
A006988	3836	1343	TRACY ANN BRENNAN-MULLIGAN	6/29/1931	0.10	El Dorado	ROCK CREEK

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A018807	12161	6790	TRACY ANN BRENNAN-MULLIGAN	6/17/1959	0.10	El Dorado	SOUTH FORK AMERICAN RIVER
			TRACY ANN BRENNAN-MULLIGAN Total		0.20		
A016402	10552	6008	TROOP #1 B S A	6/2/1955	0.50	El Dorado	CODY LAKE, UNSP
			TROOP #1 B S A Total		0.50		
A004597C		000948C	Trudy Reed, et al	8/20/2004	8.20	Placer	AUBURN RAVINE
			Trudy Reed, et al Total		8.20		
A022914	15682	13080	TRUST OF WILLIAM & MARY ROTHAUS	9/29/1967	3.00	El Dorado	JOHNTOWN CREEK
A025406	17863	13081	TRUST OF WILLIAM & MARY ROTHAUS	6/24/1977	15.00	El Dorado	JOHNTOWN CREEK
			TRUST OF WILLIAM & MARY ROTHAUS Total		18.00		
A018106	11630	6767	TRUSTEN B WADSWORTH	4/28/1958	2.00	El Dorado	UNST
			TRUSTEN B WADSWORTH Total		2.00		
A021880	14767	9277	TWILIGHT RIDE LLC	8/26/1964	0.80	Placer	UNST
			TWILIGHT RIDE LLC Total		0.80		
A012046	7203	6975	Tyson Muncher	1/28/1964	31.10	El Dorado	EAST FORK SAWMILL CREEK, SAWMILL CREEK
			Tyson Muncher Total		31.10		
A002141	936	245	U S ELDORADO NATL FOREST	12/17/1920	1.20	El Dorado	COLD STREAM
A003879	1719	534	U S ELDORADO NATL FOREST	2/28/1924	0.10	El Dorado	ATWOOD SPRING
A004722	2382	1420	U S ELDORADO NATL FOREST	8/6/1925	0.30	El Dorado	UNSP
A004740	2383	2102	U S ELDORADO NATL FOREST	8/19/1925	2.30	El Dorado	UNST
A005142	2644	1001	U S ELDORADO NATL FOREST	8/4/1926	0.50	El Dorado	UNST
A006730	3585	2405	U S ELDORADO NATL FOREST	4/14/1930	0.50	El Dorado	UNSP
A007196	3959	1679	U S ELDORADO NATL FOREST	2/27/1932	3.00	Amador	UNST
A007304	4010	2441	U S ELDORADO NATL FOREST	6/27/1932	0.10	El Dorado	UNSP
A007498	4170	4543	U S ELDORADO NATL FOREST	2/7/1933	0.80	El Dorado	UNST
A007522	4163	4099	U S ELDORADO NATL FOREST	3/24/1933	0.60	Alpine	UNST
A008271	4576	1856	U S ELDORADO NATL FOREST	3/4/1935	0.40	El Dorado	UNSP
A008582	4761	3767	U S ELDORADO NATL FOREST	3/11/1936	0.50	El Dorado	ASPEN CREEK
A008929	4944	2159	U S ELDORADO NATL FOREST	3/30/1937	3.30	El Dorado	COX CREEK
A008936	4984	3972	U S ELDORADO NATL FOREST	4/3/1937	3.40	Amador	UNSP
A009058	5052	2161	U S ELDORADO NATL FOREST	7/29/1937	0.40	El Dorado	UNSP
A009086	5020	2164	U S ELDORADO NATL FOREST	8/21/1937	2.60	El Dorado	FRY CREEK
A009087	5021	2165	U S ELDORADO NATL FOREST	8/21/1937	1.30	El Dorado	UNST
A009120	5050	3254	U S ELDORADO NATL FOREST	9/18/1937	1.00	El Dorado	ROCKY CANYON
A009122	5051	2336	U S ELDORADO NATL FOREST	9/21/1937	0.60	El Dorado	ROCKY CANYON
A009128	5100	2166	U S ELDORADO NATL FOREST	9/27/1937	0.20	El Dorado	PYRAMID CREEK
A009129	5101	2167	U S ELDORADO NATL FOREST	9/27/1937	0.20	El Dorado	PYRAMID CREEK
A009189	5104	2168	U S ELDORADO NATL FOREST	11/27/1937	0.70	El Dorado	UNSP
A009251	5195	3922	U S ELDORADO NATL FOREST	3/4/1938	5.20	Amador	BLACK ROCK SPRING
A009289	5177	4059	U S ELDORADO NATL FOREST	5/6/1938	1.10	El Dorado	OATES SPRING
A009298	5178	3129	U S ELDORADO NATL FOREST	5/19/1938	0.70	El Dorado	OLANIE SPRING
A009310	5191	3256	U S ELDORADO NATL FOREST	6/6/1938	0.50	El Dorado	SNOW SLIDE CREEK
A009399	5261	3388	U S ELDORADO NATL FOREST	8/26/1938	0.90	El Dorado	UNSP
A009408	5251	4016	U S ELDORADO NATL FOREST	9/10/1938	0.30	El Dorado	UNST
A009425	5273	2337	U S ELDORADO NATL FOREST	9/24/1938	0.30	El Dorado	UNSP
A009655	5407	2864	U S ELDORADO NATL FOREST	7/5/1939	1.80	Placer	BUCKEYE SPRING
A009843	5566	3273	U S ELDORADO NATL FOREST	2/28/1940	1.00	El Dorado	UNSP
A009869	5580	2865	U S ELDORADO NATL FOREST	4/9/1940	0.50	El Dorado	UNST
A009884	5581	2866	U S ELDORADO NATL FOREST	4/26/1940	1.30	El Dorado	UNCR
A009890	5588	2867	U S ELDORADO NATL FOREST	5/8/1940	1.10	El Dorado	ASPEN CREEK

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A009955	5646	3502	U S ELDORADO NATL FOREST	7/20/1940	1.90	El Dorado	BRYANT FORK CREEK
A010110	5844	5870	U S ELDORADO NATL FOREST	2/5/1941	5.30	Amador	SHEEP CORRAL CREEK
A010192	5858	3161	U S ELDORADO NATL FOREST	4/29/1941	0.20	Alpine	ROSS SPRING
A010289	5907	2921	U S ELDORADO NATL FOREST	9/24/1941	0.20	El Dorado	UNST
A010360	5977	4095	U S ELDORADO NATL FOREST	1/13/1942	0.20	El Dorado	UNST
A010385	5979	2948	U S ELDORADO NATL FOREST	2/6/1942	0.30	El Dorado	STATION CREEK
A010405	5980	3288	U S ELDORADO NATL FOREST	3/16/1942	2.00	El Dorado	UNSP
A010463	5975	2933	U S ELDORADO NATL FOREST	5/16/1942	2.00	El Dorado	UNST
A010593	6143	4548	U S ELDORADO NATL FOREST	1/25/1943	1.80	El Dorado	CHAMPAGNE CANYON, UNST
A010604	6178	3643	U S ELDORADO NATL FOREST	2/24/1943	0.20	El Dorado	ASPEN CREEK
A010608	6179	4044	U S ELDORADO NATL FOREST	3/4/1943	0.70	El Dorado	UNSP
A010614	6144	3297	U S ELDORADO NATL FOREST	3/16/1943	6.90	El Dorado	ALDER CREEK
A010773	6281	2940	U S ELDORADO NATL FOREST	2/23/1944	0.10	El Dorado	UNST
A010821	6282	4870	U S ELDORADO NATL FOREST	5/19/1944	12.70	El Dorado	CODY CREEK
A010823	6283	3084	U S ELDORADO NATL FOREST	5/26/1944	1.00	El Dorado	UNSP, UNST
A010827	6284	5654	U S ELDORADO NATL FOREST	6/5/1944	5.20	El Dorado	UNSP
A011256	6733	7767	U S ELDORADO NATL FOREST	1/10/1946	44.90	El Dorado	TAMARACK FLAT CREEK
A011370	6734	3497	U S ELDORADO NATL FOREST	4/12/1946	0.20	El Dorado	UNST
A011464	6682	3573	U S ELDORADO NATL FOREST	7/10/1946	0.10	El Dorado	FORNI CREEK
A011608	6759	3330	U S ELDORADO NATL FOREST	11/6/1946	0.20	El Dorado	FRY CREEK
A011742	6881	3419	U S ELDORADO NATL FOREST	2/25/1947	0.20	El Dorado	ROCKY CANYON
A011867	7003	3395	U S ELDORADO NATL FOREST	5/9/1947	0.10	El Dorado	UNSP
A011893	6976	4861	U S ELDORADO NATL FOREST	5/26/1947	0.70	El Dorado	ASPEN CREEK
A011971	7009	4744	U S ELDORADO NATL FOREST	7/3/1947	0.50	El Dorado	SAYLES CANYON
A012000	7051	3346	U S ELDORADO NATL FOREST	7/21/1947	0.70	El Dorado	UNST
A012057	7081	3399	U S ELDORADO NATL FOREST	8/26/1947	0.20	El Dorado	UNSP
A012397	7324	3721	U S ELDORADO NATL FOREST	3/12/1948	0.20	El Dorado	PYRAMID CREEK
A012552	7449	5535	U S ELDORADO NATL FOREST	6/22/1948	1.20	El Dorado	BULL CREEK
A013383	7911	3834	U S ELDORADO NATL FOREST	10/5/1949	0.50	El Dorado	UNSP
A013410	8004	3797	U S ELDORADO NATL FOREST	10/24/1949	0.10	Alpine	JONES SPRING
A013653	8136	6630	U S ELDORADO NATL FOREST	3/27/1950	1.70	El Dorado	BRYAN CREEK
A014409	9031	4382	U S ELDORADO NATL FOREST	7/27/1951	0.10	El Dorado	UNSP
A014452	9026	4713	U S ELDORADO NATL FOREST	8/29/1951	0.40	El Dorado	UNSP
A014902	9262	4533	U S ELDORADO NATL FOREST	7/10/1952	483.70	El Dorado	ASPEN CREEK
A015490	10028	4996	U S ELDORADO NATL FOREST	8/31/1953	55.00	El Dorado	SMITH LAKE
A015492	10029	4997	U S ELDORADO NATL FOREST	8/31/1953	54.00	El Dorado	CLYDE LAKE
A015493	10030	4998	U S ELDORADO NATL FOREST	8/31/1953	30.00	El Dorado	TOEM LAKE
A015494	10031	4999	U S ELDORADO NATL FOREST	8/31/1953	160.00	El Dorado	WRIGHTS LAKE
A015495	10032	5000	U S ELDORADO NATL FOREST	8/31/1953	80.00	El Dorado	ROPI LAKE
A015496	10033	5001	U S ELDORADO NATL FOREST	8/31/1953	85.40	El Dorado	LOIS LAKE
A015497	10034	5002	U S ELDORADO NATL FOREST	8/31/1953	203.60	El Dorado	LAKE SCHMIDELL
A015498	10035	5003	U S ELDORADO NATL FOREST	8/31/1953	40.00	El Dorado	LYONS LAKE
A015499	10036	6199	U S ELDORADO NATL FOREST	8/31/1953	110.00	El Dorado	BUCK ISLAND LAKE
A015500	10037	5004	U S ELDORADO NATL FOREST	8/31/1953	38.00	El Dorado	LAWRENCE LAKE
A015501	10038	6058	U S ELDORADO NATL FOREST	8/31/1953	190.00	El Dorado	SPIDER LAKE
A015503	10040	5005	U S ELDORADO NATL FOREST	8/31/1953	30.00	El Dorado	BARRETT LAKE
A015506	10043	5006	U S ELDORADO NATL FOREST	8/31/1953	148.40	El Dorado	MIDDLE VELMA LAKE
A015509	10046	6025	U S ELDORADO NATL FOREST	8/31/1953	160.00	Alpine	WINNEMUCCA LAKE
A015512	10049	5011	U S ELDORADO NATL FOREST	8/31/1953	60.00	El Dorado	ISLAND LAKE
A015513	10050	4985	U S ELDORADO NATL FOREST	8/31/1953	21.00	El Dorado	UPPER TWIN LAKE

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A015514	10051	5164	U S ELDORADO NATL FOREST	8/31/1953	26.00	El Dorado	LOWER TWIN LAKE
A015616	10052	6200	U S ELDORADO NATL FOREST	11/23/1953	440.00	El Dorado	ROCKBOUND LAKE
A016564	10564	5531	U S ELDORADO NATL FOREST	8/31/1955	0.20	El Dorado	UNST
A017521	11280	8645	U S ELDORADO NATL FOREST	3/22/1957	2.80	El Dorado	GERLE CREEK
A017846	11577	6935	U S ELDORADO NATL FOREST	10/11/1957	0.20	El Dorado	ROCKY CANYON
A018022	11627	7172	U S ELDORADO NATL FOREST	3/3/1958	2.90	Amador	UNSP
A019541	12806	7807	U S ELDORADO NATL FOREST	7/13/1960	3.50	El Dorado	PILLIKEN SPRING
A019544	12808	7971	U S ELDORADO NATL FOREST	7/13/1960	0.40	Placer	JERRYS CANYON SPRING
A019546	12810	7972	U S ELDORADO NATL FOREST	7/13/1960	0.40	Placer	CHIPMUNK RIDGE SPRING
A019547	12811	7973	U S ELDORADO NATL FOREST	7/13/1960	0.40	Placer	LYNCHBURG SPRING
A019548	12812	7974	U S ELDORADO NATL FOREST	7/13/1960	0.40	Placer	BEAR SPRINGS
A019549	12813	7975	U S ELDORADO NATL FOREST	7/13/1960	0.40	Placer	DESERT COLD SPRING
A020659	13789	8325	U S ELDORADO NATL FOREST	3/19/1962	0.40	El Dorado	UNST
A020675	13795	8324	U S ELDORADO NATL FOREST	3/26/1962	0.20	El Dorado	OWENS CAMP SPRING
A023420	16189	10597	U S ELDORADO NATL FOREST	12/23/1969	4.50	Placer	SOUTH FORK LONG CANYON
A028204	19518	12944	U S ELDORADO NATL FOREST	8/3/1984	2.20	El Dorado	UNSP
			U S ELDORADO NATL FOREST Total		2,565.40		
A007629	4209	1702	U S FOREST SERVICE	7/26/1933	0.10	El Dorado	UNST
A007848	4350	2138	U S FOREST SERVICE	2/14/1934	0.40	Placer	GREEK STORE SPRING
A009114	5095	2611	U S FOREST SERVICE	9/14/1937	13.40	Placer	BLUE CANYON RANGER STATION SP
A009816	5536	2599	U S FOREST SERVICE	1/29/1940	4.30	Placer	UNSP
A010126	5779	2886	U S FOREST SERVICE	2/20/1941	4.70	Placer	TEXAS HILL SPRING
A010129	5782	2655	U S FOREST SERVICE	2/20/1941	0.60	Placer	DAWSON SPRING
A010442	6014	4181	U S FOREST SERVICE	5/6/1942	0.10	Placer	NORTH FORK SPRING
A010443	6015	3037	U S FOREST SERVICE	5/6/1942	5.50	Placer	ONION VALLEY SPRING NO 3
A010445	6017	2890	U S FOREST SERVICE	5/6/1942	0.60	Placer	LONG VALLEY SPRING
A011157	6589	3207	U S FOREST SERVICE	9/19/1945	1.00	Placer	TADPOLE SPRING
A011787	6897	4862	U S FOREST SERVICE	3/19/1947	0.30	Placer	UNSP
A012036	7055	3250	U S FOREST SERVICE	8/12/1947	1.10	Placer	PAGGE CREEK
A014193	8704	4112	U S FOREST SERVICE	3/14/1951	11.00	Placer	ELLIOTT MEADOW SPRING
A014194	8705	4113	U S FOREST SERVICE	6/28/1955	34.10	Placer	ELLIOTT RANCH SPRING
A014195	9308	4964	U S FOREST SERVICE	3/14/1951	1.40	Placer	BEAR SPRING
A014196	8706	4126	U S FOREST SERVICE	3/14/1951	0.40	Placer	CHICKEN HAWK SPRING
A014197	8707	4127	U S FOREST SERVICE	3/14/1951	0.30	Placer	ORCHARD SPRING
A014198	8708	4876	U S FOREST SERVICE	3/14/1951	0.20	Placer	SECRET HOUSE SPRING
A016517	10278	7335	U S FOREST SERVICE	8/11/1955	96.80	Placer	CODY CREEK
A016691	10621	7367	U S FOREST SERVICE	10/26/1955	6.10	Placer	FULDA SPRING
A017304	11837	7098	U S FOREST SERVICE	1/14/1965	84.90	Placer	POWDERHORN CREEK
A021489	14495	8892	U S FOREST SERVICE	10/7/1963	5.20	Placer	BEARTRAP SPRING
A023221	16016	10309	U S FOREST SERVICE	1/30/1969	0.40	Placer	DELLER SPRING
A023222	16177	10620	U S FOREST SERVICE	1/30/1969	1.10	Placer	MT MILDRED CREEK
A023223	16178	10611	U S FOREST SERVICE	1/30/1969	4.20	Placer	DOLLY CREEK
A023224	16179	10618	U S FOREST SERVICE	1/30/1969	3.90	Placer	FRENCH MEADOW CREEK
A023227	16013	10543	U S FOREST SERVICE	1/30/1969	0.80	Placer	WILLMONT SPRING
A023228	16012	10310	U S FOREST SERVICE	1/30/1969	0.50	Placer	GIANT GAP SPRING #1
A023229	16011	10311	U S FOREST SERVICE	1/30/1969	0.50	Placer	GIANT GAP SPRING #2
			U S FOREST SERVICE Total		283.90		
A013103	7803	4220	U.S. BUREAU OF RECLAMATION	3/21/1956	4.00	El Dorado	KNICKERBOCKER CREEK
A013370	11315		U.S. BUREAU OF RECLAMATION	4/22/1958	5,347,832.00	Contra Costa, Sacramento	AMERICAN RIVER, OLD RIVER, SACRAMENTO RIVER

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A013371	11316		U.S. BUREAU OF RECLAMATION	7/29/2002	680,435.30	Contra Costa, Sacramento	AMERICAN RIVER, Sacramento River
A013629	8151	6654	U.S. BUREAU OF RECLAMATION	3/1/1963	30.00	El Dorado	UNST
A014165	8572	4221	U.S. BUREAU OF RECLAMATION	3/21/1956	22.00	El Dorado	KNICKERBOCKER CREEK
A014515	8887	4798	U.S. BUREAU OF RECLAMATION	10/24/1957	14.30	El Dorado	UNST
A015028	9246	5878	U.S. BUREAU OF RECLAMATION	11/17/1959	15.00	El Dorado	UNST
A017371	10923	5824	U.S. BUREAU OF RECLAMATION	10/22/1959	19.60	El Dorado	MIDDLE FORK AMERICAN RIVER
A018196	12706	7596	U.S. BUREAU OF RECLAMATION	3/9/1966	0.10	Placer	UNSP (2)
A019977	13093	8229	U.S. BUREAU OF RECLAMATION	2/8/1961	21.70	Placer	CARLTON SPRING, NORTH FORK AMERICAN RIVER
A020011	13161		U.S. BUREAU OF RECLAMATION	2/28/1961	22.00	El Dorado	KNICKERBOCKER CREEK
A020478	13934	8588	U.S. BUREAU OF RECLAMATION	11/7/1961	0.10	Placer	NORTH FORK AMERICAN RIVER
A021189	14220	8871	U.S. BUREAU OF RECLAMATION	3/13/1963	18.00	El Dorado	UNST
			U.S. BUREAU OF RECLAMATION Total		6,028,434.10		
A005214	2776	1075	ULF ASPENLIND	9/17/1926	231.70	Placer	CANYON CREEK
			ULF ASPENLIND Total		231.70		
A023318	15937	11043	UNION PACIFIC RAILROAD COMPANY	6/4/1980	4.00	Placer	UNXX
			UNION PACIFIC RAILROAD COMPANY Total		4.00		
A027266	18612		US BUREAU OF LAND MANAGEMENT	11/4/1982	2,533.90	Placer	DARDANELLES CREEK, POND CREEK
			US BUREAU OF LAND MANAGEMENT Total		2,533.90		
A005981	3152	5560	USDA-FOREST SERVICE, LAKE TAHOE BASIN MANAGEMENT UNIT	7/16/1928	4.30	El Dorado	HAWLEY SPRING
A010290	5988	6099	USDA-FOREST SERVICE, LAKE TAHOE BASIN MANAGEMENT UNIT	9/24/1941	0.70	El Dorado	BENWOOD CREEK
A015510	10047	5009	USDA-FOREST SERVICE, LAKE TAHOE BASIN MANAGEMENT UNIT	8/31/1953	141.80	El Dorado	HEATHER LAKE
A027518	19091	12562	USDA-FOREST SERVICE, LAKE TAHOE BASIN MANAGEMENT UNIT	9/15/1982	0.30	El Dorado	HAWLEY SPRING
			USDA-FOREST SERVICE, LAKE TAHOE BASIN MANAGEMENT UNIT Total		147.10		
A004026	1899	738	VERYL T KUCHAR	10/5/1928	113.10	Placer	BIG CHIEF CREEK, BOULDER CREEK
A011258A	6528	9362	VERYL T KUCHAR	1/10/1946	61.00	Placer	UNST
			VERYL T KUCHAR Total		174.10		
A015953	9902	5786	VICKIE L LONGO	7/26/1954	3.80	El Dorado	SOUTH FORK AMERICAN RIVER
			VICKIE L LONGO Total		3.80		
A005535	3114	1098	VICTOR HERRERO	6/17/1927	0.10	El Dorado	UNSP
			VICTOR HERRERO Total		0.10		
A017916	11348	7619	VINCENT J GRAVES	12/16/1957	2.20	Placer	BABIE CREEK
			VINCENT J GRAVES Total		2.20		
A028603	20086	13242	WAYNE BRUMMOND	10/28/1985	2.50	Placer	UNXX
			WAYNE BRUMMOND Total		2.50		
A011162	6477	3032	WAYNE HILLARD	9/27/1945	0.20	El Dorado	SOUTH FORK AMERICAN RIVER
			WAYNE HILLARD Total		0.20		
A024241	16911	12453	WILLIAM FAWX	11/8/1972	0.10	Placer	DUTCH RAVINE
			WILLIAM FAWX Total		0.10		
A027705	19112	12678	WILLIAM OZAWA	4/5/1983	1.30	El Dorado	UNST
			WILLIAM OZAWA Total		1.30		
A027173	18747	13544	WILLIAM SMITH	7/11/2003	19.00	El Dorado	ACORN CREEK

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			WILLIAM SMITH Total		19.00		
A016891	10691	7265	WILLIAM WHITAKER	2/14/1956	0.40	El Dorado	UNST
			WILLIAM WHITAKER Total		0.40		
A019850	13243		WILLIAM B ASHTON	11/21/1960	37.00	El Dorado	SILVER FORK OF SOUTH FORK AMERICAN RIVER, SUGAR LOAF CREEK
			WILLIAM B ASHTON Total		37.00		
A001963	935	428	WILLIAM B TIMBERLAKE	8/11/1920	2.90	El Dorado	NILSSON SPRING
			WILLIAM B TIMBERLAKE Total		2.90		
A005989	3394	1436	WILLIAM C SAWTELL	7/19/1928	0.20	El Dorado	UNST
			WILLIAM C SAWTELL Total		0.20		
A027491	19229	13413	WILLIAM P KLEIN JR	8/31/1982	0.80	Placer	UNST
A028034	20068	13411	WILLIAM P KLEIN JR	3/15/1984	12.00	Placer	UNST
A028035	20069	13412	WILLIAM P KLEIN JR	3/15/1984	11.00	Placer	UNST
			WILLIAM P KLEIN JR Total		23.80		
A027520	19118	13269	WILLIAM V DALLAS	9/16/1982	0.20	Placer	UNST
			WILLIAM V DALLAS Total		0.20		
A010121	5976	3045	WILLIS H LAMBERT	2/20/1941	0.70	El Dorado	UNST
			WILLIS H LAMBERT Total		0.70		
A014086	8441	4369	WILLOMAE DOBBS	12/1/1950	0.40	El Dorado	UNSP
A015918	9886	5630	WILLOMAE DOBBS	6/18/1954	0.70	El Dorado	UNSP
			WILLOMAE DOBBS Total		1.10		
A022029	15275	10683	WILSON GRANAT	1/15/1965	3.30	Placer	UNST
			WILSON GRANAT Total		3.30		
A013893	8603	4079	WOODBRIDGE RANCH HOMEOWNERS ASSOCIATION	8/14/1950	33.00	Sacramento	UNCR
			WOODBRIDGE RANCH HOMEOWNERS ASSOCIATION Total		33.00		
A008015	4390	2604	YANKEE HILL ESTATES OWNERS ASSOCIATION	7/9/1934	287.90	Placer	ANTELOPE CREEK
A013394	8207	4781	YANKEE HILL ESTATES OWNERS ASSOCIATION	10/11/1949	25.00	Placer	ANTELOPE CREEK
A016437	10551	5511	YANKEE HILL ESTATES OWNERS ASSOCIATION	6/23/1955	142.70	Placer	ANTELOPE CREEK
			YANKEE HILL ESTATES OWNERS ASSOCIATION Total		455.60		
			Grand Total		9,560,977.90		

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A009802	5719	2809	BIRD HAVEN RANCH LLC	1/11/1940	852.90	Glenn	BUTTE CREEK
			BIRD HAVEN RANCH LLC Total		852.90		
A002234	1114	5236	BUTTE VALLEY IRRIGATION DISTRICT	2/28/1921	17,163.80	Siskiyou	BUTTE CREEK
A023025	16330	10776	BUTTE VALLEY IRRIGATION DISTRICT	4/10/1968	10,000.00	Siskiyou	BUTTE CREEK
			BUTTE VALLEY IRRIGATION DISTRICT Total		27,163.80		
A013794	8624	8176	CAMERON PARK COMMUNITY SERVICES DISTRICT	6/14/1950	240.00	El Dorado	DEER CREEK
			CAMERON PARK COMMUNITY SERVICES DISTRICT Total		240.00		
A009216	5153	6113	CITY OF CHICO	12/30/1937	258.90	Butte	BIG CHICO CREEK
			CITY OF CHICO Total		258.90		
A013675	8194	7075	COLUSA SHOOTING CLUB	4/7/1950	853.90	Colusa	BUTTE CREEK
A013728	8195	7076	COLUSA SHOOTING CLUB	5/10/1950	1,386.90	Colusa	BUTTE CREEK
			COLUSA SHOOTING CLUB Total		2,240.80		
A009625	5717	2984	Dept of Fish and Game	6/19/1939	5,474.50	Butte, Glenn	BUTTE CREEK
A013008	7747	8712	Dept of Fish and Game	7/24/1968	5,182.50	Butte, Glenn	BUTTE CREEK
A013323	7885	4793	Dept of Fish and Game	10/24/1957	2,554.80	Glenn	BUTTE CREEK DRAINAGE DISTRICT DITCH
A014354	9663	4794	Dept of Fish and Game	10/24/1957	2,700.70	Butte	BUTTE CREEK
A015467	14438	9973	Dept of Fish and Game	12/21/1972	5,463.00	Glenn	BUTTE CREEK DRAINAGE DISTRICT DITCH
A015468	14439	9974	Dept of Fish and Game	12/21/1972	5,463.00	Butte	BUTTE CREEK
A024590	17233		Dept of Fish and Game	4/10/1974	7,428.00	Butte	BUTTE CREEK
			Dept of Fish and Game Total		34,266.50		
A022564	16029	10433	GAIL BROWN	8/29/1966	493.00	Butte	BUTTE CREEK
			GAIL BROWN Total		493.00		
A002777	1779	2389	GORRILL LAND COMPANY	3/6/1922	4,581.90	Butte	BUTTE CREEK, HAMLIN SLOUGH
A004664	2448	2390	GORRILL LAND COMPANY	6/30/1925	4,523.50	Butte	HAMLIN SLOUGH
A004665	2449	2391	GORRILL LAND COMPANY	3/13/1942	3,930.10	Butte	BUTTE CREEK
A022321	16018	11044	GORRILL LAND COMPANY	10/25/1965	2,500.00	Butte	BUTTE CREEK
A025717	17845	11996	GORRILL LAND COMPANY	4/12/1978	4,400.00	Butte	HAMLIN SLOUGH
			GORRILL LAND COMPANY Total		19,935.50		
A022799	15502	9911	LOUIS A PAYEN	5/31/1967	45.00	Sacramento	LITTLE DEER CREEK
			LOUIS A PAYEN Total		45.00		
A023298	15950	10194	LUCIAN B VANDEGRIFT TRUST	6/17/1969	45.00	Butte	LITTLE BUTTE CREEK
			LUCIAN B VANDEGRIFT TRUST Total		45.00		
A005109	3210	2614	M & T INCORPORATED	7/17/1926	5,060.00	Butte	BUTTE CREEK
A008188	4700	2617	M & T INCORPORATED	12/1/1934	5,060.00	Butte	BUTTE CREEK
A008565	4744		M & T INCORPORATED	2/27/1936	3,074.40	Butte	BIG BUTTE CREEK

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A009735	5847		M & T INCORPORATED	9/22/1939	13,587.00	Butte	BIG BUTTE CREEK
A015866	10390	9267	M & T INCORPORATED	5/10/1954	500.00	Butte	BUTTE CREEK
			M & T INCORPORATED Total		27,281.40		
A014546	9664	5394	MCPHERRIN LAND CO	11/2/1951	6,396.80	Butte	BUTTE CREEK
A015710	14021	8676	MCPHERRIN LAND CO	6/25/1968	2,122.40	Butte	BUTTE CREEK
			MCPHERRIN LAND CO Total		8,519.20		
A019743	13039	10035	MELVIN D MYERS	9/19/1960	142.00	Lassen	BUTTE CREEK
			MELVIN D MYERS Total		142.00		
A023084	15727	10197	MICHAEL HARRIS	7/15/1968	32	Butte	LITTLE CHICO CREEK
			MICHAEL HARRIS Total		32		
A000476	271		Paradise Irrigation District	5/3/1917	9,500.00	Butte	LITTLE BUTTE CREEK
A022061	16040		Paradise Irrigation District	6/17/1970	8,800.00	Butte	LITTLE BUTTE CREEK
			Paradise Irrigation District Total		18,300.00		
A005110	3211	2615	PARROTT INVESTMENT COMPANY	7/17/1926	5,060.00	Butte	BUTTE CREEK
A008187	4699	2616	PARROTT INVESTMENT COMPANY	12/1/1934	5,060.00	Butte	BUTTE CREEK
A008559	4743		PARROTT INVESTMENT COMPANY	2/19/1936	3,074.40	Butte	BIG BUTTE CREEK
A009736	5848		PARROTT INVESTMENT COMPANY	9/22/1939	13,587.00	Butte	BIG BUTTE CREEK
A015867	10391	9268	PARROTT INVESTMENT COMPANY	5/10/1954	500.00	Butte	BUTTE CREEK
			PARROTT INVESTMENT COMPANY Total		27,281.40		
A001656	794	880	RANCHO ESQUON INC	2/5/1920	3,665.45	Butte	HAMLIN SLOUGH
A002576	1722	1027	RANCHO ESQUON INC	10/6/1921	1,832.80	Butte	BUTTE CREEK
A002805	1872	1028	RANCHO ESQUON INC	3/24/1922	3,832.10	Butte	BUTTE CREEK
A002909	2027	1029	RANCHO ESQUON INC	6/27/1922	3,014.90	Butte	BUTTE CREEK
A004663	2447	1030	RANCHO ESQUON INC	6/30/1925	4,598.48	Butte	HAMLIN SLOUGH
A022039	16039	11046	RANCHO ESQUON INC	2/5/1965	5,540.00	Butte	BUTTE CREEK
			RANCHO ESQUON INC Total		22,483.73		
A023201	16771		RECLAMATION DISTRICT #1004	12/1/1978	36,000.00	Colusa, Sutter	BUTTE CREEK, BUTTE SLOUGH
			RECLAMATION DISTRICT #1004 Total		36,000.00		
A007925	4365	1797	RECLAMATION DISTRICT #833	5/1/1934	2,217.20	Colusa	BUTTE CREEK
			RECLAMATION DISTRICT #833 Total		2,217.20		
A004989	2706	837	SIERRA PACIFIC INDUSTRIES	1/8/1965	1,831.70	Butte	WEST BRANCH BUTTE CREEK
			SIERRA PACIFIC INDUSTRIES Total		1,831.70		
A001041	542	485	STANFORD VINA RANCH IRRIGATION CO	8/5/1918	4,581.90	Tehama	DEER CREEK
			STANFORD VINA RANCH IRRIGATION CO Total		4,581.90		
A020531			STATE WATER RESOURCES CONTROL BOARD	12/19/1961	0.00	Lassen, Modoc	ASH CREEK, BUTTE CREEK, UNST, WILLOW CREEK
			STATE WATER RESOURCES CONTROL BOARD Total		0.00		
A022534	16022	10432	Stephen Meline IV	7/27/1966	1,695.00	Butte	BUTTE CREEK

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			Stephen Meline IV Total		1,695.00		
A012437	7368	3458	U S FISH & WILDLIFE SERVICE	3/25/1948	1,097.00	Colusa	BUTTE CREEK
A013540	8838	4472	U S FISH & WILDLIFE SERVICE	1/12/1950	44,162.60	Shasta, Tehama	BATTLE CREEK
A014316	9662	7053	U S FISH & WILDLIFE SERVICE	5/21/1951	590.30	Colusa	BUTTE CREEK
A017862	11615	6591	U S FISH & WILDLIFE SERVICE	10/25/1957	7,963.80	Shasta	BATTLE CREEK
A020288	13384	7993	U S FISH & WILDLIFE SERVICE	7/3/1961	21,719.30	Shasta	BATTLE CREEK, Battle Creek
A022227	15046	9561	U S FISH & WILDLIFE SERVICE	7/19/1965	14,479.60	Shasta	BATTLE CREEK, Battle Creek
			U S FISH & WILDLIFE SERVICE Total		90,012.60		
A031071	21277		U S KLAMATH NATIONAL FOREST - GOOSENEST RECLAMATION DISTRICT	6/6/2011	185.00	Siskiyou	BUTTE CREEK
			U S KLAMATH NATIONAL FOREST - GOOSENEST RECLAMATION DISTRICT Total		185.00		
			Grand Total		326,104.54		

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A017927	11586	9898	ANTHONY D CRUYSEN	12/26/1957	23.00	Shasta	CLEAR CREEK
			ANTHONY D CRUYSEN Total		23.00		
A023232	16007	10906	BENNETT FAMILY TRUST	2/6/1969	74.00	Shasta	SOUTH FORK CLEAR CREEK
			BENNETT FAMILY TRUST Total		74.00		
A016145	10125	9563	BILL GIBSON	11/18/1954	627.00	Shasta, Tehama	COTTONWOOD CREEK
			BILL GIBSON Total		627.00		
A013972	8537	4100	CALIF DEPT OF TRANSPORTATION	9/29/1950	5.80	Shasta	MIDDLE FORK COTTONWOOD CREEK
			CALIF DEPT OF TRANSPORTATION Total		5.80		
A016373D		006033D	CARPENTER FAMILY REVOCABLE TRUST	6/3/1991	167.20	Tehama	COTTONWOOD CREEK
			CARPENTER FAMILY REVOCABLE TRUST Total		167.20		
A016373C		006033C	CEVASCO ROBT CEVASCO REVOC TRUST 2/18/9	6/3/1991	45.70	Tehama	COTTONWOOD CREEK
			CEVASCO ROBT CEVASCO REVOC TRUST 2/18/9 Total		45.70		
A012074	7559	6320	CONAWAY PRESERVATION GROUP LLC	9/8/1947	3,728.93	Yolo	WILLOW SLOUGH
A026695	19372		CONAWAY PRESERVATION GROUP LLC	1/27/1981	10,000.00	Yolo	CACHE CREEK, YOLO BYPASS
			CONAWAY PRESERVATION GROUP LLC Total		13,728.93		
A027382	20308		COUNTY OF COLUSA	7/8/1982	10.00	Colusa	STONY CREEK UNDERFLOW
			COUNTY OF COLUSA Total		10.00		
A016373A		006033A	DENNIS C DIERKSEN	6/3/1991	64.10	Shasta	COTTONWOOD CREEK
			DENNIS C DIERKSEN Total		64.10		
A013764	8578	4460	DONALD KRENN	5/29/1950	18.30	Tehama	SOUTH FORK COTTONWOOD CREEK
			DONALD KRENN Total		18.30		
A024723	16873	11283	FRENCH GULCH-WHISKEYTOWN SCHOOL DISTRICT	12/11/1974	10.20	Shasta	CLEAR CREEK
			FRENCH GULCH-WHISKEYTOWN SCHOOL DISTRICT Total		10.20		
A007284	4198	2006	HAMMER FAMILY TRUST	6/8/1932	1,463.80	Tehama	SOUTH FORK COTTONWOOD CREEK
			HAMMER FAMILY TRUST Total		1,463.80		
A021223	14272	8831	HARRY A BAKER REVOCABLE TRUST	4/8/1963	2.70	Tehama	SOUTH FORK COTTONWOOD CREEK
			HARRY A BAKER REVOCABLE TRUST Total		2.70		
A030232	20993		Heart Consciousness Church, Inc.	3/8/1993	245.00	Lake	CRAZY CREEK, PUTAH CREEK, UNST
			Heart Consciousness Church, Inc. Total		245.00		
A013976	8588	6976	IGO ONO COMMUNITY SERVICE DISTRICT	10/3/1950	341.20	Shasta	COTTONWOOD CREEK
			IGO ONO COMMUNITY SERVICE DISTRICT Total		341.20		
A000334	157	153	JOSHUA L SOSKE JR	5/11/1916	24.60	Glenn, Sonoma	NORTH FORK STONY CREEK
			JOSHUA L SOSKE JR Total		24.60		
A013701	8225	4312	KENT W PFRIMMER	4/24/1950	122.20	Tehama	COTTONWOOD CREEK
			KENT W PFRIMMER Total		122.20		
A016373B		006033B	KEVIN J DEVINE	6/3/1991	41.30	Tehama	COTTONWOOD CREEK
			KEVIN J DEVINE Total		41.30		
A013110	7843	4736	LEMA 1992 TRUST	5/24/1949	219.90	Tehama	COTTONWOOD CREEK
			LEMA 1992 TRUST Total		219.90		
A023234	16005	10921	MARY ANN SMITH	2/6/1969	1.20	Shasta	SOUTH FORK CLEAR CREEK
			MARY ANN SMITH Total		1.20		
A031558			MIDDLETOWN FARM & CATTLE COMPANY	3/30/2007	434.00	Lake	HARBIN CREEK, PUTAH CREEK, UNST
			MIDDLETOWN FARM & CATTLE COMPANY Total		434.00		
A023233	16000	10540	ROBERT W ANDERSON	2/6/1969	69.00	Shasta	SOUTH FORK CLEAR CREEK

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A024785	16939	11368	ROBERT W ANDERSON	3/24/1975	2.20	Shasta	SOUTH FORK CLEAR CREEK, UNST
			ROBERT W ANDERSON Total		71.20		
A025261	17823		STONY CREEK WATER DISTRICT	2/14/1977	3,000.00	Colusa, Glenn	LITTLE STONY CREEK, STONY CREEK
			STONY CREEK WATER DISTRICT Total		3,000.00		
A020104	13490	8028	THE REVOCABLE TRUST OF ROBERT F RETZLOFF	4/27/1961	271.70	Glenn	STONY CREEK UNDERFLOW
			THE REVOCABLE TRUST OF ROBERT F RETZLOFF Total		271.70		
A019104	12653	7454	U S NATIONAL PARK SERVICE	11/24/1959	3.20	Shasta	CLEAR CREEK
			U S NATIONAL PARK SERVICE Total		3.20		
A002212	2339	2652	U.S. BUREAU OF RECLAMATION	2/17/1921	50,200.00	Glenn	STONY CREEK
A018115	13776		U.S. BUREAU OF RECLAMATION	4/30/1958	160,000.00	Contra Costa, Tehama	STONY CREEK
A017376	12364		U.S. BUREAU OF RECLAMATION	7/28/1960	1,335,371.20	Contra Costa, Shasta	CLEAR CREEK
A015424	12363	9957	U.S. BUREAU OF RECLAMATION	4/15/2002	1,230,761.80	Shasta	CLEAR CREEK
			U.S. BUREAU OF RECLAMATION Total		2,776,333.00		
A016373E		006033E	WAYNE ROCHLITZ	6/3/1991	85.00	Tehama	COTTONWOOD CREEK
			WAYNE ROCHLITZ Total		85.00		
A012994	7469	3822	WILLIAM T GRAY	3/23/1949	114.60	Shasta	COTTONWOOD CREEK
			WILLIAM T GRAY Total		114.60		
A011389	12848		YOLO COUNTY F C & W C DISTRICT	5/3/1946	431,000.00	Lake, Yolo	CACHE CREEK, NORTH FORK CACH
			YOLO COUNTY F C & W C DISTRICT Total		431,000.00		
			Grand Total		3,228,548.83		

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A011384	6629	3641	A & L AG RENTAL & LEASING INC	4/25/1946	1,094.90	Colusa	SACRAMENTO RIVER
			A & L AG RENTAL & LEASING INC Total		1,094.90		
A000657	338	237	ALICE K MARKS	4/27/1917	136.50	Sutter	SACRAMENTO RIVER
			ALICE K MARKS Total		136.50		
A001976	1243	1206	ALLEN A EHRKE	5/31/1932	158.80	Colusa	SACRAMENTO RIVER
			ALLEN A EHRKE Total		158.80		
A012469A	7267	003722A	Anna C. Byrd 1997 Trust	4/13/1948	1,598.50	Sutter	SACRAMENTO RIVER
			Anna C. Byrd 1997 Trust Total		1,598.50		
A008931	4985	3169	ARNOLD ANDREOTTI	4/1/1937	1,094.90	Colusa	SACRAMENTO RIVER
A011618	6793	3170	ARNOLD ANDREOTTI	11/14/1946	2,007.30	Colusa	SACRAMENTO RIVER
			ARNOLD ANDREOTTI Total		3,102.20		
A013454	8010	7251	ARTHUR ANDREOTTI	11/9/1949	4,927.00	Colusa	SACRAMENTO RIVER
			ARTHUR ANDREOTTI Total		4,927.00		
A012482	7399	3655	BARRY A MCCLAIN	4/23/1948	182.50	Sacramento	SACRAMENTO RIVER
			BARRY A MCCLAIN Total		182.50		
A005100	2609	989	BURTIS RANCH	7/13/1926	140.50	Sutter	SACRAMENTO RIVER
			BURTIS RANCH Total		140.50		
A010900	6375	3569	BURTON H LAUPPE	10/9/1944	1,069.10	Sutter	SACRAMENTO RIVER
			BURTON H LAUPPE Total		1,069.10		
A000186	72	1753	CACHIL DEHE BAND OF WINTUN INDIANS OF	11/22/1915	3,198.40	Colusa	SACRAMENTO RIVER
			CACHIL DEHE BAND OF WINTUN INDIANS OF Total		3,198.40		
A014445A	16481		CALIF DEPT OF WATER RESOURCES	8/25/1951	1,575,212.40	Contra Costa, Sacramento	ITALIAN SLOUGH, SACRAMENTO RIVER DELTA CHANNELS
A017512	16482		CALIF DEPT OF WATER RESOURCES	3/15/1957	1,100,000.00	Madera, Merced, Sacramento	ITALIAN SLOUGH, SACRAMENTO RIVER DELTA CHANNELS, SAN LUIS CREEK
			CALIF DEPT OF WATER RESOURCES Total		2,675,212.40		
A014682	9061	6380	CARTER FAMILY TRUST & CARTER FAMILY MARTIAL TRUST	2/15/1952	2,498.20	Colusa	SACRAMENTO RIVER
			CARTER FAMILY TRUST & CARTER FAMILY MARTIAL TRUST Total		2,498.20		
A000230B	204	001788B	CHARLES W SEAVER	1/10/1916	1,568.10	Colusa	SACRAMENTO RIVER
			CHARLES W SEAVER Total		1,568.10		
A001179	609	1478	CHARLES W TUTTLE JR	2/15/1919	4,169.50	Colusa	SACRAMENTO RIVER
			CHARLES W TUTTLE JR Total		4,169.50		
A006716	3630	1849	CITY OF REDDING	6/30/1930	53.70	Shasta	SACRAMENTO RIVER
A008884	5163	2640	CITY OF REDDING	1/26/1937	3,619.90	Shasta	SACRAMENTO RIVER
A010320	5921	2736	CITY OF REDDING	11/18/1941	325.80	Shasta	SACRAMENTO RIVER

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A015197	9821	5677	CITY OF REDDING	2/16/1953	211.70	Shasta	SACRAMENTO RIVER
			CITY OF REDDING Total		4,211.10		
A001743	992		CITY OF SACRAMENTO	10/30/2000	81,800.00	Sacramento	SACRAMENTO RIVER
			CITY OF SACRAMENTO Total		81,800.00		
A025616	18150		CITY OF WEST SACRAMENTO	12/22/1977	18,350.00	Yolo	SACRAMENTO RIVER
			CITY OF WEST SACRAMENTO Total		18,350.00		
A010363	5952	3585	COLUSA DRAIN MUTUAL WATER COMPANY	1/16/1942	5,668.10	Glenn	SACRAMENTO RIVER
A016305	14595	12087	COLUSA DRAIN MUTUAL WATER COMPANY	4/7/1955	3,660.00	Yolo	SACRAMENTO RIVER
			COLUSA DRAIN MUTUAL WATER COMPANY Total		9,328.10		
A015452	9647	7332	COLUSA PROPERTIES INC	8/6/1953	2,032.70	Colusa	SACRAMENTO RIVER
			COLUSA PROPERTIES INC Total		2,032.70		
A001199	614	904	CONAWAY PRESERVATION GROUP LLC	3/1/1919	43,557.70	Yolo	SACRAMENTO RIVER
A001588	792	905	CONAWAY PRESERVATION GROUP LLC	4/18/1930	5,354.00	Yolo	SACRAMENTO RIVER
A012073	7234	5487	CONAWAY PRESERVATION GROUP LLC	9/8/1947	70,143.50	Yolo	SACRAMENTO RIVER
			CONAWAY PRESERVATION GROUP LLC Total		119,055.20		
A001061	513	1062	COUNTY OF SACRAMENTO	6/6/1931	2,715.30	Sacramento	SACRAMENTO RIVER
A014494	8921	4060	COUNTY OF SACRAMENTO	8/19/1982	479.60	Sacramento	SACRAMENTO RIVER
			COUNTY OF SACRAMENTO Total		3,194.90		
A017210	13872	9926	Cranmore Farms LLC	8/6/1956	100.00	Sutter	SACRAMENTO RIVER
			Cranmore Farms LLC Total		100.00		
A004376	2021	1241	DANIEL A SERPA REV TRUST	12/15/1932	116.10	Sacramento	SACRAMENTO RIVER
			DANIEL A SERPA REV TRUST Total		116.10		
A017134	10734	6192	DIAMOND LANDS CORPORATION	6/14/1956	650.00	Tehama	SACRAMENTO RIVER
			DIAMOND LANDS CORPORATION Total		650.00		
A016199	13860	8205	DIANNE E BUTLER	9/7/1967	721.60	Colusa, Sutter	SACRAMENTO RIVER
			DIANNE E BUTLER Total		721.60		
A012469B	7267	003722B	DOLORES AZEVEDO	4/13/1948	91.20	Sutter	SACRAMENTO RIVER
			DOLORES AZEVEDO Total		91.20		
A005993	3112	2393	DONNA L REED	3/19/1942	857.70	Yolo	SACRAMENTO RIVER
			DONNA L REED Total		857.70		
A014314	8782	5080	DRISCOLL STRAWBERRY ASSOCIATES	5/21/1951	240.90	Tehama	SACRAMENTO RIVER
			DRISCOLL STRAWBERRY ASSOCIATES Total		240.90		
A007641A	4215	006389A	E D WILLEY & SON INC	8/4/1933	9,582.70	Sutter	SACRAMENTO RIVER

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			E D WILLEY & SON INC Total		9,582.70		
A011274	6725	3527	EASTSIDE MUTUAL WATER COMPANY	2/4/1946	5,474.50	Colusa	SACRAMENTO RIVER
			EASTSIDE MUTUAL WATER COMPANY Total		5,474.50		
A013796	8337	4758	ELLIS FAMILY TRUST	6/16/1950	580.40	Sutter	SACRAMENTO RIVER
			ELLIS FAMILY TRUST Total		580.40		
A005916	3066	1994	EMERY BURKE POUNDSTONE	5/16/1928	2,717.70	Colusa	SACRAMENTO RIVER
A009987	5664	2763	EMERY BURKE POUNDSTONE	8/22/1940	2,788.40	Colusa	SACRAMENTO RIVER
			EMERY BURKE POUNDSTONE Total		5,506.10		
A006672	3588	10019	Erdman Family Trust	5/8/1930	1,400.00	Colusa	SACRAMENTO RIVER
			Erdman Family Trust Total		1,400.00		
A017150	13871	10221	Faraz A Saeed	6/25/1956	997.00	Yolo	SACRAMENTO RIVER
			Faraz A Saeed Total		997.00		
A009032	5004	3674	FEDORA FARMS INC	7/8/1937	547.50	Colusa, Sutter	SACRAMENTO RIVER
A013511	8061	3675	FEDORA FARMS INC	12/15/1949	328.50	Colusa, Sutter	SACRAMENTO RIVER
A013512	8062	3676	FEDORA FARMS INC	12/15/1949	587.60	Colusa, Sutter	SACRAMENTO RIVER
			FEDORA FARMS INC Total		1,463.60		
A006670	3654	1516	Frank J. O'Brien Family Trust	5/6/1930	1,681.40	Sutter	SACRAMENTO RIVER
			Frank J. O'Brien Family Trust Total		1,681.40		
A014584	9188	5432	FRANK LAMB TRUST	11/20/1951	1,527.30	Sutter	SACRAMENTO RIVER
			FRANK LAMB TRUST Total		1,527.30		
A013487	7835	7216	GARY J RUMIANO	11/29/1949	726.00	Tehama	SACRAMENTO RIVER
			GARY J RUMIANO Total		726.00		
A000018	29	2871	GLENN-COLUSA IRRIGATION DISTRICT	5/3/2006	53,673.00	Yuba	SACRAMENTO RIVER
A001554	796	7208	GLENN-COLUSA IRRIGATION DISTRICT	12/3/1919	28,078.20	Glenn	SACRAMENTO RIVER
A001624	797	7209	GLENN-COLUSA IRRIGATION DISTRICT	1/14/1920	10,793.60	Glenn	SACRAMENTO RIVER
A008688	4795	5387	GLENN-COLUSA IRRIGATION DISTRICT	5/28/1936	674.38	Colusa	HUNTERS CREEK
A012125	8272	4340	GLENN-COLUSA IRRIGATION DISTRICT	10/8/1947	3,360.00	Colusa	STONE CORRAL CREEK
A023005	15687	10635	GLENN-COLUSA IRRIGATION DISTRICT	3/12/1968	415.00	Colusa	UNST
A030838	21101		GLENN-COLUSA IRRIGATION DISTRICT	2/18/1999	182,900.00	Glenn	SACRAMENTO RIVER
			GLENN-COLUSA IRRIGATION DISTRICT Total		279,894.18		
A001653	1248	439	GREEN VALLEY CORPORATION A CA CORP	2/5/1920	2,106.70	Colusa	SACRAMENTO RIVER
			GREEN VALLEY CORPORATION A CA CORP Total		2,106.70		
A011281	7288	5261	HAMMOND RESERVOIR IRRIGATION ASSN	2/11/1946	5,742.20	Siskiyou	NORTH FORK SACRAMENTO RIVER
A016219	10679	6531	HAMMOND RESERVOIR IRRIGATION ASSN	1/26/1955	348.00	Siskiyou	NORTH FORK SACRAMENTO RIVER
			HAMMOND RESERVOIR IRRIGATION ASSN Total		6,090.20		
A006696	3589	3566	HAROLD ARMSTRONG	6/12/1930	1,885.10	Colusa	SACRAMENTO RIVER
			HAROLD ARMSTRONG Total		1,885.10		
A003466	1552	646	Heidrick & Heidrick Properties LP	6/5/1923	345.20	Sutter	SACRAMENTO RIVER
			Heidrick & Heidrick Properties LP Total		345.20		

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A018154	14510	8798	HEIDRICK & MCGINNIS PROP LP	1/2/1969	484.00	Sutter	SACRAMENTO RIVER
			HEIDRICK & MCGINNIS PROP LP Total		484.00		
A006146	3234	1484	HENLE FAMILY LIMITED PARTNERSHIP	12/27/1928	3,503.70	Sutter	SACRAMENTO RIVER
			HENLE FAMILY LIMITED PARTNERSHIP Total		3,503.70		
A006418A		001799A	HENRY D RICHTER JR	6/20/1991	3,178.80	Sutter	SACRAMENTO RIVER
A013646	8156	7218	HENRY D RICHTER JR	3/22/1950	239.80	Yolo	SACRAMENTO RIVER
			HENRY D RICHTER JR Total		3,418.60		
A016361A	013861A		HERSHEY LAND COMPANY ROW CROP LLC	6/10/2002	4,195.00	Sutter, Yolo	COLUSA BASIN DRAINAGE CANAL, SACRAMENTO RIVER
			HERSHEY LAND COMPANY ROW CROP LLC Total		4,195.00		
A001765B	1111	000613B	HIATT DOWNER RANCH LLC	4/9/1920	1,697.90	Sutter	SACRAMENTO RIVER
A003290B		002627B	HIATT DOWNER RANCH LLC	7/27/1990	1,184.30	Sutter	SACRAMENTO RIVER
			HIATT DOWNER RANCH LLC Total		2,882.20		
A001617	1888	1407	JACK W BABER	3/20/1934	1,959.90	Colusa	SACRAMENTO RIVER
			JACK W BABER Total		1,959.90		
A002317A	1259	001130A	JAMES T MUNSON	2/4/1980	82.50	Sutter	SACRAMENTO RIVER
			JAMES T MUNSON Total		82.50		
A012899	7681	3766	JOHN ZUPPAN	1/13/1949	275.20	Butte, Tehama	SACRAMENTO RIVER
A014447	8840	8011	JOHN ZUPPAN	8/27/1951	575.70	Tehama	SACRAMENTO RIVER
			JOHN ZUPPAN Total		850.90		
A017537	11071	5955	JOHN AND JANE FITZGERALD FAMILY REVOCABLE TRUST	4/2/1957	109.50	Sutter	OLD CHANNEL SACRAMENTO RIVER
			JOHN AND JANE FITZGERALD FAMILY REVOCABLE TRUST Total		109.50		
A003994	1850	651	Johnathan Tucker	1/13/1928	76.40	Glenn	SACRAMENTO RIVER
			Johnathan Tucker Total		76.40		
A007308	3980	1949	Joseph Alamo	6/29/1932	2,622.70	Colusa	SACRAMENTO RIVER
			Joseph Alamo Total		2,622.70		
A006418B		001799B	KENNETH L WALLACE	6/20/1991	1,127.70	Sutter	SACRAMENTO RIVER
A014728	9002	4951	KENNETH L WALLACE	3/24/1952	160.60	Sutter	SACRAMENTO RIVER
			KENNETH L WALLACE Total		1,288.30		
A014520	8928	5112	KENNETH R PYLMAN	10/15/1951	146.00	Yolo	SACRAMENTO RIVER
			KENNETH R PYLMAN Total		146.00		
A004364	2227	981	Knights Landing Investors LLC	12/13/1924	3,537.60	Sutter, Yolo	SACRAMENTO RIVER
			Knights Landing Investors LLC Total		3,537.60		
A006454	3388	1469	KRAMER RANCH	10/8/1929	474.50	Yolo	SACRAMENTO RIVER
			KRAMER RANCH Total		474.50		
A013667B	8303	11188	LAKE CALIFORNIA PROPERTY OWNERS ASSN INC	3/26/1982	1,220.00	Tehama	SACRAMENTO RIVER
A023140	16056	11186	LAKE CALIFORNIA PROPERTY OWNERS ASSN INC	9/23/1968	985.00	Tehama	SACRAMENTO RIVER
			LAKE CALIFORNIA PROPERTY OWNERS ASSN INC Total		2,205.00		
A004501	2285	1728	LAWRENCE SCHNEIDER AND RUTH SCHNEIDER FAMILY REV TRUST	4/19/1937	73.40	Yolo	SACRAMENTO RIVER
A012803	7563	4098	LAWRENCE SCHNEIDER AND RUTH SCHNEIDER FAMILY REV TRUST	11/17/1948	110.90	Yolo	SACRAMENTO RIVER
			LAWRENCE SCHNEIDER AND RUTH SCHNEIDER FAMILY REV TRUST Total		184.30		

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A000882A	429	001205A	LEE W RICHTER	12/30/1982	336.90	Sutter	SACRAMENTO RIVER
			LEE W RICHTER Total		336.90		
A001074A	591	004676A	LOMO COLD STORAGE A CAL GEN PARTNERSHIP	9/10/1918	1,951.80	Sutter	SACRAMENTO RIVER
A004613	2347	940	LOMO COLD STORAGE A CAL GEN PARTNERSHIP	11/28/1955	212.20	Sutter	SACRAMENTO RIVER
A004699	2364	1154	LOMO COLD STORAGE A CAL GEN PARTNERSHIP	3/21/1932	670.40	Sutter	SACRAMENTO RIVER
A006486	3615	4168	LOMO COLD STORAGE A CAL GEN PARTNERSHIP	11/14/1929	20,255.50	Sutter	SACRAMENTO RIVER
			LOMO COLD STORAGE A CAL GEN PARTNERSHIP Total		23,089.90		
A007232	3903	1651	LORNA KELSO	4/7/1932	64.10	Yolo	SACRAMENTO RIVER
			LORNA KELSO Total		64.10		
A003700	1633	1458	LOUISE A MARTIN-KOBELLAS	10/31/1923	558.70	Sutter	SACRAMENTO RIVER
			LOUISE A MARTIN-KOBELLAS Total		558.70		
A002707	1162	1729	M & H REALTY PARTNERS VI L P	12/29/1921	305.50	Sacramento	SACRAMENTO RIVER
			M & H REALTY PARTNERS VI L P Total		305.50		
A008213	4516	2618	M & T INCORPORATED	1/15/1935	1,450.00	Butte	SACRAMENTO RIVER
			M & T INCORPORATED Total		1,450.00		
A007641D2		006389D2	MARIA JOHN NICHOLAS KELLY RANCH LLC	1/5/2001	761.00	Sutter	SACRAMENTO RIVER
			MARIA JOHN NICHOLAS KELLY RANCH LLC Total		761.00		
A012120	7127	4666	MARIETTE B HOLLINS	10/7/1947	387.80	Colusa	SACRAMENTO RIVER
			MARIETTE B HOLLINS Total		387.80		
A008631	5128	7210	MAXWELL IRRIGATION DISTRICT	4/8/1936	28,990.80	Colusa	SACRAMENTO RIVER
A030445	21004		MAXWELL IRRIGATION DISTRICT	2/17/1995	13,630.00	Colusa	COLUSA BASIN DRAIN, LURLINE CREEK, SACRAMENTO RIVER, STONE CORRAL CREEK
A011956	8266	4586	MAXWELL IRRIGATION DISTRICT	6/24/1947	2,596.36	Colusa	RECLAMATION DISTRICT 2047 MAIN DRAIN
A014378	8808	4523	MAXWELL IRRIGATION DISTRICT	6/28/1951	1,636.36	Colusa	LATERAL DRAIN OF RECLAMATIN DISTRICT 2047
A011955	8265	4643	MAXWELL IRRIGATION DISTRICT	6/24/1957	4,720.66	Colusa	RECLAMATION DISTRICT 2047 MAIN DRAIN
A011597	8267	4644	MAXWELL IRRIGATION DISTRICT	6/24/1957	22,085.95	Colusa	LOGAN AND HUNTER CREEK, AND RECLAMATION DISTRICT 2047 MAIN DRAIN CANAL
A011958	8268	4694	MAXWELL IRRIGATION DISTRICT	6/24/1957	5,226.45	Colusa	STONE CORRAL CREEK
A013919	9042	5692	MAXWELL IRRIGATION DISTRICT	8/25/1950	4,946.78	Colusa	LURLINE CREEK
A030445	21004		MAXWELL IRRIGATION DISTRICT	5/30/1995	13,630.00	Colusa	SACRAMENTO RIVER, COLUSA BASIN DRAIN, STONE CORRAL CREEK, LURLINE CREEK
			MAXWELL IRRIGATION DISTRICT Total		97,463.36		
A015150	9391	4775	MCM PROPERTIES, A CALIF CORP	1/12/1953	1,094.90	Sutter	SACRAMENTO RIVER
A015152	9393	4776	MCM PROPERTIES, A CALIF CORP	1/12/1953	474.50	Sutter	SACRAMENTO RIVER
			MCM PROPERTIES, A CALIF CORP Total		1,569.40		

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A001074B	591	004676B	MERIDIAN FARMS WATER CO	9/10/1918	67,335.90	Sutter	SACRAMENTO RIVER
			MERIDIAN FARMS WATER CO Total		67,335.90		
A007641B	4215	006389B	MERILYN C SCHEIDEL	8/4/1933	3,484.60	Sutter	SACRAMENTO RIVER
			MERILYN C SCHEIDEL Total		3,484.60		
A004355A		002881A	MICHAEL E LONON	6/9/2000	822.00	Sutter	SACRAMENTO RIVER
			MICHAEL E LONON Total		822.00		
A007598	4220	1693	MILDRED HEIDRICK	6/23/1933	447.70	Yolo	SACRAMENTO RIVER
			MILDRED HEIDRICK Total		447.70		
A015811	9814	5407	Moore Bros.	3/31/1954	794.20	Colusa	SACRAMENTO RIVER
			Moore Bros. Total		794.20		
A004367	2012	1394	Narusuke Monguchi	12/15/1924	161.50	Yolo	SACRAMENTO RIVER UNDERFLOW
			Narusuke Monguchi Total		161.50		
A000534	247	1050	NATOMAS CENTRAL MUTUAL WATER CO	5/28/1931	15,394.20	Sacramento, Sutter	NATOMAS CROSS CANAL, SACRAMENTO RIVER
A001056	511	2814	NATOMAS CENTRAL MUTUAL WATER CO	8/22/1918	16,205.20	Sacramento, Sutter	NATOMAS CROSS CANAL, SACRAMENTO RIVER
A001203	580	3109	NATOMAS CENTRAL MUTUAL WATER CO	3/5/1919	58,394.20	Sacramento, Sutter	NATOMAS CROSS CANAL, SACRAMENTO RIVER
A001413	1129	3110	NATOMAS CENTRAL MUTUAL WATER CO	8/27/1919	36,655.10	Sacramento, Sutter	NATOMAS CROSS CANAL, SACRAMENTO RIVER
A015572	15150	9794	NATOMAS CENTRAL MUTUAL WATER CO	10/8/1953	11,846.00	Sacramento, Sutter	NATOMAS CROSS CANAL, SACRAMENTO RIVER
A022309	15314	9989	NATOMAS CENTRAL MUTUAL WATER CO	10/8/1965	2,627.00	Sacramento, Sutter	RECLAMATION DISTRICT 1000 EAST DRAIN, RECLAMATIN DISTRICT 1000 WEST DRAIN, RECLAMATION DISTRICT 1000 MAIN DRAIN
A025727	19400		NATOMAS CENTRAL MUTUAL WATER CO	2/7/1985	10,000.00	Sacramento, Sutter	NATOMAS CROSS CANAL, RD 1000 EAST DRAIN, RD 1000 MAIN DRAIN, RD 1000 WEST DRAIN, SACRAMENTO RIVER
			NATOMAS CENTRAL MUTUAL WATER CO Total		151,121.70		
A007641D1		006389D1	NICOLI G NICHOLAS	1/5/2001	761.00	Sutter	SACRAMENTO RIVER
			NICOLI G NICHOLAS Total		761.00		
A000880B	418	002820B	OJI BROTHERS, A CO-PARTNERSHIP	3/6/1946	636.60	Sutter	SACRAMENTO RIVER
A000880C	418	002820C	OJI BROTHERS, A CO-PARTNERSHIP	1/3/1918	1,880.70	Sutter	SACRAMENTO RIVER
A003290A		002627A	OJI BROTHERS, A CO-PARTNERSHIP	7/27/1990	3,985.80	Sutter	SACRAMENTO RIVER
A010951	6377	3242	OJI BROTHERS, A CO-PARTNERSHIP	1/11/1945	2,854.00	Sutter	SACRAMENTO RIVER
A013590	8137	3835	OJI BROTHERS, A CO-PARTNERSHIP	2/20/1950	1,047.50	Sutter	SACRAMENTO RIVER
			OJI BROTHERS, A CO-PARTNERSHIP Total		10,404.60		
A001765A	1111	000613A	PELGER MUTUAL WATER COMPANY	3/13/1972	1,697.90	Sutter	SACRAMENTO RIVER
A012470B	007268B	008547B	PELGER MUTUAL WATER COMPANY	4/13/1948	22,815.20	Sutter	SACRAMENTO RIVER

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A030410	20933		PELGER MUTUAL WATER COMPANY	9/16/1994	5,000.00	Sutter	SACRAMENTO RIVER
			PELGER MUTUAL WATER COMPANY Total		29,513.10		
A000882B	429	001205B	PHIL KNOX LEISER TRUST	12/30/1982	307.10	Sutter	SACRAMENTO RIVER
			PHIL KNOX LEISER TRUST Total		307.10		
A000244	463	2646	PRINCETON-CODORA-GLENN IRRIGATION DISTRICT	12/17/2001	50,936.30	Glenn	SACRAMENTO RIVER
A000770	464	4161	PRINCETON-CODORA-GLENN IRRIGATION DISTRICT	12/17/2001	20,936.30	Glenn	SACRAMENTO RIVER
A017066	13869	8989	PRINCETON-CODORA-GLENN IRRIGATION DISTRICT	5/2/1956	15,074.38	Colusa, Glenn	COLUSA BASIN DRAIN
A030812	21132		PRINCETON-CODORA-GLENN IRRIGATION DISTRICT	11/19/1998	24,370.00	Colusa, Glenn	COLUSA BASIN DRAIN, SACRAMENTO RIVER
			PRINCETON-CODORA-GLENN IRRIGATION DISTRICT Total		111,316.98		
A000462	303	7205	PROVIDENT IRRIGATION DISTRICT	2/27/2001	88,000.00	Glenn	COLUSA DRAIN, DRAIN NO 13, DRAIN NO 55, SACRAMENTO RIVER, UNDR, WILLOW CREEK
A000640	304	7206	PROVIDENT IRRIGATION DISTRICT	2/27/2001	36,496.00	Glenn	COLUSA DRAIN, DRAIN NO 13, DRAIN NO 55, SACRAMENTO RIVER, UNDR, WILLOW CREEK
A000892	416	7207	PROVIDENT IRRIGATION DISTRICT	1/18/1918	40,146.00	Glenn	COLUSA DRAIN, DRAIN 13, DRAIN NO 55, SACRAMENTO RIVER, UNDR, WILLOW CREEK
A001422	847	1109	PROVIDENT IRRIGATION DISTRICT	9/2/1919	3,371.90	Glenn	COLUSA DRAIN
A030813	21133		PROVIDENT IRRIGATION DISTRICT	11/19/1998	26,747.00	Glenn	COLUSA BASIN DRAIN, DRAIN NO 13, DRAIN NO 55, SACRAMENTO RIVER, UNDR, WILLOWS CREEK
			PROVIDENT IRRIGATION DISTRICT Total		194,760.90		
A004226	2024	2790	PURHIRAN FARMS LLC	6/28/1945	525.40	Yolo	SACRAMENTO RIVER
			PURHIRAN FARMS LLC Total		525.40		
A018062	14507	8795	QUAD H RANCHES, INC	1/2/1969	307.70	Sutter	SACRAMENTO RIVER
			QUAD H RANCHES, INC Total		307.70		
A004372	2017	1393	R W ROSE	12/15/1924	80.70	Yolo	SACRAMENTO RIVER
			R W ROSE Total		80.70		
A010408	6118	2966	RALPH BECKLEY	3/18/1942	549.30	Colusa	SACRAMENTO RIVER
			RALPH BECKLEY Total		549.30		
A004355B		002881B	RAY E AND JANICE R ANDERSON FAMILY TRUST	6/9/2000	286.40	Sutter	SACRAMENTO RIVER
			RAY E AND JANICE R ANDERSON FAMILY TRUST Total		286.40		
A015151	9392	5596	Rebekah Leiser	1/12/1953	36.70	Sutter	SACRAMENTO RIVER
			Rebekah Leiser Total		36.70		
A000027	31	3165	RECLAMATION DISTRICT #1004	4/2/1915	56,000.00	Colusa, Glenn	SACRAMENTO RIVER
A023201	16771		RECLAMATION DISTRICT #1004	12/26/1968	21,000.00	Colusa	

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			RECLAMATION DISTRICT #1004 Total		77,000.00		
A000576	315	3065	RECLAMATION DISTRICT #108	1/25/1917	97,469.20	Colusa, Yolo	SACRAMENTO RIVER
A000763	388	3066	RECLAMATION DISTRICT #108	8/27/1917	270,747.80	Colusa, Yolo	SACRAMENTO RIVER
A001589	1885	3067	RECLAMATION DISTRICT #108	2/24/1950	77,968.40	Colusa, Yolo	SACRAMENTO RIVER
A011899	8251	7060	RECLAMATION DISTRICT #108	5/26/1947	27,371.90	Colusa	BACK LEVEE BORROW PIT OF RECLAMATION DISTRICTC NO. 108 (COLUSA BASIN DRAIN)
A031436	21274		RECLAMATION DISTRICT #108	10/18/2010	36,000.00	Colusa	SACRAMENTO RIVER
			RECLAMATION DISTRICT #108 Total		509,557.30		
A001666	884	1301	RECLAMATION DISTRICT #999	2/11/1920	58,394.20	Solano, Yolo	ELK SLOUGH, MINER SLOUGH, SACRAMENTO RIVER, SACRAMENTO RIVER DEEP WATER SHIP CHANNEL, SUTTER SLOUGH
A004099	1890	1302	RECLAMATION DISTRICT #999	4/1/1966	1,472.30	Yolo	SACRAMENTO RIVER DEEP WATER SHIP CHANNEL
A004100	1891	1303	RECLAMATION DISTRICT #999	4/1/1966	34,174.80	Solano, Yolo	ELK SLOUGH, MINER SLOUGH, SACRAMENTO RIVER, SACRAMENTO RIVER DEEP WATER SHIP CHANNEL, SUTTER SLOUGH
A004101	1892	1304	RECLAMATION DISTRICT #999	7/18/1924	3,909.90	Yolo	SACRAMENTO RIVER, SACRAMENTO RIVER DEEP WATER SHIP CHANNEL
			RECLAMATION DISTRICT #999 Total		97,951.20		
A020087	13942	9643	RICHARD SWIERSTRA	4/17/1961	45.10	Tehama	SACRAMENTO RIVER
			RICHARD SWIERSTRA Total		45.10		
A018061	14506	8794	RICHARD & SANDRA GIUSTI FAMILY TRUST DATED 8/13/90	1/2/1969	307.70	Sutter	SACRAMENTO RIVER
			RICHARD & SANDRA GIUSTI FAMILY TRUST DATED 8/13/90 Total		307.70		
A000575	314	1718	RIVER GARDEN FARMS COMPANY	1/25/1917	15,550.60	Yolo	SACRAMENTO RIVER
A000577	316	3123	RIVER GARDEN FARMS COMPANY	1/25/1917	13,745.70	Yolo	SACRAMENTO RIVER
A011910	8258	4636	RIVER GARDEN FARMS COMPANY	5/29/1947	6,331.24	Yolo	KNIGHTS LANDING RIDGE CUT, SACRAMENTO RIVER
			RIVER GARDEN FARMS COMPANY Total		35,627.54		
A013239	7849	5140	RIVER MAID LAND LTD	7/19/1949	63.40	Sacramento	SACRAMENTO RIVER
			RIVER MAID LAND LTD Total		63.40		
A007641C	4215	006389C	RIVER RANCH PARTNERSHIP	8/4/1933	2,795.00	Sutter	SACRAMENTO RIVER
			RIVER RANCH PARTNERSHIP Total		2,795.00		
A002317C	1259	001130C	ROBERTA SCHREINER	2/4/1980	36.70	Sutter	SACRAMENTO RIVER
			ROBERTA SCHREINER Total		36.70		
A003201	2172	1060	ROGER L MATTEOLI	12/27/1922	131.40	Yolo	SACRAMENTO RIVER

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			ROGER L MATTEOLI Total		131.40		
A014836	9153	5437	SACRAMENTO & SAN JOAQUIN DRAINAGE DISTRICT	6/2/1952	277.70	Sutter	SACRAMENTO RIVER
			SACRAMENTO & SAN JOAQUIN DRAINAGE DISTRICT Total		277.70		
A030454	21209		SACRAMENTO COUNTY WATER AGENCY	2/15/2008	71,000.00	Sacramento	SACRAMENTO RIVER
			SACRAMENTO COUNTY WATER AGENCY Total		71,000.00		
A003423	1646	9994	SACRAMENTO RIVER RANCH II LLC	5/17/1923	2,646.00	Yolo	KNIGHTS LANDING RIDGE CUT, SACRAMENTO RIVER
A004901	2514	9995	SACRAMENTO RIVER RANCH II LLC	3/1/1973	9,338.30	Yolo	KNIGHTS LANDING RIDGE CUT, SACRAMENTO RIVER
A004902	2515	9996	SACRAMENTO RIVER RANCH II LLC	3/1/1973	3,446.70	Yolo	KNIGHTS LANDING RIDGE CUT, SACRAMENTO RIVER
A005359	2811	9997	SACRAMENTO RIVER RANCH II LLC	2/17/1927	1,808.20	Yolo	KNIGHTS LANDING RIDGE CUT, SACRAMENTO RIVER
			SACRAMENTO RIVER RANCH II LLC Total		17,239.20		
A004351	2098	1200	SACRAMENTO RIVER RANCH LLC	12/4/1924	113.00	Sutter, Yolo	SACRAMENTO RIVER
			SACRAMENTO RIVER RANCH LLC Total		113.00		
A001060	512	1187	SIDDIQUI FAMILY PARTNERSHIP	8/28/1918	98.50	Sacramento	SACRAMENTO RIVER
A001094	518	570	SIDDIQUI FAMILY PARTNERSHIP	9/26/1918	1,198.70	Sacramento	SACRAMENTO RIVER
			SIDDIQUI FAMILY PARTNERSHIP Total		1,297.20		
A003200	2171	1653	SIOUX CREEK PROPERTY LLC	12/27/1922	351.30	Sutter	SACRAMENTO RIVER
A005696	2931	1157	SIOUX CREEK PROPERTY LLC	9/16/1927	311.60	Sutter	SACRAMENTO RIVER
			SIOUX CREEK PROPERTY LLC Total		662.90		
A022503	15151	9726	SISKIYOU COUNTY F C & W C D	6/22/1966	26,000.00	Siskiyou	SACRAMENTO RIVER
A023016	15992		SISKIYOU COUNTY F C & W C D	4/3/1968	14.00	Siskiyou	SCOTT CAMP CREEK
A024354	18371	12062	SISKIYOU COUNTY F C & W C D	6/20/1986	25.00	Siskiyou	LITTLE CASTLE CREEK
			SISKIYOU COUNTY F C & W C D Total		26,039.00		
A013658	8302	6169	SMITH RANCHES AND WOOD ORCHARD	3/29/1950	478.10	Tehama	SACRAMENTO RIVER
			SMITH RANCHES AND WOOD ORCHARD Total		478.10		
A006726	3621	4541	STEVE TARKE	7/10/1930	1,824.80	Sutter	SACRAMENTO RIVER
A011450	6726	4542	STEVE TARKE	6/27/1946	2,919.70	Sutter	SACRAMENTO RIVER
			STEVE TARKE Total		4,744.50		
A000230A	204	001788A	STEVEN J RUDEK	1/10/1916	484.00	Colusa	SACRAMENTO RIVER
A014205	8767	4390	STEVEN J RUDEK	3/20/1951	1,277.40	Colusa	SACRAMENTO RIVER
			STEVEN J RUDEK Total		1,761.40		
A005160B	002649B	001183B	SUTTER BASIN GROWERS COOPERATIVE	8/18/1926	182.50	Sutter	SACRAMENTO RIVER
			SUTTER BASIN GROWERS COOPERATIVE Total		182.50		
A000581	287	2817	SUTTER MUTUAL WATER COMPANY	2/1/1917	21,868.10	Sutter	SACRAMENTO RIVER
A000878	419	2818	SUTTER MUTUAL WATER COMPANY	1/3/1918	56,721.00	Sutter	SACRAMENTO RIVER
A000879	420	2819	SUTTER MUTUAL WATER COMPANY	1/3/1918	12,270.40	Sutter	SACRAMENTO RIVER
A000880A	418	002820A	SUTTER MUTUAL WATER COMPANY	1/3/1918	196,725.30	Sutter	SACRAMENTO RIVER
A001160	569	2822	SUTTER MUTUAL WATER COMPANY	1/24/1919	19,681.30	Sutter	SACRAMENTO RIVER
A001758	1103	552	SUTTER MUTUAL WATER COMPANY	4/9/1920	636.70	Sutter	SACRAMENTO RIVER

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A001763	1108	1110	SUTTER MUTUAL WATER COMPANY	4/9/1920	916.40	Sutter	SACRAMENTO RIVER
A001769	1117	547	SUTTER MUTUAL WATER COMPANY	6/22/1926	3,255.10	Sutter	SACRAMENTO RIVER
A001772	1120	657	SUTTER MUTUAL WATER COMPANY	1/31/1928	94.70	Sutter	SACRAMENTO RIVER
A003195	2169	882	SUTTER MUTUAL WATER COMPANY	11/30/1929	585.80	Sutter	SACRAMENTO RIVER
A007886	4354	2240	SUTTER MUTUAL WATER COMPANY	3/29/1934	3,121.60	Sutter	SACRAMENTO RIVER
A009760	5510	2821	SUTTER MUTUAL WATER COMPANY	11/3/1939	180,994.40	Sutter	SACRAMENTO RIVER
A010658	6189	2823	SUTTER MUTUAL WATER COMPANY	6/16/1943	3,654.40	Sutter	SACRAMENTO RIVER
A011953	7194	4562	SUTTER MUTUAL WATER COMPANY	6/23/1947	2,737.20	Sutter	SACRAMENTO RIVER, WEST BORROW PIT SUTTER BYPASS
A012470A	007268A	008547A	SUTTER MUTUAL WATER COMPANY	4/13/1948	15,309.70	Sutter	SACRAMENTO RIVER
A016677	13867	8220	SUTTER MUTUAL WATER COMPANY	9/7/1967	2,038.10	Sutter	SACRAMENTO RIVER
			SUTTER MUTUAL WATER COMPANY Total		520,610.20		
A013667A	8303	11187	SUZANNE GOELET	3/26/1982	410.00	Tehama	SACRAMENTO RIVER
			SUZANNE GOELET Total		410.00		
A001659	1981	8129	Sycamore Mutual Water Company	2/9/1920	42,521.20	Colusa	SACRAMENTO RIVER
A012412	8277	4056	Sycamore Mutual Water Company	3/17/1948	2,189.75	Colusa	R D 2047 MAIN CANAL
A013000	8285	5796	Sycamore Mutual Water Company	3/25/1949	1,824.79	Colusa	R D 2047 MAIN CANAL
A013001	8285	7062	Sycamore Mutual Water Company	3/25/1949	98.54	Colusa	R D 2047 MAIN CANAL
A013002	8285	4057	Sycamore Mutual Water Company	3/25/1949	364.96	Colusa	R D 2047 MAIN CANAL
A018372	14514	9977	Sycamore Mutual Water Company	12/22/1972	1,013.00	Colusa	SACRAMENTO RIVER
			Sycamore Mutual Water Company Total		48,012.24		
A014789	9069	7219	THOMAS L NELSON & HAZEL M NELSON TRUST	5/1/1952	656.70	Sutter	SACRAMENTO RIVER
			THOMAS L NELSON & HAZEL M NELSON TRUST Total		656.70		
A007641D3		006389D3	THOMAS S ATKINSON II	1/5/2001	761.00	Sutter	SACRAMENTO RIVER
			THOMAS S ATKINSON II Total		761.00		
A000742	382	1211	TISDALE IRRIGATION & DRAINAGE CO	7/26/1917	12,473.70	Sutter	SACRAMENTO RIVER
A016985	13868	9335	TISDALE IRRIGATION & DRAINAGE CO	4/3/1956	1,350.00	Sutter	SACRAMENTO RIVER
			TISDALE IRRIGATION & DRAINAGE CO Total		13,823.70		
A009169	5099	2695	TOWNE ENTERPRISES	11/3/1937	386.90	Sacramento	SACRAMENTO RIVER
			TOWNE ENTERPRISES Total		386.90		
A016168	14505	10001	TRILOGY HOMES INC	12/6/1954	1,450.00	Sacramento	SACRAMENTO RIVER
			TRILOGY HOMES INC Total		1,450.00		
A005625	12720		U.S. BUREAU OF RECLAMATION	7/30/1927	11,153,752.50	Shasta	SACRAMENTO RIVER
A005626	12721		U.S. BUREAU OF RECLAMATION	4/12/1961	7,998,004.00	Contra Costa, Glenn, Sacramento, Shasta, Tehama	OLD RIVER, SACRAMENTO RIVER

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A009363	12722		U.S. BUREAU OF RECLAMATION	4/12/1961	1,033,977.50	Contra Costa, Sacramento, San Joaquin, Shasta, Tehama	OLD RIVER, SACRAMENTO RIVER, Victoria Canal
A009364	12723		U.S. BUREAU OF RECLAMATION	8/2/1938	7,818,797.50	Contra Costa, Sacramento, San Joaquin, Shasta, Tehama	OLD RIVER, SACRAMENTO RIVER, Victoria Canal
			U.S. BUREAU OF RECLAMATION Total		28,004,531.50		
A006527	3597	2145	VAN RUITEN BROS	1/8/1930	1,094.90	Sutter, Yolo	SACRAMENTO RIVER
			VAN RUITEN BROS Total		1,094.90		
A000771	389	4160	W.A. YERXA	9/5/1917	9,084.40	Colusa	SACRAMENTO RIVER
			W.A. YERXA Total		9,084.40		
A015711	9751	5593	WALLACE L EDSON	2/2/1954	142.70	Sutter	OLD RIVER, SACRAMENTO RIVER
			WALLACE L EDSON Total		142.70		
A002317B	1259	001130B	WAYMON LYNCH	2/4/1980	30.60	Sutter	SACRAMENTO RIVER
			WAYMON LYNCH Total		30.60		
A004369	2014	1331	WILLIAM J CORREA	12/15/1924	44.00	Sacramento	SACRAMENTO RIVER
			WILLIAM J CORREA Total		44.00		
A002884	1347	968	WILLIAM P LOCKETT	6/17/1922	116.10	Sutter	SACRAMENTO RIVER
A005160A	2649	001183A	WILLIAM P LOCKETT	8/18/1926	365.00	Sutter	SACRAMENTO RIVER
			WILLIAM P LOCKETT Total		481.10		
A028238	20073	13351	WILLOW CREEK MUTUAL WATER CO	9/7/1984	5,000.00	Glenn	SACRAMENTO RIVER
			WILLOW CREEK MUTUAL WATER CO Total		5,000.00		
A008141	4459	2631	WILSON RANCH PARTNERSHIP	10/24/1934	2,717.40	Yolo	SACRAMENTO RIVER
			WILSON RANCH PARTNERSHIP Total		2,717.40		
A003247	1695	4255	WINDSWEPT LAND AND CATTLE COMPANY	3/21/1956	3,209.00	Sutter, Yolo	SACRAMENTO RIVER
			WINDSWEPT LAND AND CATTLE COMPANY Total		3,209.00		
A004257	2066	1939	Woodland Development Company, LLC	4/6/1939	666.50	Yolo	SACRAMENTO RIVER
			Woodland Development Company, LLC Total		666.50		
A030358	20281		Woodland-Davis Clean Water Agency	4/14/2011	45,000.00	Yolo	SACRAMENTO RIVER
			Woodland-Davis Clean Water Agency Total		45,000.00		
A013031	7461	4721	Yolo Land Trust	4/18/1949	1,011.60	Yolo	SACRAMENTO RIVER
			Yolo Land Trust Total		1,011.60		
A014619	8957	11038	ZUMWALT MUTUAL WATER COMPANY	1/14/1952	63.00	Colusa	SACRAMENTO RIVER
			ZUMWALT MUTUAL WATER COMPANY Total		63.00		
			Grand Total		33,492,590.01		

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A020496	13915	8274	ALEX NACCARATO	11/15/61	13.00			Tuolumne	OWL CREEK
A029917	20928		ALEX NACCARATO	3/14/91	20.00			Tuolumne	OWL CREEK
			ALEX NACCARATO Total		33.00				
A018809	12223	6502	ALMA A RYALS	6/18/59	1.10			Tuolumne	UNSP
			ALMA A RYALS Total		1.10				
A016295	10192	10158	BEAR VALLEY HOMEOWNERS ASSOCIATION	4/1/55	2.50			Alpine	UNSP
A022290	15190	10159	BEAR VALLEY HOMEOWNERS ASSOCIATION	9/17/65	1.30			Alpine	UNSP
A022291	15449	10160	BEAR VALLEY HOMEOWNERS ASSOCIATION	9/17/65	3.20			Alpine	UNSP
A029813	20542	13866	BEAR VALLEY HOMEOWNERS ASSOCIATION	8/20/12	7.80			Alpine	UNSP
			BEAR VALLEY HOMEOWNERS ASSOCIATION Total		14.80				
A018366	12170	7514	BERNICE JANE BOTTOMLEY	10/9/58	47.00			Calaveras	CARSON CREEK
			BERNICE JANE BOTTOMLEY Total		47.00				
A012550	7440	4929	BLUE LAKE SPRINGS HOMEOWNERS ASSOCIATION	6/16/48	45.00			Calaveras	MORAN CREEK
A014576	9049	4698	BLUE LAKE SPRINGS HOMEOWNERS ASSOCIATION	11/13/51	51.20			Calaveras	MORAN CREEK
			BLUE LAKE SPRINGS HOMEOWNERS ASSOCIATION Total		96.20				
A027131	18603	12280	BRETT D THOMSON	12/2/81	1.00			Calaveras	UNST
			BRETT D THOMSON Total		1.00				
A011792B	15013		CALAVERAS COUNTY WATER DISTRICT	3/24/47	78,500.00			Calaveras, Tuolumne	HIGHLAND CREEK, NORTH FORK STANISLAUS RIVER
A012911	15016		CALAVERAS COUNTY WATER DISTRICT	1/25/49	368,091.00			Calaveras, Tuolumne	HIGHLAND CREEK, NORTH FORK STANISLAUS RIVER
A012912	15017		CALAVERAS COUNTY WATER DISTRICT	1/25/49	3,373.90			Tuolumne	NORTH FORK STANISLAUS RIVER
A012912A	14769		CALAVERAS COUNTY WATER DISTRICT	1/25/49	1,446.00			Tuolumne	NORTH FORK STANISLAUS RIVER
A013091	15018		CALAVERAS COUNTY WATER DISTRICT	5/13/49	63,000.00			Tuolumne	HIGHLAND CREEK
A013092	15019		CALAVERAS COUNTY WATER DISTRICT	5/13/49	63,000.00			Tuolumne	HIGHLAND CREEK
A013093	15020		CALAVERAS COUNTY WATER DISTRICT	5/13/49	50,050.00			Alpine, Tuolumne	HIGHLAND CREEK, NORTH FORK STANISLAUS RIVER
A018727	15021		CALAVERAS COUNTY WATER DISTRICT	5/20/59	506,809.30			Tuolumne	BEAVER CREEK, NORTH FORK STANISLAUS RIVER
A019148	15023		CALAVERAS COUNTY WATER DISTRICT	12/23/59	732,538.90			Alpine, Tuolumne	BEAVER CREEK, HIGHLAND CREEK, NORTH FORK STANISLAUS RIVER
A019149	15024		CALAVERAS COUNTY WATER DISTRICT	12/23/59	50,050.00			Alpine, Tuolumne	HIGHLAND CREEK, NORTH FORK STANISLAUS RIVER
			CALAVERAS COUNTY WATER DISTRICT Total		1,916,859.10				
A018148	11642	6479	CASTLE & COOKE CALAVERAS INC	5/22/58	50.00			Calaveras	SAWMILL CREEK
			CASTLE & COOKE CALAVERAS INC Total		50.00				
A030100	20788		CASTLE & COOKE CALIFORNIA INC	4/8/92	98.00			Calaveras	SAW MILL CREEK
			CASTLE & COOKE CALIFORNIA INC Total		98.00				
A014898	9610	4993	CEDAR RIDGE IMPROVEMENT ASSOCIATION	7/9/52	27.50			Tuolumne	FIVEMILE CREEK
A018514	12003	9773	CEDAR RIDGE IMPROVEMENT ASSOCIATION	1/30/59	15.00			Tuolumne	UNSP (3)
			CEDAR RIDGE IMPROVEMENT ASSOCIATION Total		42.50				
A004895	2599	1308	CLIFFORD D CHENEY	1/26/26	3.40			Tuolumne	UNSP
			CLIFFORD D CHENEY Total		3.40				
A021647	14633	9120	COLD SPRINGS WATER COMPANY INC	2/20/64	106.00			Tuolumne	UNST
			COLD SPRINGS WATER COMPANY INC Total		106.00				
A019732	13038	8088	DANA KAUFFMANN	9/8/60	29.00			Tuolumne	KNIGHT CREEK
			DANA KAUFFMANN Total		29.00				
A018808	12222	6501	DAVE D FICKEL	6/18/59	0.80			Tuolumne	UNSP
			DAVE D FICKEL Total		0.80				
A020819	13802	10299	DAVIES PROPERTIES	6/14/62	6.40			Calaveras	LOVE CREEK
			DAVIES PROPERTIES Total		6.40				
A016982	10614	5887	Donald Paul Deshon	4/2/56	6.00			Tuolumne	UNST
			Donald Paul Deshon Total		6.00				
A019168	12437	7468	EARL D GARRISON	1/4/60	6.00			Calaveras	UNST
			EARL D GARRISON Total		6.00				
A012659	7486	4989	ESTATE OF E ALFORD	8/19/48	24.00			Calaveras	LOVE CREEK
			ESTATE OF E ALFORD Total		24.00				
A021338	14498	10248	Eureka Valley LLC	5/9/74	15.00			Tuolumne	UNST
			Eureka Valley LLC Total		15.00				
A025335	17026	11288	GEORGE A ATHERTON	4/21/77	32.00			Tuolumne	SOUTH FORK WILDCAT CREEK

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			GEORGE A ATHERTON Total		32.00				
A017554	11689	8666	GERALD B ENGLER	4/18/57	25.00			Tuolumne	MORMON CREEK
			GERALD B ENGLER Total		25.00				
A015583	9715	6899	GREENHORN CREEK ASSOCIATES L P	10/23/53	45.00			Calaveras	UNXX
			GREENHORN CREEK ASSOCIATES L P Total		45.00				
A029013	21114		GUADALUPE RAMIREZ	4/23/87	18.00			Calaveras	LOVE CREEK
			GUADALUPE RAMIREZ Total		18.00				
A009620	5396	5298	IRVING M TERZICH	6/15/39	426.50			Tuolumne	EAGLE CREEK
			IRVING M TERZICH Total		426.50				
A022343	15266	9934	JANICE M ZUKAL	11/24/65	7.00			Tuolumne	MINE TUNNEL
			JANICE M ZUKAL Total		7.00				
A019307	12552	7663	JEFF R WILSON	3/14/60	14.10			Tuolumne	UNST
			JEFF R WILSON Total		14.10				
A021779	15162	10782	JEROME P SOLARI	5/19/64	22.50			Tuolumne	DEADMAN GULCH
			JEROME P SOLARI Total		22.50				
A018573	11984	6635	JOANNA VIDITO	3/9/59	4.00			Tuolumne	UNST
			JOANNA VIDITO Total		4.00				
A025626	17480	11277	JOHN WILLMS RANCH INC	12/30/77	11.00			Stanislaus	UNST
			JOHN WILLMS RANCH INC Total		11.00				
A020041	13786	9752	JON H JANOFSKY	3/17/61	20.00			Calaveras	PENNY CREEK
			JON H JANOFSKY Total		20.00				
A013517	8095	4279	JON V ELLIS	12/27/49	35.00			Calaveras	UNST
			JON V ELLIS Total		35.00				
A019469	16009	10448	JOSEPH W MARTIN JR	6/2/60	9.60			Tuolumne	ANDREWS CREEK
			JOSEPH W MARTIN JR Total		9.60				
A018574	11985	7360	KAREN REESE	3/9/59	48.00			Tuolumne	GREEN SPRING RUN
			KAREN REESE Total		48.00				
A021149	14736	8849	KATHARINE K STEVENS	2/4/63	2.00			Tuolumne	UNSP
			KATHARINE K STEVENS Total		2.00				
A011661	6863	4230	KATHERINE R REID	12/16/46	36.90			Tuolumne	EAGLE CREEK
			KATHERINE R REID Total		36.90				
A020312	13903	10840	LAKE ALPINE WATER COMPANY	7/21/61	42.00			Alpine	UNSP
A021485	14541	11007	LAKE ALPINE WATER COMPANY	10/7/63	261.00			Alpine	BEAR CREEK
A005648G	21237		LAKE ALPINE WATER COMPANY	6/10/09	395.00			Alpine	BEAR CREEK
			LAKE ALPINE WATER COMPANY Total		698.00				
A020450	13818	12186	LELAND MEADOW WATER DISTRICT	10/24/61	2.30			Tuolumne	UNSP
A023195	16065	11345	LELAND MEADOW WATER DISTRICT	12/17/68	68.00			Tuolumne	LELAND CREEK
A026373	18277	12187	LELAND MEADOW WATER DISTRICT	5/21/80	2.70			Tuolumne	UNSP
			LELAND MEADOW WATER DISTRICT Total		73.00				
A008919	4961	2482	LENORA HOLMES	3/13/37	0.20			Alpine	UNSP
A009217	5129	2483	LENORA HOLMES	12/30/37	0.20			Alpine	UNSP
A009851	5546	3153	LENORA HOLMES	3/14/40	0.70			Alpine	UNSP
			LENORA HOLMES Total		1.10				
A003602	1849	895	MATTHEW T BLOOM	4/17/03	0.30			Tuolumne	UNST
			MATTHEW T BLOOM Total		0.30				
A015841	10169	6882	MICHAEL P TRACY	4/23/07	18.00			Tuolumne	MORMON CREEK
			MICHAEL P TRACY Total		18.00				
A026084	18024	12790	MIKEL C WILLIAMS	9/6/79	0.50			Tuolumne	MORMON CREEK, UNST
			MIKEL C WILLIAMS Total		0.50				
A000077A	1303	9966	Northern California Power Agency	8/4/15	4,062.00			Tuolumne	HIGHLAND CREEK
			Northern California Power Agency Total		4,062.00				
A001081	2104	2012	OAKDALE IRRIGATION DISTRICT	9/20/18	96,195.00			Calaveras	STANISLAUS RIVER
A003091	2106	2013	OAKDALE IRRIGATION DISTRICT	10/19/22	10,754.00			Calaveras	STANISLAUS RIVER
A005648A	13692	12385	OAKDALE IRRIGATION DISTRICT	7/30/27	60,000.00			Tuolumne	MIDDLE FORK STANISLAUS RIVER
A010872	9360	7856	OAKDALE IRRIGATION DISTRICT	8/31/01	80,000.00			Tuolumne	STANISLAUS RIVER
A010978	6448	3986	OAKDALE IRRIGATION DISTRICT	8/31/01	25,000.00			Calaveras	STANISLAUS RIVER
A011105	9361	7857	OAKDALE IRRIGATION DISTRICT	8/31/01	98,000.00			Tuolumne	MIDDLE FORK STANISLAUS RIVER
A012490	9362	10166	OAKDALE IRRIGATION DISTRICT	8/31/01	64,500.00			Tuolumne	MIDDLE FORK STANISLAUS RIVER
A012614	9363	7858	OAKDALE IRRIGATION DISTRICT	7/23/48	496,187.60			Tuolumne	MIDDLE FORK STANISLAUS RIVER
A012873	9364	10167	OAKDALE IRRIGATION DISTRICT	12/22/48	354,091.00			Tuolumne	MIDDLE FORK STANISLAUS RIVER
A013309	9365	7859	OAKDALE IRRIGATION DISTRICT	8/22/49	144,795.50			Tuolumne	MIDDLE FORK STANISLAUS RIVER
A013310	9366	7860	OAKDALE IRRIGATION DISTRICT	8/22/49	1,165,966.30			Tuolumne	STANISLAUS RIVER
A026791	19046		OAKDALE IRRIGATION DISTRICT	4/15/81	1,303,159.50			Calaveras	STANISLAUS RIVER

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A031502	21188		OAKDALE IRRIGATION DISTRICT	8/30/07	50,000.00			Tuolumne	MIDDLE FORK STANISLAUS RIVER
A031770	21299		OAKDALE IRRIGATION DISTRICT	4/25/12	506,000.00			Tuolumne	
			OAKDALE IRRIGATION DISTRICT Total		4,454,648.90				
A001339	668	1391	PACIFIC GAS AND ELECTRIC COMPANY	1/3/34	40,904.70			Tuolumne	SOUTH FORK STANISLAUS RIVER
A006129	3507	1541	PACIFIC GAS AND ELECTRIC COMPANY	12/4/28	3,919.00			Tuolumne	SOUTH FORK STANISLAUS RIVER
A006130	3508	1542	PACIFIC GAS AND ELECTRIC COMPANY	12/4/28	5,360.00			Tuolumne	SOUTH FORK STANISLAUS RIVER
A010122	6107	2862	PACIFIC GAS AND ELECTRIC COMPANY	2/19/41	115,836.40			Tuolumne	MIDDLE FORK STANISLAUS RIVER
A031405	21170		PACIFIC GAS AND ELECTRIC COMPANY	4/5/05	4,706.00			Tuolumne	SOUTH FORK STANISLAUS RIVER
			PACIFIC GAS AND ELECTRIC COMPANY Total		170,726.10				
A022245	15262	9709	PATRICIA D DAVEY	3/31/71	12.00			Tuolumne	UNST
			PATRICIA D DAVEY Total		12.00				
A023320	16216	12444	PETER G VON DER LINDE	7/29/69	11.10			Tuolumne	UNNAMED MINE TUNNEL
			PETER G VON DER LINDE Total		11.10				
A025177	17033	13451	RICHARD M GONZALES	10/20/76	10.00			Calaveras	YORK CREEK
			RICHARD M GONZALES Total		10.00				
A020416	13653	8499	RNE INVESTMENTS LLC	10/2/61	46.00			Calaveras	SAWMILL CREEK
			RNE INVESTMENTS LLC Total		46.00				
A024335	16788	11194	ROSS A CARKEET JR	4/3/73	0.20			Tuolumne	UNSP
			ROSS A CARKEET JR Total		0.20				
A013353	8073	10902	SHERMAN ACRES MUTUAL WATER ASSN	9/14/49	1.50			Calaveras	UNSP
			SHERMAN ACRES MUTUAL WATER ASSN Total		1.50				
A024930	17704	11731	Sierra Golf Management, Inc.	11/17/75	108.00			Calaveras	ANGELS CREEK
			Sierra Golf Management, Inc. Total		108.00				
A012739	7567	5256	SIERRA PACIFIC INDUSTRIES	10/8/48	8.10			Tuolumne	UNSP
			SIERRA PACIFIC INDUSTRIES Total		8.10				
A005648X01			SIX MILE LAND COMPANY	5/9/01	81.00			Calaveras	SIX MILE CREEK
A031182			SIX MILE LAND COMPANY	5/9/01	41.00			Calaveras	SIX MILE CREEK
			SIX MILE LAND COMPANY Total		122.00				
A002524	1147	604	SOUTH SAN JOAQUIN IRRIGATION DISTRICT	8/29/21	36,000.00			Calaveras	STANISLAUS RIVER
			SOUTH SAN JOAQUIN IRRIGATION DISTRICT Total		36,000.00				
A030603A			STOCKTON EAST WATER DISTRICT	9/10/04	111,900.00			Calaveras	STANISLAUS RIVER
A030603B			STOCKTON EAST WATER DISTRICT	9/10/04	407,000.00			Calaveras, Tuolumne	STANISLAUS RIVER
			STOCKTON EAST WATER DISTRICT Total		518,900.00				
A010168	5974	3560	TAMARACK CABIN OWNERS ASSN	3/25/41	7.30			Calaveras	UNSP
			TAMARACK CABIN OWNERS ASSN Total		7.30				
A016563	10518		TAMARACK SPRINGS MUTUAL WATER CO	8/31/55	4.60			Calaveras	UNSP (2), UNXX
			TAMARACK SPRINGS MUTUAL WATER CO Total		4.60				
A019990	13140	8194	The Donald A. Bottomley 1992 Trust	2/16/61	4.00			Calaveras	UNST
			The Donald A. Bottomley 1992 Trust Total		4.00				
A018815	12329	7401	THOMAS P KLEIN	6/22/59	2.20			Tuolumne	UNST
			THOMAS P KLEIN Total		2.20				
A005648X02			THOMSON FAMILY TRUST	10/26/00	28.10			Calaveras	SIXMILE CREEK, UNST
A031364			THOMSON FAMILY TRUST	10/2/02	28.10			Calaveras	SIXMILE CREEK, UNST
			THOMSON FAMILY TRUST Total		56.20				
A003912	1781	1182	U S STANISLAUS NATL FOREST	4/18/32	32.80			Tuolumne	GOOSEBERRY SPRING
A010384	5982	3941	U S STANISLAUS NATL FOREST	2/6/42	6.60			Tuolumne	COW CREEK
A010386	5983	3917	U S STANISLAUS NATL FOREST	2/6/42	4.50			Tuolumne	LELAND CREEK
A010421	5986	3561	U S STANISLAUS NATL FOREST	4/1/42	1.10			Calaveras	BIG MEADOW CREEK
A010437	5987	3931	U S STANISLAUS NATL FOREST	4/25/42	0.70			Alpine	BEE CREEK
A010490	6038	3282	U S STANISLAUS NATL FOREST	7/8/42	1.10			Tuolumne	UNSP
A010491	6039	3012	U S STANISLAUS NATL FOREST	7/8/42	1.00			Tuolumne	UNST
A010492	6040	3013	U S STANISLAUS NATL FOREST	7/9/42	0.90			Tuolumne	UNST
A010495	6041	2977	U S STANISLAUS NATL FOREST	7/15/42	3.10			Tuolumne	UNST
A010556	6104	5015	U S STANISLAUS NATL FOREST	11/12/42	3.00			Tuolumne	BUMBLEBEE CREEK
A010557	6105	2974	U S STANISLAUS NATL FOREST	11/12/42	1.60			Tuolumne	CASCADE CREEK
A010575	6159	2975	U S STANISLAUS NATL FOREST	12/28/42	0.80			Tuolumne	UNST
A010576	6160	3903	U S STANISLAUS NATL FOREST	12/28/42	0.90			Tuolumne	UNST
A010584	6161	3283	U S STANISLAUS NATL FOREST	1/2/43	2.10			Tuolumne	UNST
A013833	8360	3860	U S STANISLAUS NATL FOREST	7/5/50	3.10			Tuolumne	UNST
A014167	8618	4660	U S STANISLAUS NATL FOREST	2/20/51	1.90			Tuolumne	UNSP
A016980	10760	7337	U S STANISLAUS NATL FOREST	3/30/56	0.70			Tuolumne	UNST

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	Season	Purpose of Use	County	Source
A017484	11017	7115	U S STANISLAUS NATL FOREST	2/27/57	11.40			Alpine	UNST
A018680	12115	7497	U S STANISLAUS NATL FOREST	4/30/59	0.90			Alpine	INSPIRATION SPRING
A018882	12197	7863	U S STANISLAUS NATL FOREST	8/3/59	1.20			Tuolumne	CRANDALL SPRING
A018883	12198	7255	U S STANISLAUS NATL FOREST	8/3/59	1.20			Tuolumne	SCHAFER SPRING
A018893	12199	7260	U S STANISLAUS NATL FOREST	8/3/59	1.20			Tuolumne	FRASER SPRING
A019702	13033	8003	U S STANISLAUS NATL FOREST	8/22/60	2.30			Tuolumne	UNST
A019703	13034	7977	U S STANISLAUS NATL FOREST	8/22/60	0.70			Tuolumne	UNSP
A019704	13035	8232	U S STANISLAUS NATL FOREST	8/22/60	1.90			Alpine	UNST
A019706	13037	8142	U S STANISLAUS NATL FOREST	8/22/60	1.40			Tuolumne	UNST
A020426	13565	8080	U S STANISLAUS NATL FOREST	10/5/61	0.90			Calaveras	UNSP
A021918	14918	9098	U S STANISLAUS NATL FOREST	9/29/64	0.50			Tuolumne	UNSP
A022030	14969	9097	U S STANISLAUS NATL FOREST	1/18/65	0.20			Tuolumne	UNSP
			U S STANISLAUS NATL FOREST Total		89.70				
A014858A	16597		U.S. BUREAU OF RECLAMATION	4/4/73	980,000.00			Calaveras	STANISLAUS RIVER
A014858B	20245		U.S. BUREAU OF RECLAMATION	7/18/88	1,000,000.00			Calaveras, San Joaquin	STANISLAUS RIVER
A014859	16598		U.S. BUREAU OF RECLAMATION	6/16/52	5,323,865.00			Calaveras	STANISLAUS RIVER
A019303	16599		U.S. BUREAU OF RECLAMATION	7/19/73	1,420,000.00			Calaveras	STANISLAUS RIVER
A019304	16600		U.S. BUREAU OF RECLAMATION	3/11/60	1,420,000.00			Calaveras, Contra Costa	STANISLAUS RIVER
A027319	20246		U.S. BUREAU OF RECLAMATION	7/18/88	2,895,910.00			Calaveras	STANISLAUS RIVER
			U.S. BUREAU OF RECLAMATION Total		13,039,775.00				
A028182	20144		VENTURE 4 MINING, A PARTNERSHIP	7/3/84	2.50			Tuolumne	UNST (AKA GREENHORN GULCH)
			VENTURE 4 MINING, A PARTNERSHIP Total		2.50				
A025369	17409	11514	WILLIAM MICHAEL ROBISON	5/27/77	28.00			Tuolumne	OWL CREEK, UNST
A025370	17410	12006	WILLIAM MICHAEL ROBISON	5/27/77	48.00			Tuolumne	OWL CREEK
A025371	17411	12007	WILLIAM MICHAEL ROBISON	5/27/77	20.00			Tuolumne	NORTH FORK WILDCAT CREEK
A025386	17412	11515	WILLIAM MICHAEL ROBISON	6/9/77	0.70			Tuolumne	NORTH FORK WILDCAT CREEK
			WILLIAM MICHAEL ROBISON Total		96.70				
A028278	19471	12939	YOUNG BERTRAND TRUSTEE ETAL	10/2/84	0.10			Calaveras	LOVE CREEK
			YOUNG BERTRAND TRUSTEE ETAL Total		0.10				
			Grand Total		20,143,681.00				

Tuolumne River Watershed - Post-1914 Appropriative Water Rights

Application ID	Permit ID	License ID	Water Right Type	Status	Holder Name	Date	Face Amt	County	Source
A014162	9583	5049	Appropriative	Licensed	Aaron Lentz	2/15/51	3.7	Tuolumne	CURTIS CREEK
					Aaron Lentz Total		3.7		
A022486	15299	9177	Appropriative	Licensed	BANK OF AMERICA NT & SA	6/8/66	15	Tuolumne	UNST
A022487	15300	9161	Appropriative	Licensed	BANK OF AMERICA NT & SA	6/8/66	20	Stanislaus	UNST
					BANK OF AMERICA NT & SA Total		35		
A018644	12028	7382	Appropriative	Licensed	BARBARA THORNTON	4/14/59	9	Tuolumne	GARROTTE CREEK
					BARBARA THORNTON Total		9		
A020279	13976	10278	Appropriative	Licensed	BERNHARD KISSINGER	6/26/61	1.5	Tuolumne	UNST
					BERNHARD KISSINGER Total		1.5		
A020324	13395	8154	Appropriative	Licensed	BIG CREEK ASSOCIATES	7/25/61	24.5	Tuolumne	BIG CREEK DRAINAGE, UNST
					BIG CREEK ASSOCIATES Total		24.5		
A018738B	12118	008164B	Appropriative	Licensed	BOBBY E MADEWELL	5/25/59	1	Tuolumne	UNST
					BOBBY E MADEWELL Total		1		
A012961	7549	4032	Appropriative	Licensed	BOY SCOUT MEMORIAL FOUNDATION	3/4/49	6	Tuolumne	UNST
A016137	10124	6866	Appropriative	Licensed	BOY SCOUT MEMORIAL FOUNDATION	11/15/54	7.9	Tuolumne	UNST
					BOY SCOUT MEMORIAL FOUNDATION Total		13.9		
A012962	7550	4033	Appropriative	Licensed	BOY SCOUT OF AMERICA MEMORIAL FOUNDATION	3/4/49	2.7	Tuolumne	NORTH FORK TUOLUMNE RIVER
					BOY SCOUT OF AMERICA MEMORIAL FOUNDATION Total		2.7		
A019217	12502	7478	Appropriative	Licensed	BRENT LOOP	2/4/60	3.6	Tuolumne	UNST
					BRENT LOOP Total		3.6		
A021372	14266	9116	Appropriative	Licensed	BRENTWOOD LAKE CLUB INC	6/28/63	100	Tuolumne	UNST
					BRENTWOOD LAKE CLUB INC Total		100		
A010902	6346	3579	Appropriative	Licensed	CAMP TAWONGA-TAWONGA JEWISH COMMUNITY CORP	10/16/44	21.7	Tuolumne	MIDDLE FORK TUOLUMNE RIVER
A011108	6525	3743	Appropriative	Licensed	CAMP TAWONGA-TAWONGA JEWISH COMMUNITY CORP	7/17/45	11	Tuolumne	UNST
A013365	7958	4251	Appropriative	Licensed	CAMP TAWONGA-TAWONGA JEWISH COMMUNITY CORP	9/27/49	21.7	Tuolumne	UNST
A015078	9901	5326	Appropriative	Licensed	CAMP TAWONGA-TAWONGA JEWISH COMMUNITY CORP	11/6/52	12.3	Tuolumne	UNST
					CAMP TAWONGA-TAWONGA JEWISH COMMUNITY CORP Total		66.7		
A020332	13421	9601	Appropriative	Licensed	CAROLE CANEPA	7/28/61	22	Tuolumne	UNST
					CAROLE CANEPA Total		22		
A020841	14114	8616	Appropriative	Licensed	CAROLYN SUE MOSLEY	7/3/62	0.3	Tuolumne	CURTIS CREEK
					CAROLYN SUE MOSLEY Total		0.3		
A018757B	12099	006636B	Appropriative	Licensed	CHARLES G YONEDA	10/28/88	0.7	Tuolumne	UNST
					CHARLES G YONEDA Total		0.7		
A013101	7796	5279	Appropriative	Licensed	CHARLES J HURST	5/19/49	4	Tuolumne	WOODS CREEK
A023560	16134	10546	Appropriative	Licensed	CHARLES J HURST	7/17/70	8	Tuolumne	UNST
					CHARLES J HURST Total		12		
A016104	10108	9181	Appropriative	Licensed	CHRISTOPHER R ROSS	2/6/03	8	Tuolumne	UNST (AKA LITTLE SUGAR PINE CREEK)
					CHRISTOPHER R ROSS Total		8		
A020574	13616	8190	Appropriative	Licensed	CLIFTON E J HODGE	1/29/62	6	Tuolumne	UNST
					CLIFTON E J HODGE Total		6		
A020617	13658	8259	Appropriative	Licensed	COUNTY OF TUOLUMNE	2/15/62	10	Tuolumne	UNST
A028689	20146	13073	Appropriative	Licensed	COUNTY OF TUOLUMNE	1/3/86	2	Tuolumne	UNST
					COUNTY OF TUOLUMNE Total		12		
A018604	12335	7329	Appropriative	Licensed	CRAIG AND PATRICIA DAMBACHER 1993 FAMILY TRUST	3/20/59	16	Tuolumne	UNST (2)
					CRAIG AND PATRICIA DAMBACHER 1993 FAMILY TRUST Total		16		
A000862	516	283	Appropriative	Licensed	CROOK REVOCABLE 1992 TRUST	12/15/17	196.4	Tuolumne	JAWBONE CREEK
A021329	14878	10317	Appropriative	Licensed	CROOK REVOCABLE 1992 TRUST	6/10/63	28	Tuolumne	UNST
					CROOK REVOCABLE 1992 TRUST Total		224.4		
A021227	14243	9178	Appropriative	Licensed	DANIEL A SCHULTZ	4/9/63	8	Tuolumne	UNST
					DANIEL A SCHULTZ Total		8		
A020883	13885	8492	Appropriative	Licensed	DAVID C HARDEN	8/1/62	8.4	Tuolumne	UNST
					DAVID C HARDEN Total		8.4		
A019299	12441	7485	Appropriative	Licensed	DAVID ERNEST HERBERT	3/9/60	1.5	Tuolumne	UNST
					DAVID ERNEST HERBERT Total		1.5		
A020381	13434	7885	Appropriative	Licensed	DENNIS S DAOUST	9/6/61	1	Tuolumne	UNST
					DENNIS S DAOUST Total		1		
A027785	19155		Appropriative	Permitted	DONALD F MC CLURE	6/30/83	8.1	Tuolumne	MOSS SPRING
					DONALD F MC CLURE Total		8.1		

A020497	13654	8293	Appropriative	Licensed	EDWARD J FILIBERTI	11/15/61	5.8	Tuolumne	UNST
					EDWARD J FILIBERTI Total		5.8		
A020784	13766	8593	Appropriative	Licensed	Eric J Coffill	5/21/62	17	Tuolumne	UNST
					Eric J Coffill Total		17		
A020575	13569	9158	Appropriative	Licensed	ESTATE OF LAVERNE LITTERAL	1/29/62	5.5	Tuolumne	UNST
A020587	13696	10008	Appropriative	Licensed	ESTATE OF LAVERNE LITTERAL	2/5/62	5.4	Tuolumne	BLUE GULCH
					ESTATE OF LAVERNE LITTERAL Total		10.9		
A022468	15546	10097	Appropriative	Licensed	ESTATES OF ELDON E & ANNA V AMOS	5/11/73	4	Tuolumne	UNSP
					ESTATES OF ELDON E & ANNA V AMOS Total		4		
A029977	20784		Appropriative	Permitted	G SCOTT FAHEY	3/6/02	44.8	Tuolumne	DEADWOOD SPRING, UNSP (AKA SUGAR PINE SPRING)
A031491	21289		Appropriative	Permitted	G SCOTT FAHEY	8/1/11	64.5	Tuolumne	UNSP
					G SCOTT FAHEY Total		109.3		
A018757A03	12099	006636A03	Appropriative	Licensed	GRAY A CLOSSMAN	5/9/90	1	Tuolumne	UNST
					GRAY A CLOSSMAN Total		1		
A019214	12433	7555	Appropriative	Licensed	Gregory C. Henley	2/3/60	30	Tuolumne	UNST
					Gregory C. Henley Total		30		
A018757C	12099	006636C	Appropriative	Licensed	GREGORY L CARR	10/28/88	0.7	Tuolumne	UNST
					GREGORY L CARR Total		0.7		
A019253	12662	7705	Appropriative	Licensed	HELGA ANKER TRUST	2/26/60	8.6	Tuolumne	RATTLESNAKE CREEK
					HELGA ANKER TRUST Total		8.6		
A019192	12410	7502	Appropriative	Licensed	HOLLY HAYDEN-FITZSIMMONS	1/26/60	1.1	Tuolumne	SONORA CREEK
					HOLLY HAYDEN-FITZSIMMONS Total		1.1		
A015987	10073	5215	Appropriative	Licensed	INGALLS FAMILY TRUST	8/9/54	213.2	Tuolumne	DUCKWALL CREEK
					INGALLS FAMILY TRUST Total		213.2		
A013343	7890	5344	Appropriative	Licensed	JACK G MILES	9/8/49	6.8	Tuolumne	UNST
					JACK G MILES Total		6.8		
A016932	10632	5991	Appropriative	Licensed	JACK J GARDELLA JR	3/13/56	24.1	Tuolumne	UNST
A016935	10635	5994	Appropriative	Licensed	JACK J GARDELLA JR	3/13/56	24.6	Tuolumne	UNST
A019043	12594	6946	Appropriative	Licensed	JACK J GARDELLA JR	10/21/59	60	Tuolumne	UNST
A025898	18041	11845	Appropriative	Licensed	JACK J GARDELLA JR	1/5/79	75	Tuolumne	UNST
					JACK J GARDELLA JR Total		183.7		
A020272	13381	8125	Appropriative	Licensed	JAMES CURTONI	6/20/61	30	Tuolumne	UNST
A022472	15391	9206	Appropriative	Licensed	JAMES CURTONI	5/19/66	18	Tuolumne	UNST
					JAMES CURTONI Total		48		
A020943	14166	9170	Appropriative	Licensed	JAY HALE	9/13/62	4	Tuolumne	UNSP
					JAY HALE Total		4		
A020459B	13513	008111B	Appropriative	Licensed	JELITO LIVING TRUST DATED 7/29/89	7/8/85	2.3	Tuolumne	UNST
					JELITO LIVING TRUST DATED 7/29/89 Total		2.3		
A020286	13436	8562	Appropriative	Licensed	JIM LUPO	7/3/61	11	Tuolumne	CURTIS CREEK
A020843	13986	9781	Appropriative	Licensed	JIM LUPO	7/5/62	24	Tuolumne	CURTIS CREEK
					JIM LUPO Total		35		
A020785	13767	8594	Appropriative	Licensed	JOANE SANTOS TRUST	5/21/62	3.6	Tuolumne	UNST
					JOANE SANTOS TRUST Total		3.6		
A018947	12204	6838	Appropriative	Licensed	JOHN B GROHL SR FAMILY RESIDUAL TRUST	8/27/59	49	Modoc, Tuolumne	QUIGLEY CREEK, UNST
A020598	13699	8746	Appropriative	Licensed	JOHN B GROHL SR FAMILY RESIDUAL TRUST	2/7/62	64	Tuolumne	NORTH FORK DRY CREEK, UNST
A021190	14209	9149	Appropriative	Licensed	JOHN B GROHL SR FAMILY RESIDUAL TRUST	2/27/70	26	Tuolumne	UNST
					JOHN B GROHL SR FAMILY RESIDUAL TRUST Total		139		
A018757A01A		006636A01A	Appropriative	Licensed	JOHN C BRUNK	8/17/92	1.4	Tuolumne	UNST
					JOHN C BRUNK Total		1.4		
A025191	17000	11404	Appropriative	Licensed	JOHN ROSS BAKER	10/28/76	24	Tuolumne	UNST
A027519	18792	12548	Appropriative	Licensed	JOHN ROSS BAKER	9/15/82	6	Tuolumne	UNST
A029743	20879		Appropriative	Permitted	JOHN ROSS BAKER	5/14/90	204	Tuolumne	TURNBACK CREEK, UNST
					JOHN ROSS BAKER Total		234		
A025627	17481	11284	Appropriative	Licensed	JOHN WILLMS RANCH INC	12/30/77	6.1	Stanislaus	UNST
					JOHN WILLMS RANCH INC Total		6.1		
A019662	12846	7789	Appropriative	Licensed	JOSEPH M MURRAY JR	8/16/60	19	Stanislaus	UNST
					JOSEPH M MURRAY JR Total		19		
A020407	13406	8086	Appropriative	Licensed	JUSTUS W HOUCK	9/26/61	1.2	Tuolumne	UNST
					JUSTUS W HOUCK Total		1.2		
A018575	11986	6776	Appropriative	Licensed	KAREN REESE	3/9/59	18	Tuolumne	UNST
					KAREN REESE Total		18		
A018602	13128	8018	Appropriative	Licensed	LAKEWOOD PARK ASSOCIATION	3/20/59	7	Tuolumne	SULLIVAN CREEK

					LAKEWOOD PARK ASSOCIATION Total		7		
A018911	12332	7420	Appropriative	Licensed	LEROY L BELT III	8/12/59	0.4	Tuolumne	UNSP (2)
					LEROY L BELT III Total		0.4		
A014262	8759	5372	Appropriative	Licensed	LOUISE ROSASCO CUNNINGHAM	4/20/51	89	Tuolumne	UNSP
					LOUISE ROSASCO CUNNINGHAM Total		89		
A017718	11083	5971	Appropriative	Licensed	LUCILLE MURPHY HATLER	7/15/57	6	Tuolumne	UNST
A017719	11084	5972	Appropriative	Licensed	LUCILLE MURPHY HATLER	7/15/57	40	Tuolumne	UNST
A017720	11085	6098	Appropriative	Licensed	LUCILLE MURPHY HATLER	7/15/57	26	Tuolumne	UNST
A017721	11086	5974	Appropriative	Licensed	LUCILLE MURPHY HATLER	7/15/57	2.3	Stanislaus	UNST
					LUCILLE MURPHY HATLER Total		74.3		
A025569	17507	11687	Appropriative	Licensed	MARILYN K RICE	11/15/77	16	Tuolumne	UNSP
					MARILYN K RICE Total		16		
A020355	13179	9207	Appropriative	Licensed	MARK R VANN	8/16/61	1.1	Tuolumne	ROUGH & READY CREEK
					MARK R VANN Total		1.1		
A021289	14265	9146	Appropriative	Licensed	MARY CURTIN	5/27/63	6.7	Tuolumne	UNST
					MARY CURTIN Total		6.7		
A020488	13752	9943	Appropriative	Licensed	MATTHEW D BEAUCHAMP	11/10/61	51	Tuolumne	CURTIS CREEK
					MATTHEW D BEAUCHAMP Total		51		
A005726	2973	1132	Appropriative	Licensed	MDL TRUST	10/18/27	10.1	Tuolumne	UNSP (2)
					MDL TRUST Total		10.1		
A022326	15125	10764	Appropriative	Licensed	MICHAEL P SARDELLA	10/29/65	9.6	Tuolumne	ROUGH & READY CREEK
					MICHAEL P SARDELLA Total		9.6		
A026084	18024	12790	Appropriative	Licensed	MIKEL C WILLIAMS	9/6/79	0.5	Tuolumne	MORMON CREEK, UNST
					MIKEL C WILLIAMS Total		0.5		
A020590	13722	9244	Appropriative	Licensed	Mountain Springs Community LP	2/5/62	133	Tuolumne	FLORAL CREEK, UNST, Unnamed Stream
					Mountain Springs Community LP Total		133		
A031384			Appropriative	Pending	MOUNTAIN SPRINGS GOLF LLC	1/21/03	99	Tuolumne	SULLIVAN CREEK, UNST, UNST (AKA FLORES CREEK)
					MOUNTAIN SPRINGS GOLF LLC Total		99		
A018554	13137	8109	Appropriative	Licensed	O J SPARROW	2/26/59	10	Tuolumne	SULLIVAN CREEK
					O J SPARROW Total		10		
A016170	10369	6249	Appropriative	Licensed	ODD FELLOWS SIERRA RECREATION ASSN	12/7/54	17.8	Tuolumne	SUGARPINE CREEK
A016172	10370	9772	Appropriative	Licensed	ODD FELLOWS SIERRA RECREATION ASSN	12/7/54	15	Tuolumne	UNSP
					ODD FELLOWS SIERRA RECREATION ASSN Total		32.8		
A018547	13125	8112	Appropriative	Licensed	Pamela Prime and David Kirkpatrick Trust	2/20/59	12	Tuolumne	UNST
					Pamela Prime and David Kirkpatrick Trust Total		12		
A019946	13110	8032	Appropriative	Licensed	PATRICIA B BROOKS	1/31/61	30.2	Tuolumne	UNST
					PATRICIA B BROOKS Total		30.2		
A020885C	14018	9963	Appropriative	Licensed	PINE MOUNTAIN LAKE ASSOCIATION	8/2/62	14	Tuolumne	UNST
A022980	15823	10634	Appropriative	Licensed	PINE MOUNTAIN LAKE ASSOCIATION	2/7/68	7,650.00	Tuolumne	BIG CREEK
					PINE MOUNTAIN LAKE ASSOCIATION Total		7,664.00		
A030367	21220		Appropriative	Permitted	PLGC Partners	8/27/08	36.8	Tuolumne	UNST
A030699	21221		Appropriative	Permitted	PLGC Partners	8/29/08	28	Tuolumne	UNST
					PLGC Partners Total		64.8		
A023262	15978	10774	Appropriative	Licensed	RACHEL M VUYOVICH	4/16/69	21	Tuolumne	UNST
A025092	17006	11369	Appropriative	Licensed	RACHEL M VUYOVICH	7/6/76	10	Tuolumne	UNST
					RACHEL M VUYOVICH Total		31		
A021028	14037	9698	Appropriative	Licensed	RICHARD J NORTON	11/23/62	8.5	Tuolumne	UNST
					RICHARD J NORTON Total		8.5		
A021183	14150	8329	Appropriative	Licensed	Robert E Thomason	3/8/63	30	Tuolumne	KANAKA CREEK
					Robert E Thomason Total		30		
A018614	12019	6496	Appropriative	Licensed	RON GROHL	3/31/59	3	Tuolumne	UNST
					RON GROHL Total		3		
A015254	9645	6368	Appropriative	Licensed	RONALD E CARTER	3/26/53	51.1	Tuolumne	WOODS CREEK
					RONALD E CARTER Total		51.1		
A019388	12687	7837	Appropriative	Licensed	ROYCE WHITNEY	8/4/66	160.6	Tuolumne	UNST
A020328	13410	7838	Appropriative	Licensed	ROYCE WHITNEY	7/26/61	31	Tuolumne	UNST
					ROYCE WHITNEY Total		191.6		
A012858	7618	4990	Appropriative	Licensed	SCOT PATTERSON	3/24/58	5	Tuolumne	UNXX
					SCOT PATTERSON Total		5		
A018738A	12118	008164A	Appropriative	Licensed	SIERRA PACIFIC HOLDING COMPANY	5/25/59	2.5	Tuolumne	UNST
					SIERRA PACIFIC HOLDING COMPANY Total		2.5		

A014947	9197	5270	Appropriative	Licensed	SONORA RIDGE LLC	8/1/52	47.7	Tuolumne	SULLIVAN CREEK
					SONORA RIDGE LLC Total		47.7		
A022146	15250	9454	Appropriative	Licensed	SOREN E JENSEN JR RANCH TRUST	5/10/65	5	Tuolumne	UNST
					SOREN E JENSEN JR RANCH TRUST Total		5		
A019188	12426	7472	Appropriative	Licensed	STEPHEN A FINN	1/21/60	0.4	Tuolumne	UNST
					STEPHEN A FINN Total		0.4		
A020459A	13513	008111A	Appropriative	Licensed	SUSAN A MACDONALD	7/8/85	1.5	Tuolumne	UNST
					SUSAN A MACDONALD Total		1.5		
A020092	13193	9201	Appropriative	Licensed	TUOLUMNE BAND ME-WUK INDIANS	4/19/61	1	Tuolumne	UNST
					TUOLUMNE BAND ME-WUK INDIANS Total		1		
A008758	4830	2252	Appropriative	Licensed	TUOLUMNE PARK AND RECREATION DISTRICT	8/12/36	5	Tuolumne	UNSP
					TUOLUMNE PARK AND RECREATION DISTRICT Total		5		
A016173	10371	10989	Appropriative	Licensed	TUOLUMNE UTILITIES DISTRICT	12/7/54	9.1	Tuolumne	UNSP
A018549	13127	7936	Appropriative	Licensed	TUOLUMNE UTILITIES DISTRICT	2/24/59	2	Tuolumne	UNST
A020565	13606	9740	Appropriative	Licensed	TUOLUMNE UTILITIES DISTRICT	1/19/62	28	Tuolumne	UNST
A023813	16949	11576	Appropriative	Licensed	TUOLUMNE UTILITIES DISTRICT	6/22/71	3.9	Tuolumne	UNSP
					TUOLUMNE UTILITIES DISTRICT Total		43		
A001232	1164	5420	Appropriative	Licensed	TURLOCK I D & MODESTO I D	4/8/19	325,000.00	Tuolumne	TUOLUMNE RIVER
A001233	1165	5417	Appropriative	Licensed	TURLOCK I D & MODESTO I D	4/8/19	325,000.00	Stanislaus, Tuolumne	TUOLUMNE RIVER
A001532	1166	5421	Appropriative	Licensed	TURLOCK I D & MODESTO I D	11/21/19	1,851,934.50	Tuolumne	TUOLUMNE RIVER
A003648	3026	2424	Appropriative	Licensed	TURLOCK I D & MODESTO I D	9/24/23	48,595.80	Stanislaus	TUOLUMNE RIVER
A006711	4271	2425	Appropriative	Licensed	TURLOCK I D & MODESTO I D	6/25/30	480,800.40	Stanislaus	TUOLUMNE RIVER
A009996	5909	5418	Appropriative	Licensed	TURLOCK I D & MODESTO I D	9/6/40	868,773.00	Stanislaus, Tuolumne	TUOLUMNE RIVER
A009997	5910	5419	Appropriative	Licensed	TURLOCK I D & MODESTO I D	9/6/40	721,200.60	Stanislaus, Tuolumne	TUOLUMNE RIVER
A014126	9319	11057	Appropriative	Licensed	TURLOCK I D & MODESTO I D	1/16/51	1,046,800.00	Tuolumne	TUOLUMNE RIVER
A014127	9320	11058	Appropriative	Licensed	TURLOCK I D & MODESTO I D	1/16/51	1,046,800.00	Tuolumne	TUOLUMNE RIVER
					TURLOCK I D & MODESTO I D Total		6,714,904.30		
A003139	1699	2580	Appropriative	Licensed	TURLOCK IRRIGATION DISTRICT	4/2/43	436,558.40	Stanislaus	TUOLUMNE RIVER
					TURLOCK IRRIGATION DISTRICT Total		436,558.40		
A004946	2575	1086	Appropriative	Licensed	TWAIN HARTE LAKE ASSOCIATION	6/29/31	181	Tuolumne	CALDER CREEK
					TWAIN HARTE LAKE ASSOCIATION Total		181		
A007058	3825	2727	Appropriative	Licensed	U S STANISLAUS NATL FOREST	8/24/31	25.5	Tuolumne	NORTH FORK TUOLUMNE RIVER
A009759	5475	2728	Appropriative	Licensed	U S STANISLAUS NATL FOREST	10/31/39	25.5	Tuolumne	SHEERING CREEK
A010355	5937	2962	Appropriative	Licensed	U S STANISLAUS NATL FOREST	1/5/42	1.7	Tuolumne	UNST
A010420	5985	2955	Appropriative	Licensed	U S STANISLAUS NATL FOREST	4/1/42	22.4	Tuolumne	GRANITE SPRING
A010487	6035	3189	Appropriative	Licensed	U S STANISLAUS NATL FOREST	7/3/42	1	Tuolumne	UNSP
A010489	6037	2946	Appropriative	Licensed	U S STANISLAUS NATL FOREST	7/3/42	2.2	Tuolumne	UNCR
A010587	6163	4444	Appropriative	Licensed	U S STANISLAUS NATL FOREST	1/4/43	2.6	Tuolumne	UNSP
A015485	9781	5681	Appropriative	Licensed	U S STANISLAUS NATL FOREST	8/27/53	6.7	Tuolumne	MIDDLE FORK TUOLUMNE RIVER
A015828	10132	6319	Appropriative	Licensed	U S STANISLAUS NATL FOREST	4/9/54	3.3	Tuolumne	MIDDLE FORK TUOLUMNE RIVER
A016052	10113	5923	Appropriative	Licensed	U S STANISLAUS NATL FOREST	9/16/54	3.7	Tuolumne	UNSP (2)
A016979	10759	5510	Appropriative	Licensed	U S STANISLAUS NATL FOREST	3/30/56	13.4	Tuolumne	UNSP
A017259	10962	7582	Appropriative	Licensed	U S STANISLAUS NATL FOREST	8/28/56	46.2	Tuolumne	JORDAN CREEK
A018678	12082	7385	Appropriative	Licensed	U S STANISLAUS NATL FOREST	4/30/59	0.7	Tuolumne	UNSP
A018885	12443	7256	Appropriative	Licensed	U S STANISLAUS NATL FOREST	8/3/59	1.2	Tuolumne	CLAVEY ROAD SPRING
A018886	12444	7548	Appropriative	Licensed	U S STANISLAUS NATL FOREST	8/3/59	1.2	Tuolumne	WALTON SPRING
A018887	12445	7530	Appropriative	Licensed	U S STANISLAUS NATL FOREST	8/3/59	1.2	Tuolumne	FLEMING SPRING
A018888	12446	7257	Appropriative	Licensed	U S STANISLAUS NATL FOREST	8/3/59	1.2	Tuolumne	DODGE RIDGE SPRING
A018889	12447	7258	Appropriative	Licensed	U S STANISLAUS NATL FOREST	8/3/59	1.2	Tuolumne	MT LEWIS SPRING
A018891	12449	7865	Appropriative	Licensed	U S STANISLAUS NATL FOREST	8/3/59	1.2	Tuolumne	BROKENDOWN CABIN SPRING
A018892	12450	7259	Appropriative	Licensed	U S STANISLAUS NATL FOREST	8/3/59	1.2	Tuolumne	MARBLE SPRING
					U S STANISLAUS NATL FOREST Total		163.3		
A016931	10631	5990	Appropriative	Licensed	V A RODDEN INC	3/13/56	12.8	Tuolumne	UNST
A016933	10633	5992	Appropriative	Licensed	V A RODDEN INC	3/13/56	11.9	Stanislaus	UNST
A016937	10637	5996	Appropriative	Licensed	V A RODDEN INC	3/13/56	19.6	Stanislaus	JOHNSON CREEK
A016938	10638	5997	Appropriative	Licensed	V A RODDEN INC	3/13/56	6	Stanislaus	GOODWIN CREEK
					V A RODDEN INC Total		50.3		
A020693	13917	8364	Appropriative	Licensed	VERNAN P HATLER	4/2/62	19.2	Tuolumne	UNCR
					VERNAN P HATLER Total		19.2		

A017054	10961	7338	Appropriative	Licensed	VIRGINIA S SATTLER	4/27/56	4.5	Tuolumne	BIG CREEK
					VIRGINIA S SATTLER Total		4.5		
A020636	13832	9176	Appropriative	Licensed	W D FAHEY TRUST	3/2/62	0.3	Tuolumne	UNSP
					W D FAHEY TRUST Total		0.3		
A018757A01B		006636A01B	Appropriative	Licensed	Wagner Family Trust	8/17/92	1.5	Tuolumne	UNST
A020885A	14018	9961	Appropriative	Licensed	Wagner Family Trust	8/2/62	15	Tuolumne	BIG HUMBUG CREEK
A020885B	14018	9962	Appropriative	Licensed	Wagner Family Trust	8/2/62	12	Tuolumne	BIG HUMBUG CREEK
A031545	21252		Appropriative	Permitted	Wagner Family Trust	4/14/10	47.6	Tuolumne	Big Humbug Creek
					Wagner Family Trust Total		76.1		
A019663	12847	7779	Appropriative	Licensed	WILLIAM C RITTS	8/16/60	51.5	Tuolumne	UNST, WEST FORK BIG CREEK
					WILLIAM C RITTS Total		51.5		
A017965	11426	7771	Appropriative	Licensed	WILLIAM L GOOKIN JR	1/29/58	9	Tuolumne	UNST
					WILLIAM L GOOKIN JR Total		9		
					Grand Total		7162449.4		

Merced River Watershed - Post-1914 Appropriative Right Holders

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
A022506	15290	9699	AMANDA VANCE	6/23/66	8.40	Mariposa	UNSP
			AMANDA VANCE Total		8.40		
A017202	10895	8196	BRIAN T SCHUTT	7/27/56	22.40	Mariposa	DUTCH CREEK
A017822	12142	8197	BRIAN T SCHUTT	9/13/57	12.00	Mariposa	DUTCH CREEK
			BRIAN T SCHUTT Total		34.40		
A015747	9795	5714	CALIF DEPT OF FORESTRY & FIRE PROTECTION	5/1/59	33.30	Mariposa	UNSP
			CALIF DEPT OF FORESTRY & FIRE PROTECTION Total		33.30		
A016484	10389	6889	Carol M Menzel	7/25/55	520.00	Mariposa	MAXWELL CREEK
			Carol M Menzel Total		520.00		
A020033	13202	10081	CEDAR LODGE LLC	3/14/61	4.50	Mariposa	UNSP
			CEDAR LODGE LLC Total		4.50		
A018358	11785	7994	CHRISTINA CRAIG	10/3/58	5.40	Mariposa	UNST
			CHRISTINA CRAIG Total		5.40		
A017147	10855	6585	COASTAL DEVELOPMENT COMPANY LLC, INDIAN FLAT	6/22/56	3.60	Mariposa	MERCED RIVER UNDERFLOW
A028726	19939	13089	COASTAL DEVELOPMENT COMPANY LLC, INDIAN FLAT	1/14/86	0.50	Mariposa	UNSP
			COASTAL DEVELOPMENT COMPANY LLC, INDIAN FLAT Total		4.10		
A020935	14124	10181	CRANBERRY GULCH WATER SUPPLY LTD	9/11/62	3.00	Mariposa	CRANBERRY SPRING
			CRANBERRY GULCH WATER SUPPLY LTD Total		3.00		
A017008	10768	6549	DALE HURLEY	4/16/56	10.50	Mariposa	UNST
A018267	11688	9205	DALE HURLEY	8/14/58	14.50	Mariposa	UNST
			DALE HURLEY Total		25.00		
A028991	20429	13735	DAVID RICHARD WILKEY	8/23/07	1.80	Mariposa	UNST
			DAVID RICHARD WILKEY Total		1.80		
A026054	18134	12034	DREAM RANCH WEST LLC	7/25/79	23.00	Mariposa	UNST
A028861	20148	13046	DREAM RANCH WEST LLC	6/19/86	10.00	Mariposa	UNST
			DREAM RANCH WEST LLC Total		33.00		
A010696	6196	6528	Estate of Herbert F. Frey	4/16/62	4.30	Mariposa	BEAN CREEK
			Estate of Herbert F. Frey Total		4.30		
A006762	3650	1847	FISKE TRUST	8/8/30	4.80	Mariposa	UNSP
			FISKE TRUST Total		4.80		
A018695	12514	8655	FRANK R DOMINGUES III	5/7/59	1.50	Mariposa	CRANBERRY SPRING
			FRANK R DOMINGUES III Total		1.50		
A027985	19338		GERALD P HARRISON	3/2/84	21.00	Mariposa	SMITH CREEK
			GERALD P HARRISON Total		21.00		
A014982	9338	6134	GLEN PICKREN	8/20/52	35.00	Mariposa	PLUMBAR CREEK
			GLEN PICKREN Total		35.00		
A017647	11272	6825	HORACE MEYER ESTATE	6/11/57	1.00	Mariposa	UNXX
A017648	11457	6826	HORACE MEYER ESTATE	6/11/57	16.00	Mariposa	UNXX
			HORACE MEYER ESTATE Total		17.00		
A021014	14083	8491	JAMES DICKEY	11/13/62	16.00	Mariposa	DUTCH CREEK
			JAMES DICKEY Total		16.00		
A016639	10434	5721	JAMES D LAW	9/29/55	4.50	Mariposa	UNSP
			JAMES D LAW Total		4.50		
A022268	15006	10524	JAMES E EWERT	8/20/65	18.00	Mariposa	UNST
			JAMES E EWERT Total		18.00		
A027761	19391	12814	JERRY INMAN	5/26/83	1.20	Mariposa	UNST
			JERRY INMAN Total		1.20		
A019463	12765	8917	JOHN REYNOLDS	5/31/60	2.70	Mariposa	CRANBERRY SPRING
			JOHN REYNOLDS Total		2.70		

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
A023205	15972	10272	John C. Fox Revocable Trust	1/7/69	4.30	Mariposa	UNST
			John C. Fox Revocable Trust Total		4.30		
A017496	11036	7522	JOHN H WELCH	3/5/57	25.70	Mariposa	UNSP, UNST
			JOHN H WELCH Total		25.70		
A022076	14930	9082	JOSEPH C LODGE	3/18/65	19.00	Mariposa	LONG CANYON CREEK
			JOSEPH C LODGE Total		19.00		
A017011	10888	7626	KAO CHAO	4/17/56	1.60	Mariposa	UNST
			KAO CHAO Total		1.60		
A011814	7943	3955	Kelsey Ranch LP	4/4/47	1,002.80	Mariposa, Merced	SOUTH FORK DRY CREEK, UNST
			Kelsey Ranch LP Total		1,002.80		
A016348	10503	7813	KENNETH J PULVINO	4/27/55	50.00	Mariposa	BEAN CREEK
			KENNETH J PULVINO Total		50.00		
A016969	10678	5509	LAUREL L ANDERSON	3/26/56	2.70	Mariposa	CRANBERRY SPRING
			LAUREL L ANDERSON Total		2.70		
A013954	8963	4323	LAUREL MUNSON BOYERS	9/20/50	0.20	Mariposa	CRANE CREEK
			LAUREL MUNSON BOYERS Total		0.20		
A018444	12134	7529	LEONARD SYNKOWICZ	12/24/58	1.20	Mariposa	UNST
			LEONARD SYNKOWICZ Total		1.20		
A021760	14875	9687	LLOYD MYERS	5/1/64	16.00	Mariposa	SAXON CREEK
			LLOYD MYERS Total		16.00		
A016736	11046	9275	LYLE TURPIN	11/16/55	55.60	Mariposa	UNST, WILLOW CREEK
			LYLE TURPIN Total		55.60		
A023731	16551	10498	MARGERY M DE LA MARE	3/22/71	1.00	Mariposa	UNSP
			MARGERY M DE LA MARE Total		1.00		
A020422	13988	8553	MARK HAYNES	3/18/68	16.70	Mariposa	EAST FORK PINEY CREEK
			MARK HAYNES Total		16.70		
A024212	16807	11733	MELBA WRIGHT	10/18/72	22.00	Mariposa	UNST
A027198	19304	12739	MELBA WRIGHT	2/2/82	8.20	Mariposa	UNST
			MELBA WRIGHT Total		30.20		
A020524	13735	8385	MERCED COMMUNITY COLLEGE DISTRICT	12/13/61	3.40	Mariposa	UNSP
			MERCED COMMUNITY COLLEGE DISTRICT Total		3.40		
A001221	912	990	MERCED IRRIGATION DISTRICT	3/26/19	868,773.00	Mariposa	MERCED RIVER
A001222	913	2684	MERCED IRRIGATION DISTRICT	3/26/19	491,080.20	Mariposa	MERCED RIVER
A001224	914	2685	MERCED IRRIGATION DISTRICT	6/20/03	345,440.00	Mariposa, Merced	MERCED RIVER
A016186	12825	11395	MERCED IRRIGATION DISTRICT	6/20/03	605,000.00	Mariposa	MERCED RIVER
A016187	12826	11396	MERCED IRRIGATION DISTRICT	12/23/54	1,861,824.90	Mariposa	MERCED RIVER
			MERCED IRRIGATION DISTRICT Total		4,172,118.10		
A019859	13044	8192	MIGUEL FLORES JR	11/28/60	2.50	Mariposa	UNXX
			MIGUEL FLORES JR Total		2.50		
A017204	10846	5919	MJ OAKS LLC	7/31/56	0.80	Mariposa	UNST
			MJ OAKS LLC Total		0.80		
A016463	10443	7282	OLIVER HAYCRAFT	7/13/55	18.00	Mariposa	UNST
			OLIVER HAYCRAFT Total		18.00		
A025842	17639	11876	P ORD HATTON	10/5/78	34.00	Mariposa	UNST
			P ORD HATTON Total		34.00		
A009056	5056	2555	PacificUS Real Estate Group	7/29/37	47.10	Mariposa	UNSP
A016646	10487	10522	PacificUS Real Estate Group	10/4/55	21.00	Mariposa	UNSP
			PacificUS Real Estate Group Total		68.10		

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
A016994	10556	6534	PHILIP M HOULIHAN	4/9/56	48.00	Mariposa	DUTCH CREEK
A017786	11217	6535	PHILIP M HOULIHAN	8/19/57	27.00	Mariposa	DUTCH CREEK
			PHILIP M HOULIHAN Total		75.00		
A016559	10845	7366	RICHARD FERRY	8/30/55	72.40	Mariposa	PORATH GULCH
			RICHARD FERRY Total		72.40		
A020476	13787	8658	ROBERT W KINGMAN	11/6/61	16.00	Mariposa	DUTCH CREEK
			ROBERT W KINGMAN Total		16.00		
A016431	10264	6363	ROBERTA G FLANAGAN	6/21/55	2.50	Mariposa	UNXX
			ROBERTA G FLANAGAN Total		2.50		
A012986	7809	3778	ROD KENNEC	3/17/49	17.90	Mariposa	LITTLE BEAR CREEK
			ROD KENNEC Total		17.90		
A016653	10486	6321	RODNEY A BAKER	10/10/55	17.10	Mariposa	SMITH CREEK
			RODNEY A BAKER Total		17.10		
A028536	19785	13775	RONALD B LUFFY	9/5/08	4.30	Mariposa	UNST
			RONALD B LUFFY Total		4.30		
A020969	14119	8707	ROSEMARY M GAMBLIN	10/5/62	31.50	Mariposa	DUTCH CREEK, UNST
			ROSEMARY M GAMBLIN Total		31.50		
A017012	10889	7627	RUSSELL BOCKHOP	4/17/56	8.00	Mariposa	UNST
			RUSSELL BOCKHOP Total		8.00		
A017523	11236	7138	THE BARRIER	3/22/57	9.30	Mariposa	UNST
			THE BARRIER Total		9.30		
A020765	13763	8358	The Estate of William Rottenkolber	5/3/62	10.00	Mariposa	UNST
			The Estate of William Rottenkolber Total		10.00		
A019306	12551	6891	THERAN L BALMAIN	3/14/60	0.60	Mariposa	UNXX
			THERAN L BALMAIN Total		0.60		
A018430	11877	9147	Tidall Virginia	12/9/58	46.00	Mariposa	BEAN CREEK
			Tidall Virginia Total		46.00		
A014979	9336	6392	TRAIAN MICU	8/19/52	180.00	Mariposa	SMITH CREEK
A031125	21122		TRAIAN MICU	1/10/01	60.00	Mariposa	SMITH CREEK
			TRAIAN MICU Total		240.00		
A018097	11726	7117	Transition Mountain Properties	4/21/58	4.20	Mariposa	MILLER GULCH
			Transition Mountain Properties Total		4.20		
A029559	20689	13768	U S BUREAU OF LAND MANAGEMENT	6/19/08	2.40	Mariposa	UNSP
			U S BUREAU OF LAND MANAGEMENT Total		2.40		
A006729	3549	6112	U S NATIONAL PARK SERVICE	7/11/30	170.60	Madera	UNSP (2)
A010488	6036	2973	U S NATIONAL PARK SERVICE	7/3/42	7.30	Mariposa	CRANE CREEK
A019116	12387	11233	U S NATIONAL PARK SERVICE	12/2/59	76.50	Mariposa	MOSS CREEK
			U S NATIONAL PARK SERVICE Total		254.40		
A019671	12991	8390	U S SIERRA NATL FOREST	8/18/60	0.30	Madera	UNSP
A027715	19740	13206	U S SIERRA NATL FOREST	4/12/83	0.10	Mariposa	UNST
A027717	19741	13207	U S SIERRA NATL FOREST	4/12/83	0.10	Mariposa	UNST
A027718	19742	13155	U S SIERRA NATL FOREST	4/12/83	0.10	Mariposa	UNST
			U S SIERRA NATL FOREST Total		0.60		
A011772	6842	3408	U S STANISLAUS NATL FOREST	3/12/47	0.90	Mariposa	UNSP
A017904	11347	6441	U S STANISLAUS NATL FOREST	12/4/57	1.00	Mariposa	PROUTY SPRING
A022229	15102	10349	U S STANISLAUS NATL FOREST	7/19/65	3.30	Mariposa	JORDAN CREEK
			U S STANISLAUS NATL FOREST Total		5.20		
A028321	19652	13486	US BUREAU OF LAND MANAGEMENT	11/9/84	0.40	Mariposa	UNST
A028322	19653		US BUREAU OF LAND MANAGEMENT	11/9/84	0.10	Mariposa	UNSP
			US BUREAU OF LAND MANAGEMENT Total		0.50		

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A023074	15746	10295	VERE GEARY	6/26/68	22.00	Mariposa	UNST
			VERE GEARY Total		22.00		
A014721	9768	6166	W B STURTEVANT	3/20/52	80.00	Mariposa	EAST FORK PINEY CREEK
			W B STURTEVANT Total		80.00		
A029615	20574		WALTER K BUNT & DOROTHY L BUNT TRUST ETAL	11/15/89	8.00	Mariposa	UNST
			WALTER K BUNT & DOROTHY L BUNT TRUST ETAL Total		8.00		
A029012	20543	13561	Wendy L Garrish	9/10/03	0.70	Mariposa	PINEY CREEK
			Wendy L Garrish Total		0.70		
A018244	11854	7131	YOSEMITE-MARIPOSA KOA	7/30/58	4.50	Mariposa	UNST
			YOSEMITE-MARIPOSA KOA Total		4.50		
			Grand Total		4,175,203.90		

San Joaquin River Watershed - Post-1914 Appropriative Rights

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
A015789	9819	5684	ALLISON S FAHEY	3/22/54	597	Stanislaus	DRY CREEK
			ALLISON S FAHEY Total		597		
A028622	20118	13057	ANITA SERRANO	11/19/85	200	Merced	DUTCHMAN CREEK
			ANITA SERRANO Total		200		
A017775	11410	7344	ANTHONY VALLELUNGA	8/16/57	44	Merced	DEADMAN CREEK
			ANTHONY VALLELUNGA Total		44		
A013018	7777	6132	ANTHONY J DUTRA	4/5/49	361.1	Stanislaus	STANISLAUS RIVER
			ANTHONY J DUTRA Total		361.1		
A028539	19943	13034	ARMELIM DE SOUSA	8/19/85	293	Stanislaus	UNST (AKA VIVIAN SLOUGH)
			ARMELIM DE SOUSA Total		293		
A013679	8224	4313	ARTHUR BRIGHT	4/7/50	1,592.80	Merced	DEADMAN CREEK
			ARTHUR BRIGHT Total		1,592.80		
A023257	16003	10359	AUGUST KNITTEL	4/10/69	4.00	Fresno	UNST
A023258	16002	10358	AUGUST KNITTEL	4/10/69	18.10	Fresno	UNST
A023313	16004	10360	AUGUST KNITTEL	7/15/69	1.70	Fresno	UNST
			AUGUST KNITTEL Total		23.80		
A024900	17060	13099	BASS LAKE SCHOOL DISTRICT	10/14/75	2.70	Madera	UNSP
			BASS LAKE SCHOOL DISTRICT Total		2.70		
A003736	1887	3927	BASS LAKE WATER COMPANY	5/20/54	217.20	Madera	North Fork Willow Creek
A011270	6514	3928	BASS LAKE WATER COMPANY	1/30/46	36.20	Madera	North Fork Willow Creek
A015566	11072	9993	BASS LAKE WATER COMPANY	10/5/53	355.00	Madera	North Fork Willow Creek
			BASS LAKE WATER COMPANY Total		608.40		
A020649	13814	8403	BIG CREEK COMMUNITY SERVICE DISTRICT	3/9/62	57.90	Fresno	BIG CREEK
			BIG CREEK COMMUNITY SERVICE DISTRICT Total		57.90		
A009573	5463	2847	BILL J LYONS JR	5/1/39	4,781.80	Stanislaus	TUOLUMNE RIVER
			BILL J LYONS JR Total		4,781.80		
A012634	8701	5875	BILLY D GRISSOM	8/6/48	1,467.80	Merced	DUCK SLOUGH
			BILLY D GRISSOM Total		1,467.80		
A001730	863	1661	BORBA FAMILY HOME & STEVINSON RANCH LP	3/22/20	955.1	Merced	MERCED RIVER
			BORBA FAMILY HOME & STEVINSON RANCH LP Total		955.1		
A015835	9925	7298	BRENDA KNUTSON	4/14/54	11.8	Stanislaus	DRY CREEK
			BRENDA KNUTSON Total		11.8		
A013697	8179	4470	BRICHETTO TRUST	4/19/50	1,463.80	Stanislaus	UNCR
			BRICHETTO TRUST Total		1,463.80		
A021823	14922	9360	BRIGHT'S NURSERY INCORPORATED	5/8/70	685	Merced	DEADMAN CREEK
			BRIGHT'S NURSERY INCORPORATED Total		685		
A006963	3885	5495	BROCCHINI FARMS INC	5/19/31	4,096.90	Stanislaus	STANISLAUS RIVER
			BROCCHINI FARMS INC Total		4,096.90		
A018526	14677	8400	BRUCE AVERY	2/10/59	333.8	San Joaquin	STANISLAUS RIVER
			BRUCE AVERY Total		333.8		
A011741	6924	4420	CALIF DEPARTMENT OF TRANSPORTATION	2/21/47	204.7	Stanislaus	STANISLAUS RIVER
			CALIF DEPARTMENT OF TRANSPORTATION Total		204.7		
A001935	848	349	Camp Sierra Improvement Association	3/31/24	29.40	Fresno	ALDER CREEK
			Camp Sierra Improvement Association Total		29.40		
A011047	7583	8706	CHOWCHILLA WATER DISTRICT	5/9/45	6,195.70	Madera	ASH CREEK, BERENDA SLOUGH
A013175	9136	8577	CHOWCHILLA WATER DISTRICT	6/27/49	77,312.80	Madera	CHOWCHILLA RIVER
			CHOWCHILLA WATER DISTRICT Total		83,508.50		
A018718	12939	8257	CHRISTOPHER H GALFO	11/30/67	47.00	Fresno	LITTLE SANDY CREEK
A019193	12940	7818	CHRISTOPHER H GALFO	1/26/60	28.00	Fresno	UNST
			CHRISTOPHER H GALFO Total		75.00		

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A004102	1816	2883	City of Modesto WQC Primary	10/22/47	1,219.90	Stanislaus	SAN JOAQUIN RIVER
			City of Modesto WQC Primary Total		1,219.90		
A013541	9076	4689	COSTA VIEW FARMS #2, A CA GEN PARTNERSHIP	9/20/57	21,689.60	Madera	FRESNO RIVER
A013541	9076	4689	COSTA VIEW FARMS #2, A CA GEN PARTNERSHIP	9/20/57	21,689.60	Madera	FRESNO RIVER
			COSTA VIEW FARMS #2, A CA GEN PARTNERSHIP Total		43,379.20		
A023231	16200	10592	COTTONWOOD CREEK VINEYARDS PARTNERSHIP	2/6/69	920	Madera	COTTONWOOD CREEK
			COTTONWOOD CREEK VINEYARDS PARTNERSHIP Total		920		
A012674	7675	7556	Couchman Brothers	9/2/48	1,622.70	Stanislaus	TUOLUMNE RIVER
			Couchman Brothers Total		1,622.70		
A024298	16638	11097	COUNTY OF MERCED	2/2/73	5	Merced	UNST
			COUNTY OF MERCED Total		5		
A027544	18910	12372	Cynthia A. Downing	9/30/82	0.30	Fresno	UNSP
			Cynthia A. Downing Total		0.30		
A028192	19732	12955	D & D LAND & WATER INC	7/16/84	907	Merced	SAN JOAQUIN RIVER
			D & D LAND & WATER INC Total		907		
A029966	20860		D.M. BRYANT FARMS INC	6/17/91	21.50	Madera	UNST
			D.M. BRYANT FARMS INC Total		21.50		
A023214	15869	10375	DAMAN PITTS	1/28/69	33.00	Fresno	UNST
			DAMAN PITTS Total		33.00		
A014104	8683	4081	DEER CREEK WATER ASSOCIATION	12/14/50	2.80	Fresno	DEER CREEK
			DEER CREEK WATER ASSOCIATION Total		2.80		
A026121	19395		DIRK J VLOT	10/22/79	2,534.00	Madera	EASTSIDE BYPASS
			DIRK J VLOT Total		2,534.00		
A027241	19140	12867	DM BRYANT FARMS INC	3/9/82	30.00	Madera	UNST
A027242	19141	12868	DM BRYANT FARMS INC	3/9/82	30.00	Madera	UNST
A027243	19142	12869	DM BRYANT FARMS INC	3/9/82	6.00	Madera	UNST
A027244	19143	12870	DM BRYANT FARMS INC	3/9/82	13.00	Madera	UNST
A027245	19144	12871	DM BRYANT FARMS INC	3/9/82	4.00	Madera	LITTLE FINE GOLD CREEK
			DM BRYANT FARMS INC Total		83.00		
A016465	10407	5578	DONALD HARCKSEN	7/14/55	19.6	Merced	MERCED RIVER
			DONALD HARCKSEN Total		19.6		
A014455	9568	4428	DONALD L SMITH	8/30/51	171.10	Madera	UNST
			DONALD L SMITH Total		171.10		
A013071	8703	4456	Donald L. Smith, Trustee	5/3/49	301.5	Merced	DUCK SLOUGH
			Donald L. Smith, Trustee Total		301.5		
A006467	3448	1295	DONALD M HEINY	10/26/29	190.2	Stanislaus	SAN JOAQUIN RIVER
			DONALD M HEINY Total		190.2		
A024520	19878	12836	DOROTHY R AYERS FAMILY TRUST	1/7/74	19.50	Madera	ARNOLD CREEK
			DOROTHY R AYERS FAMILY TRUST Total		19.50		
A025872	17656	11870	Double A Ranches	11/16/78	20	Stanislaus	UNST
			Double A Ranches Total		20		
A012396	7348	4949	EAST STANISLAUS RESOURCES CONSERVATION DISTRICT	3/11/48	487.9	Stanislaus	TUOLUMNE RIVER
			EAST STANISLAUS RESOURCES CONSERVATION DISTRICT Total		487.9		
A019738	12923	7494	EDWIN DANIELS	9/14/60	1.30	Madera	UNSP
			EDWIN DANIELS Total		1.30		
A017633	11484	6138	EL CAJON RETIREMENT RESIDENCE LP	5/31/57	77.4	Merced	UNST
A017812	11485	6139	EL CAJON RETIREMENT RESIDENCE LP	9/4/57	8.7	Merced	CANAL CREEK, UNST
A017813	11486	6140	EL CAJON RETIREMENT RESIDENCE LP	9/4/57	33.1	Merced	UNST

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A018329	11781	6141	EL CAJON RETIREMENT RESIDENCE LP	9/23/58	1.3	Merced	UNST
A018330	11782	6142	EL CAJON RETIREMENT RESIDENCE LP	9/23/58	2.2	Merced	UNST
A024071	16613	10681	EL CAJON RETIREMENT RESIDENCE LP	5/22/72	7	Merced	UNST
			EL CAJON RETIREMENT RESIDENCE LP Total		129.7		
A018993	12472	9790	ELSIE KING	9/18/59	590	Stanislaus	VIVIAN SLOUGH
			ELSIE KING Total		590		
A020244	13495	7998	EST OF D E JACKSON & DIXIE R JACKSON	6/2/61	4.50	Madera	UNSP
			EST OF D E JACKSON & DIXIE R JACKSON Total		4.50		
A016317	10209	7574	FORD RANCH INC	4/19/55	50.00	Fresno	UNST
A019577	12771	7631	FORD RANCH INC	7/26/60	26.00	Fresno	UNST
A019578	12772	7632	FORD RANCH INC	7/26/60	19.50	Fresno	UNST
A019581	12773	7635	FORD RANCH INC	7/26/60	13.10	Fresno	UNST
			FORD RANCH INC Total		108.60		
A011555	6742	3459	FRANK J GOMES DAIRY	9/17/46	941.2	Merced	MERCED RIVER
			FRANK J GOMES DAIRY Total		941.2		
A016329	11460	10393	GALLO CATTLE COMPANY, A PARTNERSHIP	4/21/55	9,020.00	Merced	LIVINGSTON DRAIN
A016604	11121	7220	GALLO CATTLE COMPANY, A PARTNERSHIP	9/15/55	7,239.80	Merced	UNSL
			GALLO CATTLE COMPANY, A PARTNERSHIP Total		16,259.80		
A012715	8354	4948	GALLO VINEYARDS, INC. (LIVINGSTON RANCH)	9/27/48	493.7	Merced	MERCED RIVER
			GALLO VINEYARDS, INC. (LIVINGSTON RANCH) Total		493.7		
A012987	7734	10045	GARY M BARTON	3/18/49	1,506.00	San Joaquin	STANISLAUS RIVER, UNSL
A013099	7768	9123	GARY M BARTON	5/17/49	83	San Joaquin, Stanislaus	STANISLAUS RIVER
A013100	7769	6130	GARY M BARTON	5/17/49	170.6	Stanislaus	STANISLAUS RIVER
A018715	12116	9960	GARY M BARTON	5/18/59	66	Stanislaus	STANISLAUS RIVER
			GARY M BARTON Total		1825.6		
A010255	5965	6445	GEORGE C JONES III	8/21/41	1,423.40	Merced	DRY CREEK
			GEORGE C JONES III Total		1,423.40		
A015680	9749	5653	GERTRUDE PELUCCA	1/11/54	273.7	Stanislaus	STANISLAUS RIVER
			GERTRUDE PELUCCA Total		273.7		
A020975	14129	9545	GIN FLATS LLC	10/9/62	2.20	Fresno	UNSP
			GIN FLATS LLC Total		2.20		
A010466	6064	3429	GIRARDI FARMS	5/25/42	1,279.40	San Joaquin	STANISLAUS RIVER
A014716	9011	4539	GIRARDI FARMS	3/17/52	474.5	San Joaquin	STANISLAUS RIVER
			GIRARDI FARMS Total		1753.9		
A023031	16060		GRAVELLY FORD WATER DISTRICT	4/18/68	5,000.00	Madera	COTTONWOOD CREEK
			GRAVELLY FORD WATER DISTRICT Total		5,000.00		
A003664	2360	1307	GRAVELSTONE RANCH LP	10/5/23	365	Merced	MERCED RIVER
A006603	3581	2429	GRAVELSTONE RANCH LP	3/17/30	660.6	Merced	MERCED RIVER
			GRAVELSTONE RANCH LP Total		1025.6		
A012262	7309	6985	Gregory B. Reed	1/26/48	2,171.90	Stanislaus	TUOLUMNE RIVER
			Gregory B. Reed Total		2,171.90		
A017208	12313	10673	HARRY H BAKER JR	8/3/56	580	Madera	FRESNO RIVER
			HARRY H BAKER JR Total		580		
A016662	10345	9816	HARRY H BAKER JR TRUST	10/10/55	230	Stanislaus	SAN JOAQUIN RIVER
			HARRY H BAKER JR TRUST Total		230		
A005702	3001	1880	HOOGENDAM FAMILY LIMITED PARTNERSHIP	9/29/27	426.5	Merced	NORTH SLOUGH MARIPOSA CREEK

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A005703	3002	1881	HOOGENDAM FAMILY LIMITED PARTNERSHIP	9/29/27	1,279.40	Merced	NORTH SLOUGH MARIPOSA CREEK
			HOOGENDAM FAMILY LIMITED PARTNERSHIP Total		1,705.90		
A016934	10634	5993	JACK J GARDELLA JR	3/13/56	15	Tuolumne	UNST
A019042	12593	6945	JACK J GARDELLA JR	10/21/59	55	Tuolumne	UNST
A020976	14123	8248	JACK J GARDELLA JR	10/9/62	19	Tuolumne	UNST
			JACK J GARDELLA JR Total		89		
A020271	13380	8124	JAMES CURTONI	6/20/61	9	Stanislaus	UNST
			JAMES CURTONI Total		9		
A020364B	13428	008351B	JAMES R CHANCE	3/18/88	8	Merced	UNST
A022977B	15637	009776A	JAMES R CHANCE	3/18/88	50.5	Merced	UNST
			JAMES R CHANCE Total		58.5		
A009301	5192	4576	JAMES R DEMARTINI	5/20/38	1,066.10	Stanislaus	TUOLUMNE RIVER
			JAMES R DEMARTINI Total		1,066.10		
A001195	588	4934	JAMES S CODDINGTON	2/26/19	15,897.80	Stanislaus	SAN JOAQUIN RIVER
			JAMES S CODDINGTON Total		15,897.80		
A027546	19615		JEFF A LION	8/5/96	15,700.00	Madera	EASTSIDE BYPASS (AKA CHOWCHILLA CANAL)
			JEFF A LION Total		15,700.00		
A026829	18359	12028	Jerry Hollingshead	5/21/81	0.20	Fresno	UNSP
			Jerry Hollingshead Total		0.20		
A028679	20259	13270	JIMMY W LIPE	12/23/85	2.40	Fresno	UNST
A028908	20258	13271	JIMMY W LIPE	9/25/86	3.60	Fresno	UNST
			JIMMY W LIPE Total		6.00		
A020364C	13428	008351C	JOHN SMALLEY	3/18/88	1	Merced	UNST
A022977C	15637	009776A	JOHN SMALLEY	3/18/88	11.3	Merced	UNST
			JOHN SMALLEY Total		12.3		
A006748	3880	2549	JOHN VANDERSCHAAF JR	7/24/30	729.9	San Joaquin	LONE TREE CREEK
			JOHN VANDERSCHAAF JR Total		729.9		
A011003A	007582A	9073	JOHN HANCOCK LIFE INS. CO.	3/9/45	5,727.40	Madera	FRESNO RIVER
			JOHN HANCOCK LIFE INS. CO. Total		5,727.40		
A001442F	940	000388F	JOHN J SHAW	9/10/19	40.6	Merced	MERCED RIVER
			JOHN J SHAW Total		40.6		
A025373	17078	11286	JOHN M LASGOITY	5/31/77	24	Madera	UNST
			JOHN M LASGOITY Total		24		
A006539	3403	2044	JOSE DA SILVA	1/20/30	27.1	San Joaquin	UNDR
			JOSE DA SILVA Total		27.1		
A001322	890	311	JOSEPH E GALLO	6/11/19	182.5	Merced	MERCED RIVER
			JOSEPH E GALLO Total		182.5		
A016895	10696	6421	JOSEPH J CARDOZA	2/15/56	45.8	Merced	MERCED RIVER
			JOSEPH J CARDOZA Total		45.8		
A013414	7929	5274	Karlene H Bert	10/24/49	799.3	Stanislaus	STANISLAUS RIVER
			Karlene H Bert Total		799.3		
A011814	7943	3955	Kelsey Ranch LP	4/4/47	1,002.80	Mariposa, Merced	SOUTH FORK DRY CREEK, UNST
A018344	11787	6738	Kelsey Ranch LP	9/29/58	8.8	Merced	UNCR
A018345	11788	6480	Kelsey Ranch LP	9/29/58	5.6	Merced	UNCR
A018346	11789	6481	Kelsey Ranch LP	9/29/58	4.2	Merced	UNCR
A018347	11790	6482	Kelsey Ranch LP	9/29/58	8.1	Merced	UNCR
A018348	11791	6739	Kelsey Ranch LP	9/29/58	9	Merced	UNCR
			Kelsey Ranch LP Total		1038.5		
A022294	15550	10429	L EUGENE MONDO	9/24/65	26	Stanislaus	STANISLAUS RIVER

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			L EUGENE MONDO Total		26		
A026088	18077	12047	LEWIS MATHIS	9/13/79	188	Merced	UNST
			LEWIS MATHIS Total		188		
A027759	19031	12557	LINDA OUIMETTE	5/26/83	0.10	Madera	UNSP
			LINDA OUIMETTE Total		0.10		
A019746	12982	8031	LIVE OAK TRUST	9/20/60	17.00	Fresno	UNST
			LIVE OAK TRUST Total		17.00		
A018540	12215	8522	LURINE S TOPHAM	2/19/59	37.50	Fresno	UNST
A019005	12999	8523	LURINE S TOPHAM	9/28/59	45.00	Fresno	UNST
A020869	13897	8524	LURINE S TOPHAM	7/25/62	20.00	Fresno	UNST
A021951	15093	8525	LURINE S TOPHAM	11/4/64	10.00	Fresno	UNST
A022269	15094	9153	LURINE S TOPHAM	8/20/65	20.00	Fresno	UNST
A027159	19743	13028	LURINE S TOPHAM	12/23/81	3.10	Fresno	UNST
A027160	19744	13029	LURINE S TOPHAM	12/23/81	3.20	Fresno	UNST
			LURINE S TOPHAM Total		138.80		
A010710	6241	5077	M & R ZOLEZZI A PARTNERSHIP	9/11/43	273.7	San Joaquin	STANISLAUS RIVER
			M & R ZOLEZZI A PARTNERSHIP Total		273.7		
A017311	11172	9229	MADERA IRRIGATION DISTRICT	10/4/56	4,700.00	Madera	FRESNO RIVER
			MADERA IRRIGATION DISTRICT Total		4,700.00		
A013344	8355	6418	MAGNESON REVOCABLE TRUST	9/8/49	1,122.30	Merced	MERCED RIVER
			MAGNESON REVOCABLE TRUST Total		1,122.30		
A005316	2937	4912	MCMULLIN RECL DISTRICT #2075	12/24/26	35,293.90	San Joaquin	STANISLAUS RIVER
A017966	14674	10403	MCMULLIN RECL DISTRICT #2075	1/29/58	490	San Joaquin	STANISLAUS RIVER
			MCMULLIN RECL DISTRICT #2075 Total		35783.9		
A016136	10115	7561	MENEFEE RIVER RANCH COMPANY	11/15/54	856.9	Merced	FRESNO RIVER
A026875	19669	13106	MENEFEE RIVER RANCH COMPANY	6/16/81	4,470.00	Merced	SAN JOAQUIN RIVER
			MENEFEE RIVER RANCH COMPANY Total		5,326.90		
A028626	20066	13378	MERCED COUNTY FIRE DEPARTMENT	11/25/85	0.4	Merced	MERCED RIVER
			MERCED COUNTY FIRE DEPARTMENT Total		0.4		
A001224	914	2685	MERCED IRRIGATION DISTRICT	6/20/03	345,440.00	Mariposa, Merced	MERCED RIVER
A006807	5732	5227	MERCED IRRIGATION DISTRICT	9/27/30	1,251.20	Merced	DEADMAN CREEK
A008238	4893	6032	MERCED IRRIGATION DISTRICT	2/11/35	5,066.00	Merced	DUCK SLOUGH
A010572	6808	6047	MERCED IRRIGATION DISTRICT	6/20/03	63,719.90	Merced	MERCED RIVER
A018774	13088	9429	MERCED IRRIGATION DISTRICT	6/8/59	5,000.00	Merced	DUCK SLOUGH
			MERCED IRRIGATION DISTRICT Total		420,477.10		
A005269	2727	1173	MICHAEL PASSALAQUA	11/15/26	635.4	Stanislaus	TUOLUMNE RIVER
			MICHAEL PASSALAQUA Total		635.4		
A004233	2261	1616	MICHAEL J KNAPP	2/28/36	255.5	Madera	CHOWCHILLA RIVER
A004233	2261	1616	MICHAEL J KNAPP	2/28/36	255.5		
			MICHAEL J KNAPP Total		511		
A025113	17303	11417	MICHELLE MIDBOE	7/27/76	0.30	Fresno	UNSP
			MICHELLE MIDBOE Total		0.30		
A006393	3386	3044	MOONSHINE DAIRY	8/3/29	868.8	Stanislaus	SAN JOAQUIN RIVER
			MOONSHINE DAIRY Total		868.8		
A017729	11214	6782	MUIR TRAIL RANCH, INC	7/19/57	271.70	Fresno	SENGER CREEK
			MUIR TRAIL RANCH, INC Total		271.70		
A013218	8130	5170	Myers Ranch, LLC	7/8/49	1,630.40	Merced	SNAKE SLOUGH
			Myers Ranch, LLC Total		1,630.40		
A011048	7584	5753	N & W Land Co. LLC	6/30/59	3,979.70	Madera	FRESNO RIVER
			N & W Land Co. LLC Total		3,979.70		

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
A020148	13372	7960	NANCY GASSETT	5/25/61	5.90	Fresno	UNST
			NANCY GASSETT Total		5.90		
A010957	6373	3036	NORTH FORK COMMUNITY DEVELOPMENT COUNCIL	1/15/45	44.20	Madera	SOUTH FORK WILLOW CREEK
			NORTH FORK COMMUNITY DEVELOPMENT COUNCIL Total		44.20		
A008892	4924	2634	OAKDALE IRRIGATION DISTRICT	2/3/37	1,665.90	Stanislaus	STANISLAUS RIVER
A009666	5421	2706	OAKDALE IRRIGATION DISTRICT	7/17/39	616.5	Stanislaus	STANISLAUS RIVER
			OAKDALE IRRIGATION DISTRICT Total		2282.4		
A025688	17834	11824	PATRICIA J MANNING	3/3/78	1,471.00	Madera	SAN JOAQUIN RIVER
			PATRICIA J MANNING Total		1,471.00		
A011324	6615	3051	PATRICK DAVID MARTIN	3/25/46	4.50	Fresno	UNSP
			PATRICK DAVID MARTIN Total		4.50		
A027777	19139		PHIL MUELLER	6/23/83	85	Merced	DUTCHMAN CREEK
A027880	19591		PHIL MUELLER	9/16/83	85	Merced	DUTCHMAN CREEK
			PHIL MUELLER Total		170		
A001633	784	2072	PHILIP DICKERSON	1/20/20	1,518.30	Stanislaus	TUOLUMNE RIVER
A004607	2357	2071	PHILIP DICKERSON	5/26/25	356.6	Stanislaus	TUOLUMNE RIVER
			PHILIP DICKERSON Total		1874.9		
A023561	16184	10646	PREMIERE AGRICULTURAL PROPERTIES LLC	7/20/70	720	Madera	COTTONWOOD CREEK
			PREMIERE AGRICULTURAL PROPERTIES LLC Total		720		
A014484	9229	5249	RANCHERIA WATER & IMPROVEMENT ASSN	9/14/51	3.90	Fresno	POTTER CREEK
			RANCHERIA WATER & IMPROVEMENT ASSN Total		3.90		
A015919	10316	8498	RAY GENE VELDHUIS	6/18/54	815.2	Merced	JONES DRAIN
			RAY GENE VELDHUIS Total		815.2		
A004945	2593	1336	RECLAMATION DISTRICT #2039	3/5/26	56,904.60	San Joaquin	MIDDLE RIVER, TRAPPER SLOUGH
			RECLAMATION DISTRICT #2039 Total		56,904.60		
A010365	5942	3035	REDEVELOPMENT AGENCY OF THE COUNTY OF MADERA	1/19/42	36.20	Fresno	SOUTH FORK WILLOW CREEK
			REDEVELOPMENT AGENCY OF THE COUNTY OF MADERA Total		36.20		
A001442C	940	000388C	RICCI THORESON	9/10/19	123.7	Merced	MERCED RIVER
			RICCI THORESON Total		123.7		
A026674	18416	12251	RICHARD LIAL	12/23/80	10.3	Stanislaus	UNST
A029133	20326	13324	RICHARD LIAL	11/9/87	6	Stanislaus	UNST
			RICHARD LIAL Total		16.3		
A011390	6631	7451	RICHARD MARCHY	5/4/46	818.2	Stanislaus	TUOLUMNE RIVER
			RICHARD MARCHY Total		818.2		
A004460	2277	8697	RIVER JUNCTION RECL DIST NO 2064	2/14/25	30,828.30	San Joaquin	SAN JOAQUIN RIVER, STANISLAUS RIVER
			RIVER JUNCTION RECL DIST NO 2064 Total		30,828.30		
A009834	5533	2827	Robert Albert Brocchini Trust	2/21/40	2,129.60	San Joaquin	STANISLAUS RIVER
A013628	8140	4918	Robert Albert Brocchini Trust	3/10/50	366	Stanislaus	STANISLAUS RIVER
			Robert Albert Brocchini Trust Total		2495.6		
A025168	17424	11416	ROBERT B FITZGERALD	10/5/76	0.40	Fresno	UNSP
			ROBERT B FITZGERALD Total		0.40		
A020364A	13428	008351A	ROBINSON CATTLE COMPANY	3/18/88	16	Merced	UNST
A022976	15636	9777	ROBINSON CATTLE COMPANY	1/31/68	37	Merced	UNST
A022977A	15637	009776A	ROBINSON CATTLE COMPANY	3/18/88	1.9	Merced	UNST
			ROBINSON CATTLE COMPANY Total		54.9		
A001628	692	289	Roger K Beeman	1/15/20	251.8	Stanislaus	STANISLAUS RIVER
A003516	1620	2009	Roger K Beeman	4/1/40	901.5	Stanislaus	STANISLAUS RIVER
			Roger K Beeman Total		1153.3		
A020135	13652	8479	ROY H RICHARDS	5/17/61	48.9	Merced	UNST

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
			ROY H RICHARDS Total		48.9		
A017362	10979	6834	ROY N TALLMAN	11/19/56	10.00	Fresno	UNXX
A017363	10980	6835	ROY N TALLMAN	11/19/56	48.00	Fresno	UNXX
A017364	10981	6836	ROY N TALLMAN	11/19/56	8.00	Fresno	UNXX
			ROY N TALLMAN Total		66.00		
A004061	1901	937	Sharon D. Naraghi	3/9/42	182	Stanislaus	DRY CREEK
A009225	5127	2374	Sharon D. Naraghi	1/12/38	477.6	Stanislaus	DRY CREEK
			Sharon D. Naraghi Total		659.6		
A004709	2381	2131	SHEILA KLIEWER	7/21/25	0.70	Madera	UNSP
			SHEILA KLIEWER Total		0.70		
A015924	10002	5636	SHIRLEY M WELDON	6/21/54	48.00	Fresno	LITTLE DRY CREEK, UNST
A015925	10003	5637	SHIRLEY M WELDON	6/21/54	48.00	Fresno	LITTLE DRY CREEK, UNST
			SHIRLEY M WELDON Total		96.00		
A020138	13359	9235	SIERRA LINDA MUTUAL WATER COMPANY INC	5/19/61	16.80	Madera	UNSP
			SIERRA LINDA MUTUAL WATER COMPANY INC Total		16.80		
A005271	2761	741	SIERRA PINES YOUTH CAMP, INC	11/16/26	14.50	Madera	UNSP (2)
			SIERRA PINES YOUTH CAMP, INC Total		14.50		
A017751	11504	6280	SPRING CREEK IMPROVEMENT ASSN	8/1/57	2.80	Fresno	SPRING CREEK
			SPRING CREEK IMPROVEMENT ASSN Total		2.80		
A018950			STATE WATER RESOURCES CONTROL BOARD	8/28/59	0	Madera	FRESNO RIVER
			STATE WATER RESOURCES CONTROL BOARD Total		0		
A028166	19456	12734	STEVE FIELDS	6/21/84	10	Stanislaus	UNST
			STEVE FIELDS Total		10		
A001885	893	5397	STEVINSON WATER DISTRICT	1/14/59	16,716.90	Merced	MERCED RIVER
A005724	5726	5940	STEVINSON WATER DISTRICT	10/17/27	79,534.40	Merced	BEAR CREEK, OWENS CREEK
A006111	5729	5941	STEVINSON WATER DISTRICT	11/5/28	58,552.90	Merced	ARENA SPILLWAY, BEAR CREEK, MCCOY SPILLWAY, OWENS CREEK
A007012	5733	6222	STEVINSON WATER DISTRICT	7/20/31	35,619.70	Merced	ARENA SPILLWAY, BEAR CREEK
			STEVINSON WATER DISTRICT Total		190,423.90		
A027326B		12759	SUSIE MOODY	4/26/91	0.70	Fresno	UNST
A027469	19303	12763	SUSIE MOODY	8/10/82	29.00	Fresno	UNST
			SUSIE MOODY Total		29.70		
A020049	13203	8939	TAMAR V ARMSTRONG	3/24/61	10.60	Madera	UNSP
			TAMAR V ARMSTRONG Total		10.60		
A001925	838	366	The Irrevocable Flying M Ranch Trust	7/15/24	424.5	Merced	BURNS CREEK
			The Irrevocable Flying M Ranch Trust Total		424.5		
A029279	20627		THE PROTESTANT EPISCOPAL BISHOP OF S J	6/24/88	11	Madera	LEWIS FORK FRESNO RIVER, UNST
			THE PROTESTANT EPISCOPAL BISHOP OF S J Total		11		
A010797	6505	5402	THE VANDER WOUDE FAMILY REVOCABLE TRUST OF NOV 25 2003	4/11/44	223.1	Merced	NORTH SLOUGH MARIPOSA CREEK
A024973	17419	11605	THE VANDER WOUDE FAMILY REVOCABLE TRUST OF NOV 25 2003	1/13/76	394	Merced	NORTH SLOUGH MARIPOSA CREEK
			THE VANDER WOUDE FAMILY REVOCABLE TRUST OF NOV 25 2003 Total		617.1		
A015628	11092	12268	U S FISH & WILDLIFE SERVICE	12/2/53	6,868.00	Merced	BRAVEL SLOUGH, DEEP SLOUGH
A020246	14323	10139	U S FISH & WILDLIFE SERVICE	8/5/61	360	Merced	DUCK SLOUGH
A027586	19473		U S FISH & WILDLIFE SERVICE	11/17/82	3,000.00	Merced	DEADMAN CREEK
			U S FISH & WILDLIFE SERVICE Total		10,228.00		
A012416	7363	5342	U S SIERRA NATL FOREST	3/18/48	2.40	Fresno	BEAR CREEK, MONO CREEK
A013904	8656	4608	U S SIERRA NATL FOREST	8/18/50	96.00	Madera	MCCLURE LAKE CREEK
A013907	8659	4609	U S SIERRA NATL FOREST	8/18/50	155.00	Madera	LILLIAN LAKE CREEK
A014150	8681	4064	U S SIERRA NATL FOREST	2/6/51	0.30	Fresno	RANCHERIA CREEK

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
A016424	10496	8203	U S SIERRA NATL FOREST	6/20/55	9.20	Madera	UNSP
A016426	10270	6263	U S SIERRA NATL FOREST	6/20/55	5.20	Fresno	COON CREEK
A017209	10992	6266	U S SIERRA NATL FOREST	8/3/56	100.00	Madera	RUTHERFORD LAKE CREEK
A017439	11009	7270	U S SIERRA NATL FOREST	1/28/57	29.00	Madera	UNST
A017594	11166	7587	U S SIERRA NATL FOREST	5/10/57	0.50	Madera	UNSP
A017595	11167	7588	U S SIERRA NATL FOREST	5/10/57	0.20	Madera	UNSP
A018245	12266	7274	U S SIERRA NATL FOREST	7/30/58	8.00	Fresno	BEAR CREEK
A018318	12267	8388	U S SIERRA NATL FOREST	9/15/58	16.10	Fresno	BIG CREEK
A019420	12420	7325	U S SIERRA NATL FOREST	5/6/60	103.00	Madera	MCCLURE LAKE
A019634	12729	7589	U S SIERRA NATL FOREST	8/1/60	0.10	Fresno	UNSP
A019635	12730	7590	U S SIERRA NATL FOREST	8/1/60	0.10	Fresno	UNSP
A019636	12731	6696	U S SIERRA NATL FOREST	8/1/60	0.40	Fresno	UNSP
A019637	12732	6697	U S SIERRA NATL FOREST	8/1/60	0.40	Fresno	UNSP
A019638	12733	6698	U S SIERRA NATL FOREST	8/1/60	0.10	Fresno	UNSP
A019639	12734	6699	U S SIERRA NATL FOREST	8/1/60	0.10	Fresno	UNSP
A019640	12735	6700	U S SIERRA NATL FOREST	8/1/60	0.40	Fresno	UNSP
A019641	12736	6914	U S SIERRA NATL FOREST	8/1/60	0.10	Fresno	UNSP
A019676	12738	7781	U S SIERRA NATL FOREST	8/18/60	0.40	Madera	UNSP
A019839	13175	8145	U S SIERRA NATL FOREST	11/3/60	8.80	Fresno	LINE CREEK
A019930	13146	9121	U S SIERRA NATL FOREST	1/24/61	11.20	Madera	UNSP
A021107	14247	9089	U S SIERRA NATL FOREST	1/2/63	0.70	Madera	MOUSE TRAP SPRING
A023979	16611	10878	U S SIERRA NATL FOREST	2/10/72	0.20	Fresno	UNSP
A027719	19882	13043	U S SIERRA NATL FOREST	4/12/83	0.20	Fresno	UNST
			U S SIERRA NATL FOREST Total		548.10		
A000023	273	1986	U.S. BUREAU OF RECLAMATION	3/27/15	44,340.00	Madera	SAN JOAQUIN RIVER
A000234	11885		U.S. BUREAU OF RECLAMATION	6/29/59	2,124,486.50	Madera	SAN JOAQUIN RIVER
A001465	11886		U.S. BUREAU OF RECLAMATION	6/29/59	2,124,486.50	Madera	SAN JOAQUIN RIVER
A005638	11887		U.S. BUREAU OF RECLAMATION	6/29/59	3,917,477.50	Madera	SAN JOAQUIN RIVER
A014858B	20245		U.S. BUREAU OF RECLAMATION	7/18/88	1,000,000.00	Calaveras, San Joaquin	STANISLAUS RIVER
A018714	16301		U.S. BUREAU OF RECLAMATION	5/15/59	143,000.00	Madera	CHOWCHILLA RIVER
A018733	16584	13836	U.S. BUREAU OF RECLAMATION	8/25/11	71,600.00	Madera	FRESNO RIVER
			U.S. BUREAU OF RECLAMATION Total		9,425,390.50		
A013345	8356	6419	UHRHAMMER PROPERTIES	9/8/49	405	Merced	MERCED RIVER
			UHRHAMMER PROPERTIES Total		405		
A011438	6672	3314	V A RODDEN INC	6/17/46	1,273.40	Stanislaus	UNION SLOUGH
A030613	21156		V A RODDEN INC	7/10/03	3,769.50	Stanislaus	UNION SLOUGH
			V A RODDEN INC Total		5,042.90		
A006160	5731	4638	VANDER WOUDE FARMS	1/14/29	138.7	Merced	NORTH SLOUGH MARIPOSA CREEK
			VANDER WOUDE FARMS Total		138.7		
A005386	2847	1518	VANDER-WOUDE DAIRY	3/21/27	14,479.60	Merced	DUCK SLOUGH
			VANDER-WOUDE DAIRY Total		14,479.60		
A013496	8037	4747	VERNA M MURRAY	12/2/49	83.9	Stanislaus	TUOLUMNE RIVER
			VERNA M MURRAY Total		83.9		
A006479	3582	1443	VISTA LIVESTOCK COMPANY	11/6/29	36.6	Merced	DRY CREEK
			VISTA LIVESTOCK COMPANY Total		36.6		
A006114	5730	2911	W P RODUNER CATTLE & FARMING COMPANY	11/9/28	2,945.50	Merced	DUCK CREEK
A011653	7585	4910	W P RODUNER CATTLE & FARMING COMPANY	12/10/46	14,519.20	Madera	ASH CREEK
A012635	8702	4909	W P RODUNER CATTLE & FARMING COMPANY	8/6/48	12,810.20	Merced	OWENS CREEK
			W P RODUNER CATTLE & FARMING COMPANY Total		30,274.90		

Application ID	Permit ID	License ID	Holder Name	Date	Face Amt	County	Source
A020268	13377	7963	WALTER D HARRIS TRUSTEE OF THE WALTER D HARRIS TRUST DATED SEPTEMBER 29 2005	6/20/61	23.80	Fresno	UNST
A020269	13378	7964	WALTER D HARRIS TRUSTEE OF THE WALTER D HARRIS TRUST DATED SEPTEMBER 29 2005	6/20/61	28.00	Fresno	UNST
A020270	13379	7965	WALTER D HARRIS TRUSTEE OF THE WALTER D HARRIS TRUST DATED SEPTEMBER 29 2005	6/20/61	45.00	Fresno	UNST
			WALTER D HARRIS TRUSTEE OF THE WALTER D HARRIS TRUST DATED SEPTEMBER 29 2005 Total		96.80		
A016936	10636	5995	WILLIAM J FOGARTY	3/13/56	22.7	Stanislaus	UNST
A019044	12595	6947	WILLIAM J FOGARTY	10/21/59	30	Stanislaus	UNST
A020928	14122	8247	WILLIAM J FOGARTY	9/5/62	20	Stanislaus	UNST
			WILLIAM J FOGARTY Total		72.7		
A015371	9578	5478	WILLIAM J HALL	6/8/53	91.2	Stanislaus	TUOLUMNE RIVER
			WILLIAM J HALL Total		91.2		
A023861	16610	10928	WILLIAM J JAWIEN	9/3/71	0.70	Fresno	UNSP
			WILLIAM J JAWIEN Total		0.70		
A019227	12707	7805	William O Jamison	2/9/60	61.50	Madera	UNST
A022724	15563	9796	William O Jamison	5/26/71	20.3	Madera	UNST
A022727	15566	9848	William O Jamison	3/13/67	11.60	Madera	UNST
			William O Jamison Total		93.40		
A001442B	940	000388B	WILMA R THOMPSON	9/10/19	119.1	Merced	MERCED RIVER
			WILMA R THOMPSON Total		119.1		
A026152	18151	12012	WILSHIRE ALEC	12/26/79	0.40	Fresno	UNSP
			WILSHIRE ALEC Total		0.40		
			Grand Total		10,484,617.10		

Appendix D

Section D.7
Priority Rankings for Sacramento River Water Rights Claimants

Sacramento + Trinity + East and West Creeks Above Feather River Confluence by Priority - Post-1914 Appropriative Water Rights

Post-1914 Water Right Holder Name	Priority Date	Face Amount
Reclamation District 1004	4/2/1915	56.0
Reclamation District 108	1/25/1917	97.5
River Garden Farms Company	1/25/1917	29.3
Sutter Mutual Water Company	2/1/1917	21.9
Tisdale Irrigation & Drainage Co	7/26/1917	12.5
Reclamation District 108	8/27/1917	270.7
Oji Brothers	1/3/1918	1.9
Sutter Mutual Water Company	1/3/1918	265.7
Provident Irrigation District	1/18/1918	40.1
Stanford Vina Ranch Irrigation Co	8/5/1918	4.6
Natomas Central Mutual Water Co	8/22/1918	16.2
Lomo Cold Storage	9/10/1918	2.0
Meridian Farms Water Company	9/10/1918	67.3
Sutter Mutual Water Company	1/24/1919	19.7
Conaway Preservation Group LLC	3/1/1919	43.6
Natomas Central Mutual Water Co	3/5/1919	58.4
Natomas Central Mutual Water Co	8/27/1919	36.7
Provident Irrigation District	9/2/1919	3.4
Glenn-Colusa Irrigation District	12/3/1919	28.1
Glenn-Colusa Irrigation District	1/14/1920	10.8
Rancho Esquon, Inc	2/5/1920	3.7
Sycamore Mutual Water Company	2/9/1920	42.5
Reclamation District 999	2/11/1920	58.4
Sutter Mutual Water Company	4/9/1920	1.5
US Bureau of Reclamation	2/17/1921	50.2
Butte Valley Irrigation District	2/28/1921	17.2
Rancho Esquon, Inc	10/9/1921	1.8
Rancho Esquon, Inc	3/4/1922	3.8
Gorrill Land Company	3/6/1922	4.6
Rancho Esquon, Inc	6/27/1922	3.0
Hot Springs Valley Irrigation District	4/12/1923	48.4
Sacramento River Ranch II	5/17/1923	2.6
Reclamation District 999	7/18/1924	3.9
Gorrill Land Company	6/30/1925	4.5
Rancho Esquon, Inc	6/30/1925	4.6
Sutter Mutual Water Company	6/22/1926	3.3
M & T Incorporated	7/17/1926	5.1
Parrott Investment Company	7/17/1926	5.1
Sacramento River Ranch II	2/17/1927	1.8
Subtotal Before Initial State Filings in 1927		1,352.4
US Bureau of Reclamation	7/30/1927	11,153.8
US Bureau of Reclamation	7/30/1927	3,349.9
Sutter Mutual Water Company	1/31/1928	0.1
Lomo Cold Storage	11/14/1929	20.3
Conaway Preservation Group LLC	4/18/1930	5.4
Natomas Central Mutual Water Co	5/28/1931	15.4
County of Sacramento	6/6/1931	2.7
Lomo Cold Storage	3/21/1932	0.7
South Fork Irrigation District	3/5/1934	17.0
Reclamation District 883	5/1/1934	2.2
M & T Incorporated	12/1/1934	5.1
Parrott Investment Company	12/1/1934	5.1
M & T Incorporated	2/27/1936	3.1
Parrott Investment Company	2/27/1936	3.1
Maxwell Irrigation District	4/8/1936	29.0
Glenn-Colusa Irrigation District	5/28/1936	0.7
Subtotal Before Second State Filings in 1938		14,613.5
US Bureau of Reclamation	8/2/1938	7,818.8

Post-1914 Water Right Holder Name	Priority Date	Face Amount
Calif Dept of Fish & Game	6/19/1939	5.5
M & T Incorporated	9/22/1939	13.6
Parrott Investment Company	9/22/1939	13.6
Sutter Mutual Water Company	11/3/1939	0.6
Gorrill Land Company	3/13/1942	3.9
Sutter Mutual Water Company	6/16/1943	3.7
Oji Brothers	1/11/1945	2.9
Oji Brothers	3/6/1946	0.6
Reclamation District 108	5/26/1947	27.4
River Garden Farms Company	5/29/1947	6.3
Sutter Mutual Water Company	6/23/1947	2.7
Conaway Preservation Group LLC	9/8/1947	70.1
Glenn-Colusa Irrigation District	10/8/1947	3.4
Sycamore Mutual Water Company	3/17/1948	2.2
Pelger Mutual Water Company	4/13/1948	22.8
Sutter Mutual Water Company	4/13/1948	15.3
Sycamore Mutual Water Company	3/25/1949	2.3
US Fish & Wildlife Service	1/12/1950	44.2
Oji Brothers	2/20/1950	1.0
Reclamation District 108	2/24/1950	78.0
Maxwell Irrigation District	8/25/1950	4.9
Maxwell Irrigation District	6/28/1951	1.6
Subtotal Before Feather River Project Rights Filed in 1951		8,145.4
CA DWR	8/25/1951	1,575.2
Natomas Central Mutual Water Co	10/8/1953	11.8
M & T Incorporated	5/10/1954	0.5
Parrott Investment Company	5/10/1954	0.5
Lomo Cold Storage	11/28/1955	0.2
Tisdale Irrigation & Drainage Co	4/3/1956	1.4
Princeton-Codora-Glenn Irrig Dist	5/2/1956	15.1
US Bureau of Reclamation	11/28/1956	1,335.4
US Bureau of Reclamation	11/28/1956	1,230.8
CA DWR	3/15/1957	1,100.0
Maxwell Irrigation District	6/24/1957	34.6
Calif Dept of Fish & Game	10/24/1957	5.3
US Fish & Wildlife Service	10/25/1957	8.0
US Bureau of Reclamation	4/30/1958	160.0
US Bureau of Reclamation	9/16/1959	3,030.8
South Fork Irrigation District	3/14/1960	2.2
US Bureau of Reclamation	7/28/1960	1,335.4
US Bureau of Reclamation	4/12/1961	9,032.0
US Fish & Wildlife Service	7/3/1961	21.7
Subtotal of Most Feather River and CVP Filings 1951-1961		18,901.0
Rancho Esquon, Inc	2/5/1965	5.5
US Fish & Wildlife Service	7/19/1965	14.5
Gorrill Land Company	10/25/1965	2.5
Hot Springs Valley Irrigation District	3/17/1966	20.0
Reclamation District 999	4/1/1966	35.6
Sutter Mutual Water Company	9/7/1967	2.0
Butte Valley Irrigation District	4/10/1968	10.0
Calif Dept of Fish & Game	7/24/1968	5.2
Reclamation District 1004	12/26/1968	21.0
Pelger Mutual Water Company	3/13/1972	1.7
Calif Dept of Fish & Game	12/21/1972	5.5
Sycamore Mutual Water Company	12/22/1972	1.0
Sacramento River Ranch II	3/1/1973	12.7
Calif Dept of Fish & Game	4/10/1974	7.4
Gorrill Land Company	4/12/1978	4.4

Sacramento + Trinity + East and West Creeks Above Feather River Confluence by Priority - Post-1914 Appropriative Water Rights

Post-1914 Water Right Holder Name	Priority Date	Face Amount
Reclamation District 1004	12/1/1978	36.0
County of Sacramento	8/19/1982	0.5
Pelger Mutual Water Company	9/16/1994	5.0
Maxwell Irrigation District	2/17/1995	13.6
Princeton-Codora-Glenn Irrig Dist	11/19/1998	24.4
Provident Irrigation District	11/19/1998	26.7
Glenn-Colusa Irrigation District	2/18/1999	182.9
City of Sacramento	10/30/2000	81.8
Provident Irrigation District	2/27/2001	124.5
Princeton-Codora-Glenn Irrig Dist	12/17/2001	71.8
US Bureau of Reclamation	7/29/2002	2,203.1
Glenn-Colusa Irrigation District	5/3/2006	53.7
Sacramento County Water Agency	2/15/2008	71.0
Reclamation District 108	10/18/2010	36.0
Woodland-Davis Clean Water Agency	4/14/2011	45.0
Subtotal Since 1963		3,125.0
Total		46,137.3

Source: State Water Resources Control Board; California Water Impact Network.

Appendix E
Water Availability Analysis Model Assumptions and Methodology

Analysis of water supply availability must account for water rights claims in addition to the variability contained within watershed hydrology. C-WIN's method of water supply availability has three components: watershed hydrology, known water rights claims, and yield estimation from the interaction of hydrology and water claims. All analytic methods contain assumptions.

Hydrology and Instream Flow Assumptions:

- The State Water Resources Control Board adopts a Delta inflow criterion for the major tributaries of the San Joaquin River Basin of 60 percent of unimpaired flow. This implies a diversion cap not to exceed 40 percent of unimpaired flow in the San Joaquin River Basin.

- The State Water Resources Control Board adopts a Delta inflow criterion for the major tributaries of the Sacramento River Basin of 75 percent of unimpaired flow. This implies a diversion cap not to exceed 25 percent of unimpaired flow in the San Joaquin River Basin. As with the San Joaquin, C-WIN is well aware that this is an assumption, not a foregone conclusion.

- C-WIN's water supply availability analysis relies on the 82-year unimpaired flow hydrology prepared for water years 1922 through 2003 by the California Department of Water Resources (2007). These data are arrayed by major watershed of the Central Valley and Delta. C-WIN calculated monthly decile, quartile and median flows by month and year, and then calculated the subtotals for key regulation periods: November through June for the Sacramento River Basin, and February through June for the San Joaquin River Basin. The percent of regulated period to total flows in the unimpaired hydrology was also calculated for each year, from which deciles, quartiles, medians, averages, and minima and maxima were calculated.

- The annual total and regulated period subtotals were then employed in the water rights yield analysis component. Remaining flows in the non-regulation season (July to October in the Sacramento Basin, July to January in the San Joaquin Basin) are estimated by simply subtracting regulation season flows from annual totals.

- All non-regulated flows are assumed to be fully available for diversion by water right holders; no instream flow requirements are assumed for the unregulated flow period. This assumptions inflates the amount of water that junior water right holders would be allocated during this period of the year, and may ignore temperature restrictions for fish protection.

- No monthly breakdown of flows and diversion allocations is attempted.

- Use of an 82-year unimpaired flow hydrology accounts for inter-annual flow variations in assessing the potential for paper water.

Water Rights Claims Assumptions:

- C-WIN sought to gather water rights information from a variety of sources. Using the Public Records Act, C-WIN requested from nearly 100 different public water districts and agencies information concerning any and all pre-1914 water rights they may have. Many had no pre-1914 water rights. Others provided copies of pre-1914 notices, copies of adjudication decrees, operation agreements, diagrams, statements of diversion and use, and other information that described their early water rights claims. C-WIN wishes to express our gratitude for their helpful responses, which are too numerous to mention here.

- C-WIN also gathered from the State Water Resources Control Board's web site copies of adjudication decrees from the Pit River watershed, the Stanislaus River, Butte Creek, and the Indian Creek and Middle Fork Feather River watersheds.

- State law requires that pre-1914 and riparian water right holders file Statements of diversion and use with the State Water Resources Control Board annually. The Board has made most, but not yet all SDUs available online. The Board's eWRIMS database search engine itemizes each SDU but does not provide usage quantities when query answers are returned in the vast majority of cases. Consequently, C-WIN staff downloaded as many as possible to study and record the highest usage claims, as well as year of first usage. C-WIN includes only SDUs with cumulative usage claims by the same claimant that exceed 1,000 acre-feet. This kept the research scope manageable, while also capturing statistically significant cumulations of water usage.

- C-WIN's reliance on SDUs assumes that each usage report they contain is accurately measured. The highest amount claimed is employed to represent the maximum claim that might be exerted by the water right holder on behalf the right under which the reported diversion was made. This is assumed to be the case regardless of whether the type or right claimed is riparian or pre-1914.

- Many SDUs do not provide adequate usage information, however, and were ignored. Therefore, it is quite possible that C-WIN's use of SDU data in this analysis understates the magnitude and location of riparian and pre-1914 water rights claims throughout the Sacramento and San Joaquin river basins.

Yield Analysis Assumptions:

- The water rights priority system would operate subordinate to the application of water quality instream flow objectives.

- The obverse of the Board's instream flow objectives is referred to in our method as a "diversion cap." a 75 percent of unimpaired flow criterion thus is converted to a 25 percent of unimpaired flow diversion cap for Sacramento River Basin rivers in this analysis. In other words, if 75 percent of unimpaired flow is available for fish and aquatic beneficial uses, the 25 percent of unimpaired flow is available for diversion to consumptive uses. For the San Joaquin River Basin, a 60 percent of unimpaired flow objective is reflected in the analysis as a 40 percent of unimpaired flow diversion cap.

- Under the diversion cap, paramount riparian water rights are given first diversion rights, followed by senior pre-1914 water right holders, based on highest usage claimed, the cumulative face amount of water rights claim notices, adjudications, or other water rights claim source. For some river models, riparian and pre-1914 water rights claims are bundled together to simply the analysis when the pre-1914 rights are senior to all other succeeding rights. Only after major pre-1914 water rights claims are any post-1914 appropriative water rights granted by the State of California provided with any remaining flows. Post-1914 water rights that are not shown in a specific river model's results are left off because no flows are left for these rights to divert given the model's operation.

- SDU highest use claims, adjudication allocations, and pre-1914 water right notice claims by the same entities are summed. While this appears to be double-counting, we believe it is important to cumulate them on the assumption that when the Board or a court undertakes to adjust water rights, the Board or court must be aware of all claims (both in notices as well as in uses) made in order to remove clouds from their titles.

- As noted above, the unimpaired flow hydrology data is analyzed to determine an average percent of regulated period to total flow for each river. This average indicates that share of the hydrograph's overall flows that occur during the regulated period. We assume that water right claimants claim their supplies under the diversion in a manner that is directly proportional to the regulated period's share of the overall total flow for that river. (This is a water diverter's way of "mimicking the natural hydrograph.") For all riparian and many pre-1914 water right holders, this seemed a reasonable assumption; for post-1914 water right holders whose rights may have limited seasons of diversion or contributions to storage, this assumption may break down. However, but this assumption might only come into play during the wettest portions of each river's overall unimpaired flow hydrology, if at all. The factors used for each river system is shown in Table E-1:

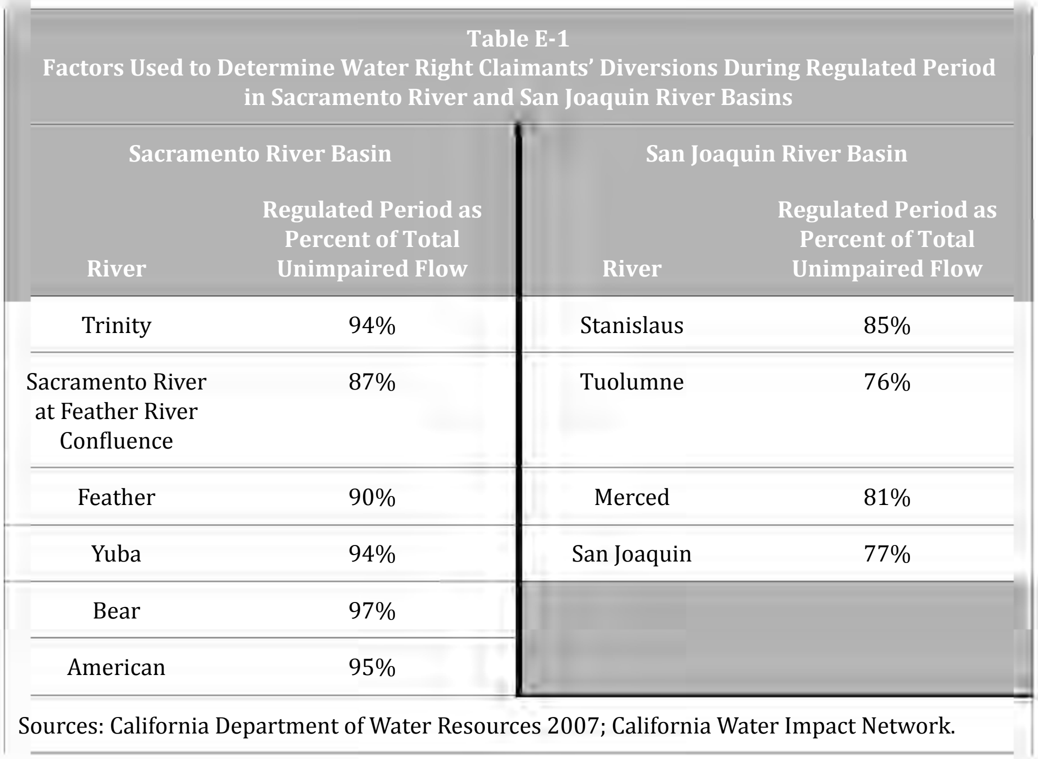

Table E-1
Factors Used to Determine Water Right Claimants' Diversions During Regulated Period in Sacramento River and San Joaquin River Basins

Sacramento River Basin		San Joaquin River Basin	
River	Regulated Period as Percent of Total Unimpaired Flow	River	Regulated Period as Percent of Total Unimpaired Flow
Trinity	94%	Stanislaus	85%
Sacramento River at Feather River Confluence	87%	Tuolumne	76%
Feather	90%	Merced	81%
Yuba	94%	San Joaquin	77%
Bear	97%		
American	95%		

Sources: California Department of Water Resources 2007; California Water Impact Network.

- Default calculation method for pre-1914 water rights notices are often expressed in cubic feet per second (cfs) without seasonal limitation are to multiply the cfs by 3600 (seconds per hour), then by 24 (hours in a day), then by 365.25 days per year. The result is then divided by 43,560 square feet to the acre to obtain the face amount expressed in acre-feet.

- Default calculation method for pre-1914 water rights notices expressed in miners inches is to divide the miners inches by 50 to convert the claim to cubic feet per second, then follow the calculation for converting cfs claims to acre-feet of face amount. We see this as a conservative conversion assumption. Some pre-1914 water right holders may have legal documents that suggest that the conversion should be 40 miners inches to 1 cubic feet per second. This would increase the face value of such pre-1914 water rights by 20 percent.

Appendix E

- Default calculation method for water rights claims (particularly in SDUs) expressed in gallons per day was to divide the gallons by 325,851 gallons per acre-foot, then multiply by the number of days in the usage season disclosed in the SDU.
- These calculation methods are employed for estimating the quantity of rights administered under adjudication decrees as well. Diversion seasons mandated under the decrees were used as well.

Appendix F
California Water Code Article 1.3
Declaration of Fully Appropriated Streams

1205. (a) Following notice and hearing, the board may adopt a declaration that a stream system is fully appropriated. As used in this article, "stream system" includes stream, lake, or other body of **water**, and tributaries and contributory sources, but does not include an underground **water** supply other than a subterranean stream following through known and definite channels.
(b) A declaration that a stream system is fully appropriated shall contain a finding that the supply of **water** in the stream system is being fully applied to beneficial uses where the board finds that previous **water** rights decisions have determined that no **water** remains available for appropriation.
(c) Upon its own motion or upon petition of any interested person, and following notice and hearing, the board may revoke or revise a declaration that a stream system is fully appropriated.

1206. (a) From and after the date of adoption of a declaration that a stream system is fully appropriated, and subject to subdivision (b), the board shall not accept for filing any application for a permit to appropriate **water** from the stream system described in that declaration, and the board may cancel any application pending on that date.
(b) Notwithstanding subdivision (a), the board may provide, in any declaration that a stream system is fully appropriated, for acceptance for filing of applications to appropriate **water** under specified conditions. Any provision to that effect shall specify the conditions and may contain application limitations, including, but not limited to, limitations on the purpose of use, on the instantaneous rate of diversion, on the season of diversion, and on the amount of **water** which may be diverted annually. The board may make those limitations applicable to individual applications to appropriate **water**, or to the aggregate of the applications, or to both.
(c) Subdivision (a) shall not apply to applications for temporary permits made pursuant to Chapter 6.5 (commencing with Section 1425) or to any provision of this **code** respecting change in point of diversion, place of use, or purpose of use.

1207. Notice of hearing pursuant to this article shall be given as follows:
(a) The notice shall be published at least once a week for four consecutive weeks in one or more newspapers of general circulation published in each county in which any part of the stream system is situated, and publication shall be complete at least 60 days prior to the date of hearing.
(b) At least 60 days prior to the date of the hearing, the notice shall be mailed to all persons known to the board who own land that appears to be riparian to the stream system, who divert **water** from the stream system, or who have made written request to the board for special notice of hearing pursuant to this article.

Appendix G

Selected Fully-Appropriated Rivers and Creeks of the Bay-Delta Estuary's Central Valley Watershed

River	Fully-Appropriated Season	Critical Reach
Trinity	1/1 to 12/31	North Fork from Salmon-Trinity Primitive Area to Helena at river mouth (W&S)
	1/1 to 12/31	South Fork Trinity from State Route 36 to river mouth at Salver (W&S)
	1/1 to 12/31	Main stem from 100 yards below Lewiston Dam to river mouth at Weitchpec (W&S)
Pit River	4/1 to 11/30	North and South Forks, Franklin Creek, and Pit River in Big Valley adjudications
	3/15 to 10/31	Ash Creek from confluence with Pit River upstream (adjudication)
McCloud	1/1 to 12/31	Mainstem from Algoma to Lake McCloud, mainstem from McCloud Dam to Shasta Lake (W&S)
Squaw Creek	1/1 to 12/31	Squaw Valley Creek from Section 14, T38N, R3W to confluence with McCloud River
Feather	1/1 to 12/31	Middle Fork from confluence of its tributary streams 1 KM south of Beckwourth, CA. (W&S)
	5/15 to 9/30	Middle Fork at Beckwourth, CA upstream (D-831)
	4/1 to 11/30	Indian Creek from North Fork Feather upstream (adjudication)
	3/1 to 10/31	South Fork Feather from confluence of Oroville Dam and Middle and South Forks of Feather River upstream (D-25)
	7/1 to 9/30	From confluence of Feather with Sacramento River upstream (D-1275)
	4/15 to 9/30	Sierra Valley channels from the confluence of Middle Fork Feather River at Beckwourth upstream (D-1391)
	7/1 to 11/30	West Branch of Feather River from upper Miocene Canal Head Dam located in Section 30, T23N R4E, upstream (D-844)
Yuba	8/1 to 10/31	From Englebright Dam upstream (D-934)
	4/1 to 11/30	From Shady Creek within Section 17, T17N R7E and upstream of South Fork Yuba River (adjudication)
Bear	5/1 to 11/30	From Camp Far West Reservoir upstream (D-1091)
	4/15 to 11/30	From Wolf Creek upstream (above Bear River, D-1059, D-1091)
American	1/1 to 12/31	North Fork of American River from source to Iowa Hill Bridge (W&S)
	1/1 to 12/31	North Fork of American River from point 0.3 miles above Heath Springs to 1,000 feet upstream of Colfax-Iowa Hill Bridge, including Gold Run Addition area. (W&S)
	7/1 to 10/31	From the Sacramento River upstream (D-1108)

Appendix G
Selected Fully-Appropriated Rivers and Creeks of the Bay-Delta Estuary's Central Valley Watershed

River	Fully-Appropriated Season	Critical Reach
	5/1 to 10/31	White Rock Creek from the confluence with South Fork American upstream (D-1522, D-1211)
	7/1 to 12/31	Silver Creek from confluence with South Fork American upstream (D-163, D-1211)
	6/15 to 10/31	Sugar Loaf Creek from confluence with South Fork American upstream (D-776)
Butte Creek	4/1 to 11/30	Butte Creek from confluence with Butte Sink in T17N R1E (adjudication)
	6/1 to 9/30	Butte Creek from confluence of Butte Slough upstream (D-1329)
Stony Creek	4/1 to 11/30	Stony Creek from confluence with Sacramento River upstream (adjudication)
Cache Creek	4/15 to 10/31	Cache Creek from confluence with Yolo Bypass upstream (D-1506)
Putah Creek	1/1 to 12/31	Putah Creek from Monticello Dam upstream (D-869, WR Order 96-002)
Stanislaus River	4/1 to 11/30	From confluence with San Joaquin River upstream (adjudication)
	7/1 to 10/31	From confluence with San Joaquin River upstream (D-1422)
Tuolumne	1/1 to 12/31	From source on Mount Lyell and Mount Dana to Don Pedro Reservoir (W&S)
	7/1 to 12/31	From Don Pedro Reservoir upstream (D-995)
Merced	1/1 to 12/31	From south side of Mount Lyell in Yosemite National Park to 300 feet upstream of confluence with Bear Creek (W&S)
	1/1 to 12/31	South Fork Merced River from Triple Divide Peak to confluence with mainstem of Merced River (W&S)
Chowchilla	1/1 to 12/31	From confluence of Chowchilla River with San Joaquin River upstream (D-1365)
Fresno River	5/1 to 11/30	From Hidden Dam and Fresno River upstream (D-1407)
San Joaquin	1/1 to 12/31	From confluence with Mendota Pool upstream (D-935)
Fresno Slough	1/1 to 12/31	From confluence with San Joaquin River upstream to Kings River and including upstream watershed of Kings River (D-1290)
Sacramento-San Joaquin Delta	6/15 to 8/31	From the Delta upstream - allowing no diversions from the Delta less than 1 cubic foot per second or less than 100 acre-feet in storage. (D-1594)
Source: State Water Resources Control Board, 1998. Key: W&S = Wild & Scenic Designation; adjudication = decree issued adjudicating water rights in that critical reach; D-"[Some number]" refers to a Board Water Rights Decision.		

Letter 8 Natural Resources Defense Council/ Defenders of Wildlife/ The Bay Institute

NRDC
DEFENDERS OF WILDLIFE
The Bay Institute

October 17, 2016

Ted Alvarez
State Water Project Analysis Office
Department of Water Resources
P.O. Box 942836
Sacramento, CA 94236-0001
Email: watercontractextension@water.ca.gov

VIA EMAIL AND U.S. MAIL

Subject: Comments on Draft EIR for the Water Supply Contract Extension Project

Dear Mr. Alvarez:

On behalf of the Natural Resources Defense Council ("NRDC"), Defenders of Wildlife ("DOW"), and The Bay Institute ("TBI"), which collectively have hundreds of thousands of members and activists in California, we are writing to provide input on the Draft Environmental Impact Report ("DEIR") for the Department of Water Resources' ("DWR") Water Supply Contract Extension Project ("proposed project"). The proposed project and DEIR fail to satisfy the requirements of CEQA and DWR's obligations under state law. As we explained in our scoping comments submitted on October 13, 2014, DWR's proposal to extend the term of existing State Water Project ("SWP") contracts for an additional 50 years necessarily implicates the urgent need to modernize other contract terms to reflect the current realities of climate change, restricted surface water supplies, declining water quality and environmental health of the Bay-Delta estuary, existing statutory requirements, and other current and anticipated changes that have occurred since these contracts were originally executed. DWR's failure to address these important issues while proposing to extend the contracts to 2085 is irreconcilable with Governor Brown's recognition in the 2016 California Water Action Plan of the "broad agreement that the state's water management system is currently unable to satisfactorily meet both ecological and human needs, too exposed to wet and dry climate cycles and natural disasters, and inadequate to handle the additional pressures of future population growth and climate change."[1]

DWR's proposal and the analysis on which it is based are legally flawed. First, DWR concludes that extending SWP contracts and water deliveries for another 50 years would result in no impact on the environment. But this conclusion is based on at least two faulty assertions that fatally taint the entire analysis. The first faulty assumption is that the SWP contracts would be extended to 2085 in any case, with or without this proposed project, "upon receipt of Article 4 letters from the Contractors," without any other changes to the contracts. DEIR at ES-6. The second faulty assumption is that SWP operations and facilities will not change based on the more affordable financing and broader construction authority that the 50-year extension would provide. Second, DWR incorrectly asserts that the "proposed project is separate and independent from the California WaterFix project," DEIR at 6-3, which causes DWR to impermissibly piecemeal the impacts of extending the contracts from the impacts of California WaterFix ("WaterFix"). Third, DWR and the SWP Contractors have recognized that multiple additional modifications to the SWP contracts will be necessary in order to implement WaterFix, but the project and DEIR also impermissibly exclude those modifications from analysis.

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[1] http://resources.ca.gov/docs/california_water_action_plan/Final_California_Water_Action_Plan.pdf, at 1. All cited documents are incorporated herein by reference.

DWR should reject the proposed project and prepare a new project and California Environmental Quality Act ("CEQA") analysis that considers the full suite of contract modifications and related impacts that are necessary to modernize the State Water Project and keep it functional beyond 2035.

I. The DEIR's Conclusion that the Proposed Project Would Cause No Environmental Impacts Is Flawed

A. DWR Improperly Conflates the "No Project" Alternative with the Proposed Project

The premise of the DEIR's no impacts conclusion is that the SWP contracts would be extended to 2085 with or without the proposed project because of Article 4 of the contracts. Thus, DWR defines the "no project" alternative as extension of the contracts from 2035 to 2085 with no changes to any existing contract terms or operations. DEIR at 7-6. But DWR inexplicably selects a 2085 contract extension date under this alternative, thus rendering it essentially identical to the proposed project. This selection, which is not supported by any analysis or reasoning, undermines the impact analysis.

Article 4 allows for extension of the contracts on terms that are mutually agreed to. *See, e.g.,* DEIR at 7-9. The Contractors may not simply demand that the contracts be extended indefinitely, or for 50 years as DWR assumes in the DEIR, nor does DWR have to acquiesce to such demands under Article 4. Indeed, the DEIR recognizes that "it is uncertain how far beyond 2035 the Contracts would be extended under this alternative." DEIR at 7-11.[2] But the DEIR randomly selects 2085 as the expiration date, noting that this "is the same as the proposed project." This unjustified assumption impermissibly skews the impact analysis. If a shorter date were selected, then DWR would continue to face constraints on its ability to finance and construct additions and improvements to the SWP, leading to impacts very different from those anticipated under the proposed project, which would facilitate such construction. The DEIR acknowledges that DWR would continue to face constraints on its ability to sell bonds under this scenario, thus limiting the ability to finance significant upgrades to SWP facilities, but fails to recognize that reality in its impact analysis. *Id.* at 7-4 to 7-6.

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[2] The DEIR also recognizes that "DWR and the Contractors have made many amendments to the Contracts to address matters that have arisen over the past 55 years." DEIR at 2-12. Implementation and extension of the contracts over the next 69 years – to 2085 – should be no different, but the "no project" alternative unreasonably assumes it will be.

The Ninth Circuit Court of Appeals recently held that even where a statute mandates renewal, which is not the case here, the federal equivalent of CEQA, the National Environmental Policy Act ("NEPA"), "imposes obligations on agencies considering major federal actions that may affect the environment … [and] [a]n Agency may not evade these obligations by contracting around them." *Pac. Coast Fed'n of Fishermen's Ass'ns v. U.S. Dep't of the Interior*, 2016 WL 3974183, at *2 (9th Cir. July 25, 2016). As the Ninth Circuit noted, "a 'no action' alternative is 'meaningless' if it assumes the existence of the very plan being proposed." *Id.* at *1. The court held that the United States Bureau of Reclamation ("Reclamation") violated NEPA by failing to consider an alternative that would reduce water deliveries in a renewed contract. *Id.* at *3.[3]

A reduced delivery scenario under the "no action" alternative is more likely than the one that DWR has put forward. In fact, DWR itself has recently published and commissioned documents that assert that SWP deliveries will be far less in a "no action" future, under which new facilities are not constructed and upgraded. For example, the draft Bay Delta Conservation Plan ("BDCP") prepared by DWR in 2013 projects that by 2025, Delta exports will fall to a range of 3.4-3.9 million acre-feet ("MAF") per year on average, a reduction of about 1 MAF or more on average from today's levels. *See, e.g.*, DWR, public draft BDCP, at Table 9.A-2 (Nov. 2013), http://baydeltaconservationplan.com/Libraries/Dynamic_Document_Library/Public_Draft_BDCP_Appendix_9A_-_Economic_Benefits_of_the_BDCP_and_Take_Alternatives.sflb.ashx. DWR's economic consultant for the WaterFix project recently reiterated this reduction in level of exports under a "no action" alternative, finding that Delta exports from existing SWP and Central Valley Project ("CVP") facilities are likely to decline to 3.9 MAF by 2020, "a reduction of 0.8 maf from current levels." The Brattle Group, Draft California WaterFix Economic Analysis, at 6 (Nov. 15, 2015), http://www.restorethedelta.org/wp-content/uploads/2016/09/CA-WaterFix-Economic-Analysis-Sunding.pdf. DWR has presented similar reduced SWP delivery scenarios as likely in its most recent SWP delivery capability report. DWR, 2015 SWP Delivery Capability Report, at App., https://msb.water.ca.gov/documents/86800/c97c3baa-0189-4154-bf19-aa88392026ac. Indeed, DWR's largest contractor, the Metropolitan Water District of Southern California, relied on the reduced "ECLO" SWP delivery projections from the 2015 SWP Delivery Capability Report in its 2015 Urban Water Management Plan. MWD, 2015 Urban Water Management Plan, at 2-13, http://www.mwdh2o.com/PDF_About_Your_Water/2.4.2_Regional_Urban_Water_Management

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[3] As discussed *infra* at note 5, DWR incorrectly rejected the "reduced deliveries" alternative here.

_Plan.pdf ("Under the 2015 SWP Delivery Capability Report with existing conveyance and low outflow requirements scenario, the delivery estimates for the SWP for 2020 conditions … [are] equivalent to 976 TAF for Metropolitan, under long-term average condition."); *compare with id.* (MWD estimates that this SWP delivery amount will increase to 1.2 MAF on average starting in 2030 when WaterFix is in place).

Because DWR anticipates that, without the addition of significant new SWP facilities, SWP deliveries are likely to decline significantly in the near future, the "no action" alternative should be revised to reflect a shorter contract extension and reduced delivery estimates over the life of this project. That assumption, which better matches DWR's, and its contractors' projections elsewhere, would lead to a different impact analysis than the one presented in the DEIR, with a greater disparity of future deliveries between the "no action" and "proposed project" alternatives. The DEIR should be revised to reflect those differences.

B. The DEIR Admits that the Proposed Project Will Allow DWR to Implement Projects with Potentially Significant Environmental Impacts

The DEIR states that a core purpose of the project is to "[e]nsure DWR can finance SWP expenditures beyond 2035." DEIR at ES-3. As DWR explains: "In order for DWR to sell bonds for 30 years or more, which would provide more affordable financing to the Contractors for the SWP costs associated with constructing and repairing the SWP facilities allocated to water supply, it is necessary to extend the expiration dates of the Contracts." DEIR at 1-2; *see also id.* at 4-1 (recognizing that DWR could not "as a practical matter" issue bonds with a maturity date beyond 2035 without extending the contract terms as proposed); *id.* at 5-4 ("the current Contracts require existing capital obligations to be repaid by 2035, causing a sharp increase in capital charges to contractors toward the end of the 2035 repayment period"). While the DEIR admits that this more affordable financing will increase the likelihood of modifications to the SWP that will have significant environmental impacts, it fails to analyze the impact of those reasonably foreseeable modifications. Further, the proposed project would explicitly authorize DWR to extend the physical components of the SWP beyond current facilities, and thereby increase the likelihood of projects with significant environmental impacts.

CEQA requires that an EIR identify and describe the significant indirect environmental impacts that will result from the project, including actions that are a foreseeable consequence of the project, such as the construction and modification of SWP facilities here that the contract extension would make possible. 14 Cal. Code of Regs. § 15126.2(a); *City of Hayward v. Board of Trustees of Cal. State Univ.*, 242 Cal. App. 4th 833, 859 (2015) (EIR on plan to expand campus deficient for not analyzing increased student use of parks). For example, the DEIR notes that "[c]apital projects that could be financed in whole or in part by the sale of longer term bonds (if available as the result of contract extension) include: (1) reinforcing Perris Dam at Lake Perris against seismic failure … ; (2) reconstructing the Ronald B. Robie Thermalito pump-generating plant … ; (3) implementing the Oroville hydroelectric license project; and (4) obtaining a renewed Federal Energy Regulatory Commission (FERC) license for the SWP's southern hydroelectric plants." DEIR at 5-7. Each of these anticipated projects would likely have significant environmental impacts. Similarly, the DEIR notes that:

> Because of physical and water quality limitations, the diversion at Barker Slough cannot deliver the maximum Table A water requested. In order to address these facility limitations and meet projected future water delivery needs of the North Bay Contractors, DWR is considering constructing a new intake and pumping plant facility in the Sacramento River and a new segment of [North Bay Aqueduct (NBA)] Conveyance pipeline that would be operated in conjunction with the existing Barker Slough Pumping Plant…[T]he NBA Alternate Intake Project (NBA AIP) would enable the NBA to deliver the total water supply allocation (Table A amounts) to the North Bay Contractors.

DEIR at 2-5 to 2-6; *see also* DWR, North Bay Aqueduct Alternative Intake Project, http://www.water.ca.gov/engineering/Projects/Current/NBA/. Given the current stresses on and over-allocation of the Delta ecosystem, there can be no question that increasing SWP diversions from the Delta would cause potentially significant environmental impacts.[4] Yet, that is what DWR proposes to do with the NBA AIP, a project which would be more likely to occur with the more affordable financing available under the proposed extended contract term. *See, e.g.*, Solano Cty. Water Agency, NBA AIP, http://www.scwa2.com/home/showdocument?id=918, at 5 (Solano County Water Agency discussing the challenges of funding the project, which "capital costs are estimated at about $550 million" and "is expected to be financed by the State Water Project with revenue bonds," and explaining that "[f]ull payment by SCWA and Napa County would be a significant financial burden to our rate payers").

The DEIR anticipates that other SWP modifications will be made more likely with the contract extension, which modifications are also likely to have potentially significant environmental impacts. In fact, the DEIR notes that the contracts themselves "require DWR to make all reasonable efforts to complete the water supply facilities necessary to deliver the Table A amounts in the Contracts." DEIR at 2-12.[5] DWR's pursuit of such facilities "necessary to deliver the Table A amounts in the Contracts," including WaterFix with its stated purpose of enabling full contract deliveries, would significantly increase diversions and exports within and upstream of the Delta, causing significant environmental impacts. *See*, *e.g.*, DWR Application to USACE to Implement WaterFix, at 8 (Aug. 24, 2015), https://s3.amazonaws.com/californiawater/pdfs/5n2mg_Complete_Final_CA_Water_Fix_USACE_404_Permit_Application.pdf (the "purposes of the proposed actions are to … restore and protect the ability of the SWP and CVP to deliver up to full contract amounts … consistent with the terms and conditions of water delivery contracts held by SWP contractors."). As DWR's most recent SWP Capability Report admits, "[u]nder existing conditions, the average annual delivery of Table A water … is 2,550 taf/year," far less than the nearly 4.2 MAF of annual Table A amounts in the contracts,[6] and the "future inability of the SWP to deliver water to meet demands of certain [south-of-delta] contractors is a very real concern." *Id.* at 10.

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[4] *See, e.g.*, DWR's 2015 SWP Capability Report at 1-2 (available at https://msb.water.ca.gov/documents/86800/144575dd-0be1-4d2d-aeff-8d7a2a7b21e4).

[5] The proposed project's extension of this contract provision for another 50 years also undermines DWR's asserted basis for rejecting an alternative that would reduce Table A deliveries. The DEIR states that "Reducing Table A amounts proportionately for all the Contractors by amendment would not change the amount of water being delivered to the Contractors…." DEIR at 7-3. This assertion is not true if DWR is simultaneously obligating itself through 2085, as the proposed project would do, "to make all reasonable efforts to complete the water supply facilities necessary to deliver the Table A amounts in the Contracts." Nor is it true if the proposed project increases the ability of DWR to expand SWP facilities to increase deliveries, as it would do. Thus, the DEIR also suffers from

Finally, the proposed project includes new authorization for "SWP revenue bonds to be issued to: (1) finance repairs, additions, and betterments to most facilities of the SWP without regard to whether the facilities were in existence prior to January 1, 1987, which is the current Contract requirement in Article 1(hh)(8); and (2) finance other capital projects (not already in the list in Article 1(hh) for which revenue bonds could be sold) when mutually agreed to by DWR and at least 80 percent of the affected Contractors." DEIR at 4-5 (emphasis added). This new authorization to finance and build new SWP facilities that were not in existence prior to January 1, 1987, is likely to cause significant impacts beyond those contained in the current contracts, including, but not limited to, increasing the likelihood of the new SWP diversion and conveyance facilities envisioned by WaterFix, which DWR has already acknowledged will cause significant environmental impacts. *See, e.g*, Letter from Jake Campos, STIFEL, to Mary Lou Cotton, SWPCA at 4 (March 19, 2014) (Exhibit A) (without contract amendments, "DWR's legal counsel has concluded that BDCP is not on the list of approved projects that are eligible for funding, including through bond financing"). The DEIR's failure to identify and analyze those impacts fails to comply with CEQA.

Thus, DWR's conclusions in the DEIR that the proposed project would not "alter the existing authority to build new or modify existing facilities" or "result in construction or modification of SWP facilities," DEIR at 5-96, and that "SWP water supply would not change under the proposed project" are contradicted by the facts. *See* DEIR at 5-6. The proposed project makes increased SWP water supply more likely by explicitly authorizing new facilities that are not authorized under the current contract, extending DWR's obligation to build out the SWP to achieve full Table A amounts, and making SWP expansion and extension projects more

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failing to analyze a reasonable range of alternatives, including a reduced contract amount alternative, as well as modifications to other contract terms.

[6] *Id.* at 2.

affordable. DWR's failure to analyze the impacts of these and related SWP modifications is impermissible piecemealing under CEQA. A far better solution would be to adjust Table A amounts to reflect more realistic delivery terms, now and in the future, and to omit the SWP contract term that "require[s] DWR to make all reasonable efforts to complete the water supply facilities necessary to deliver the Table A amounts."

II. The DEIR Improperly Piecemeals Reasonably Foreseeable SWP Changes and Contract Modifications with Potentially Significant Environmental Impacts

The DEIR asserts that the "proposed project is separate and independent from the WaterFix project," DEIR at 6-3, and excludes numerous other SWP contract modifications that are reasonably foreseeable.

CEQA defines a "project" as the whole of an action that has a potential for resulting in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment. The entire project being proposed must be described in the EIR, and the project description must not be artificially truncated so as to minimize project impacts. *City of Santee v. Cty. of San Diego*, 214 Cal. App. 3d 1438, 1450 (1989). A project description must include all relevant aspects of a project, including reasonably foreseeable future activities that are part of the project. *Laurel Heights Improvement Ass'n v. Regents of the University of Cal.*, 47 Cal.3d 376 (1988). Responsibility for a project cannot be avoided by limiting the title or description of the project. *Rural Land Owners Ass'n v. Lodi City Council*, 143 Cal. App.3d 1013, 1025 (1983).

The DEIR fails to meet these requirements of CEQA because, among other things, it fails to analyze the impacts of the proposed WaterFix project, even though several Contractors have admitted that the proposed SWP contract extension is a necessary condition for financing WaterFix. In addition, the DEIR excludes consideration of other contract changes that are being anticipated to enable implementation of the proposed California WaterFix project.

The SWP Contractors have recognized that the proposed project is necessary to enable financing and implementation of WaterFix. For example, in September, 2014, staff at the Metropolitan Water District of Southern California acknowledged that the proposed SWP contract amendments are a necessary step in financing what was then called the Bay Delta Conservation Plan ("BDCP"), now known as WaterFix. *See* MWD, Special Committee on Bay-Delta Presentation Re. Review Status of BDCP Cost Allocation Discussions (Sept. 23, 2014), http://edmsidm.mwdh2o.com/idmweb/cache/MWD%20EDMS/003735248-1.pdf (Exhibit B). Similarly, Kern County Water Agency staff explained in September 2013 that "DWR and SWP Contractors need to come to agreement on a contract extension that matches the term of the BDCP and provides the SWP Contractors with a more appropriate role in managing SWP expenses." Kern County Water Agency, "Resolution of Issues Necessary to Inform a

Development of a Business Case to Support a Decision on Continued Funding for the Bay Delta Conservation Plan and the Delta Habitat Conservation and Conveyance Program," at 1 (Sept. 23, 2013) (Exhibit C).

Several financing agencies similarly reiterated the need to extend the contracts to enable WaterFix. In response to a State Water Project Contractors Authority's request for proposal regarding financing the BDCP in March 2014, Morgan Stanley stated,

> "***Water Supply Contracts***. We understand that DWR's water supply contracts are in the process of being extended, likely to 2085, or 50 years from 2035 when most expire. Clearly, in order to finance the substantial costs associated with CM1 in the BDCP, the extension of these contracts is essential to allow for the amortization of financing payments over a long period of time."[7]

Raymond James echoed that the "current contracts between DWR and the water contractors … will have to be renegotiated in order to fund the tunnels…. Investors will be concerned about the extension of those terms through the life of the bonds." Raymond James and Assocs., Inc., Response to Request for Qualifications and Proposals for Underwriting Services, at 9 (March 19, 2014) (Exhibit E).

In addition, the Contractors have identified a number of other contract amendments that are likely when and if the proposed WaterFix is approved, but which are excluded from the proposed project and DEIR. For example, in a November 2013 presentation, the State Water Contractors identified a number of recommended alternatives for financing WaterFix, all of which require SWP contract amendments. State Water Contractors Management Briefing to DHCCP SWP Cost Allocation Working Group, at 9 (November 8, 2013) (Exhibit F) ("Contract Amendment Likely Needed to Reflect Different Cost Allocations and Different Water Supply Deliveries, and Allowance for Annual Sales"); *see also id.* at 13 ("SWP Contract Amendment Needed" for Alternative 2C); *id.* at 17 (Alternative 4A "Would Require Contract Amendment"). On April 1, 2014, the State Water Contractors considered another set of financing options for WaterFix, all of which, again, would require amendments to existing SWP contracts. State Water Contractors Presentation to SWP Cost Allocation Workgroup, April 1, 2014 (Exhibit G).

DWR and the Contractors have indicated that they will make financing decisions on WaterFix by the end of this year. Those pending, near-term decisions are likely to have a significant impact on the scope of amendments needed to SWP contracts, but also the range of impacts associated with those impacts. *See, e.g.,* Email from Stephen Arakawa Re. Kern County Proposal on BDCO [*sic*] Cost Allocation, January 30, 2014 (Exhibit H) (Kern County Water Agency propose financing strategies for a smaller, "urban-only" 6,000 cubic feet per second ("cfs") WaterFix facility because Kern is not supportive of the current 9,000 cfs approach). DWR should suspend the current SWP contract amendment proposal until these discussions are final and the full suite of amendments and impacts can be considered in a comprehensive fashion, as CEQA requires.

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[7] Morgan Stanley, "State Water Project Contractors Authority: Response to Request for Qualifications and Proposals for Underwriting Services," at 8 (March 19, 2014) (Exhibit D).

The attempt by the DEIR to separate the WaterFix financing and related issues to some future analysis runs afoul of CEQA's requirements to define the project to encompass the whole of the action. It must be revised in a recirculated CEQA analysis.

We appreciate the opportunity to provide our input and urge DWR to address these issues in a revised project and EIR.

Sincerely,

Katherine S. Poole	Rachel Zwillinger	Gary Bobker
Senior Attorney	Water Policy Advisor	Rivers & Delta Program Director
Natural Resources Defense Council	Defenders of Wildlife	The Bay Institute

Exhibit A

STATE WATER PROJECT CONTRACTORS AUTHORITY

PROPOSAL TO PROVIDE UNDERWRITING SERVICES

MARCH 19, 2014

STIFEL

STIFEL

March 19, 2014

Ms. Mary Lou Cotton SWPCA	Mr. Will Frymann PFM	Mr. Brian Thomas PFM	Mr. Doug Brown Stradling

Dear Mary Lou,

On behalf of Stifel, Nicolaus & Company, Incorporated ("Stifel"), please find attached our proposal to provide Underwriting Services to the State Water Project Contractors Authority. We hope that you find our ideas to be thoughtful, considerate and helpful in evaluating the structure and marketability of various financing concepts. We would like to highlight the key items below as an Executive Summary.

- **Structuring Expertise.** Whether the SWPCA pursues an interim financing or accesses the market with a long-term issue, our team has the ability to work through challenges and identify solutions in the development of the credit. Stifel will work with the finance team to best meld certain features of prior multi-participant projects (federal DHCCP, BAWSCA, SCPPA) under the limitations of existing indenture requirements and bonding authority in order to meet the objectives of the project stakeholders.
  - *Stifel has provided structuring and credit recommendations for both an interim note and a long-term permanent financing. We have evaluated interim options such as a draw-down bond that would minimize the carrying cost of the financing. We have also reviewed the potential security structure and offered suggestions for the development of a permanent financing vehicle that fit within certain existing limitations of the Contractors.*
- **Marketing and Distribution Leadership**. Stifel has the largest municipal sales and trading presence in the West and one of the largest in the industry. We have the ability to sell bonds directly to all classes of investors and do not rely upon third party distribution agreements to reach individual investors. We have consistently outperformed as an underwriter and remarketing agent for Note financing programs and we annually lead manage far more new issue financings in the California market than our nearest competitor. With our recent agreement to acquire De La Rosa, Stifel now has senior underwriters in San Francisco and Los Angeles and an unmatched presence into the investor market in California and across the west.
  - *Stifel has been a consistent performer in the underwriting of notes and bonds for Metropolitan, as the largest participant in the SWPCA. Over many years and in direct competition with our peers, Stifel has demonstrated structuring acumen, aggressive marketing and the willingness and ability to commit our firm's capital in order to underwrite bonds.*

We are very appreciative of the consideration to serve the SWPCA on this important project and believe that our response is demonstrative of our commitment to the project and the finance team.

Yours Truly,

Jake Campos
Director
STIFEL
jcampos@stifel.com | (213) 443-5017

STIFEL, NICOLAUS & COMPANY, INCORPORATED
515 South Figueroa Street, Suite 1800, Los Angeles, CA 90071 | www.stifel.com

PROPOSAL TO PROVIDE UNDERWRITING SERVICES

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Exhibit C: Marketing Case Study
Exhibit D: Draw Down Bond Analysis

Disclosure

As outlined in the SEC's Municipal Advisor Rule with current effective implementation date of July 1, 2014, Stifel, Nicolaus & Company, Incorporated ("Stifel") is providing the attached material and all information and advice contained therein in response to a request for proposals or request for qualifications (the "RFP") by a municipal issuer or obligated person with respect to a specific issue of municipal securities. Stifel has not acted, and will not act, as your municipal advisor with respect to the issuance of the municipal securities that is the subject to the RFP.

Stifel is providing information and is declaring to the proposed municipal issuer and any obligated person that it has done so within the regulatory framework of MSRB Rule G-23 as an underwriter (by definition also including the role of placement agent) and not as a financial advisor, as defined therein, with respect to the referenced proposed issuance of municipal securities. The primary role of Stifel, as an underwriter, is to purchase securities for resale to investors in an arm's- length commercial transaction. Serving in the role of underwriter, Stifel has financial and other interests that differ from those of the issuer. The issuer should consult with its own financial and/or municipal, legal, accounting, tax and other advisors, as applicable, to the extent it deems appropriate.

These materials have been prepared by Stifel for the client or potential client to whom such materials are directly addressed and delivered for discussion purposes only. All terms and conditions are subject to further discussion and negotiation. Stifel does not express any view as to whether financing options presented in these materials are achievable or will be available at the time of any contemplated transaction. These materials do not constitute an offer or solicitation to sell or purchase any securities and are not a commitment by Stifel to provide or arrange any financing for any transaction or to purchase any security in connection therewith and may not relied upon as an indication that such an offer will be provided in the future. Where indicated, this presentation may contain information derived from sources other than Stifel. While we believe such information to be accurate and complete, Stifel does not guarantee the accuracy of this information. This material is based on information currently available to Stifel or its sources and is subject to change without notice. Stifel does not provide accounting, tax or legal advice; however, you should be aware that any proposed indicative transaction could have accounting, tax, legal or other implications that should be discussed with your advisors and /or counsel as you deem appropriate.

Section Two

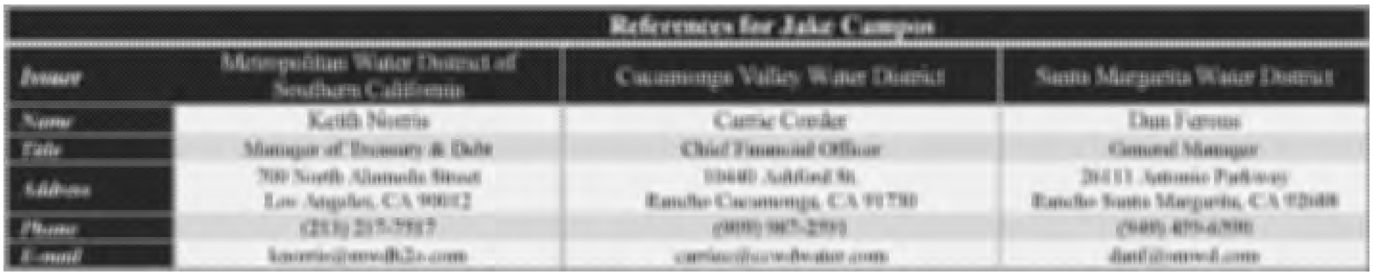
1. *Contacts: Provide the name of the proposing firm with the name, address, telephone and facsimile numbers, and email addresses of the proposed lead and backup banker(s).*

Stifel will serve the SWPCA (the "Contractors" or the "Authority") with a team of seasoned senior bankers that have experience with many of the project stakeholders as well as high profile issuers in California and across the country. Our team will be led by **Jake Campos**, a Director in Los Angeles. **Steve Heaney**, co-head of Stifel's 130-member public finance department, will serve as co-lead banker and ensure the full commitment of resources to the potential transaction. Stifel has announced an agreement to acquire De La Rosa ("DLR") and expects the transaction to close in the coming weeks. As such, we will augment our team to include **Guillermo Garcia** as an additional senior banking team member. Guillermo has a wealth of experience with water agencies in California and will be an integral member of our senior team for the entirety of the financing process.

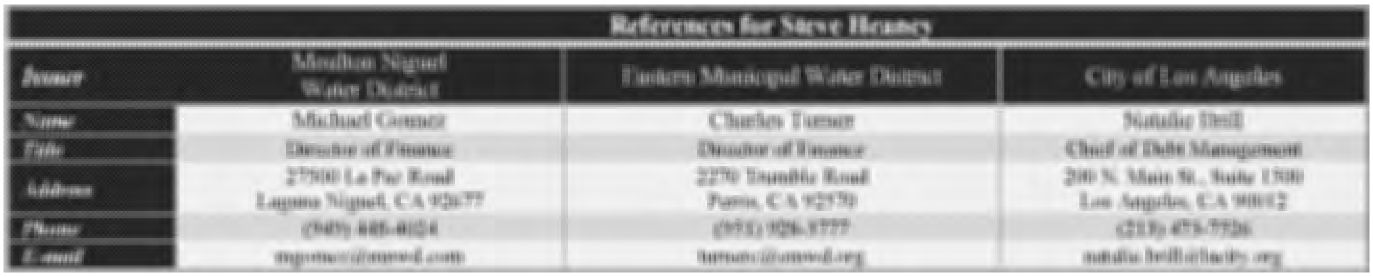
Lead Banker/Primary Contact		Co-Lead Banker		Co-Lead Banker	
STIFEL	515 South Figueroa St. Suite 1800 Los Angeles, CA 90071	STIFEL	515 South Figueroa St. Suite 1800 Los Angeles, CA 90071	STIFEL	456 Montgomery St. 19th Fl. San Francisco, CA 94104
Jake Campos *Director*	Phone: (213) 443-5017 Fax: (213) 443-5023 jcampos@stifel.com	**Steve Heaney** *Managing Director*	Phone: (213) 443-5001 Fax: (213) 443-5023 sheaney@stifel.com	**Guillermo Garcia** *Vice President*	Phone: (415) 217-3384 Fax: (415) 495-8864 ggarcia@ejdelarosa.com

2. *Resume and References: Provide three client references for the lead and backup banker(s). Enclose resumes of each of the assigned team members as Exhibit A to your proposal.*

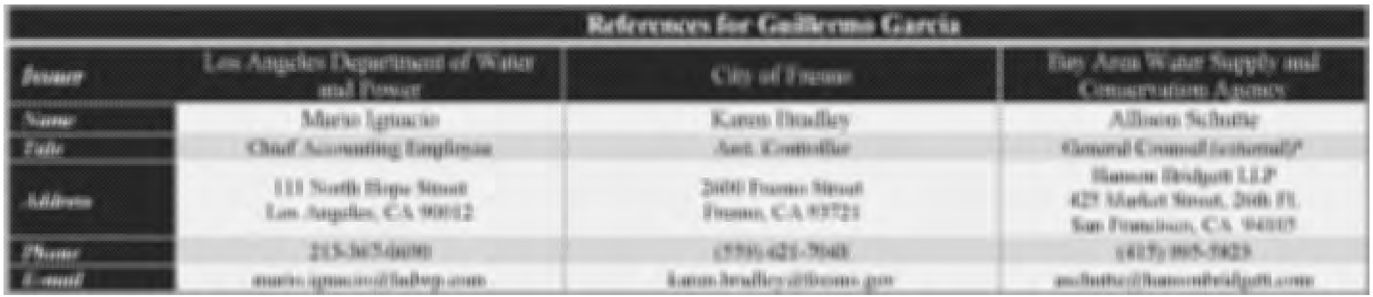
We have provided three client references for Jake, Steve, and Guillermo in the tables below.



References for Jake Campos			
Issuer	Metropolitan Water District of Southern California	Cucamonga Valley Water District	Santa Margarita Water District
Name	Keith Norris	Carrie Corder	Dan Ferons
Title	Manager of Treasury & Debt	Chief Financial Officer	General Manager
Address	700 North Alameda Street Los Angeles, CA 90012	10440 Ashford St. Rancho Cucamonga, CA 91730	26111 Antonio Parkway Rancho Santa Margarita, CA 92688
Phone	(213) 217-7517	(909) 987-2591	(949) 459-6590
E-mail	knorris@mwdh2o.com	carriec@cvwdwater.com	danf@smwd.com



References for Steve Heaney			
Issuer	Moulton Niguel Water District	Eastern Municipal Water District	City of Los Angeles
Name	Michael Gomez	Charles Turner	Natalie Brill
Title	Director of Finance	Director of Finance	Chief of Debt Management
Address	27500 La Paz Road Laguna Niguel, CA 92677	2270 Trumble Road Perris, CA 92570	200 N. Main St., Suite 1500 Los Angeles, CA 90012
Phone	(949) 448-4024	(951) 928-3777	(213) 473-7726
E-mail	mgomez@mnwd.com	turnerc@emwd.org	natalie.brill@lacity.org



References for Guillermo Garcia			
Issuer	Los Angeles Department of Water and Power	City of Fresno	Bay Area Water Supply and Conservation Agency
Name	Mario Ignacio	Karen Bradley	Allison Schutte
Title	Chief Accounting Employee	Asst. Controller	General Counsel (external)*
Address	111 North Hope Street Los Angeles, CA 90012	2600 Fresno Street Fresno, CA 93721	Hanson Bridgett LLP 425 Market Street, 26th Fl. San Francisco, CA 94105
Phone	213-367-0690	(559) 621-7048	(415) 995-5823
E-mail	mario.ignacio@ladwp.com	karen.bradley@fresno.gov	aschutte@hansonbridgett.com

**BAWSCA's General Manager Art Jensen retired in 2013*

3. *Case Study: Provide two case studies that highlight the firm's ability to provide underwriting services on similar transactions as contemplated in this RFP. Case studies should be for transactions where the proposed team members were actively involved.*

Stifel and our predecessor firms (Stone & Youngberg and De La Rosa) have recently served in leadership roles on high profile transactions of similar scope to that required by the Authority. The examples that we have provided below were led by the senior banking and underwriting team members of our proposed team.

State of California Department of Water Resources

$2,992,540,000 Series 2010L Power Supply Revenue Bonds
$1,763,215,000 Series 2010M Power Supply Revenue Bonds
$959,565,000 Series 2011N Power Supply Revenue Bonds

Stifel has served the State of California's Department of Water Resources Power System as Joint Senior manager on three separate issues for a combined $5.7 billion in par amount. The financings were undertaken to refund certain fixed rate bonds and a portion of DWR's VRDBs as well as terminate the associated swaps. The objective was to reduce interest rate exposure and exposure to bank credit enhancement cost and capacity, as well as eliminate swap basis exposure and swap counterparty credit risk. Through the three financings, DWR was able to eliminate all of its variable rate exposure.

Power Supply Revenue Security Structure

The Power Supply Bonds are payable by charges imposed by the CPUC and received by DWR. The charges are made upon customers in the service area of the three major investor-owned utilities in California, Pacific Gas & Electric Company, San Diego Gas & Electric Company and Southern California Edison (collectively, the "IOUs"). DWR charges are included as "Bond and Power Charges" in the IOUs' regular billing statements to customers.

Marketing: Stifel initiated the marketing efforts on behalf of the syndicate and led the development of the investor presentation and net road show for the transaction. As part of our weeklong marketing campaign, we utilized internet, print, and radio advertising to enhance retail interest. This culminated with a three-day order period, with the first two days reserved exclusively for retail orders.

Result: The financing was extremely well received despite the large number of bonds offered over a short amortization range. Because of this success, institutional pricing was ultimately accelerated into the second day of retail marketing. Stifel's specific contribution to retail distribution was to generate over $55 million in retail orders, second only to the bookrunning senior manager on the transaction.

Bay Area Water Supply and Conservation Agency

$335,780,000 Series 2013 A & B Revenue Bonds

Stifel (DLR) served as co-senior manager on this financing that pre-paid to the San Francisco Public Utilities Commission (SFPUC) a $356 million obligation owed by its 26 wholesale customers. The credit quality of the wholesale customers, who are the members of BAWSCA, varied tremendously, and included several AAA-rated cities, as well as eight water districts and cities with no ratings at all.

Structure: The bonds were secured by an additional charge on each wholesale customer's monthly invoice from the SFPUC, who agreed to serve as servicing agent for the bond payments. Per the Water Supply Agreement between the SFPUC and the wholesale customers, all charges had to be based on consumption; however, a strictly consumption-based revenue stream was a major credit negative for the bond issue. We proposed an innovative structure where each wholesale customer would be charged a fixed monthly fee each year based on consumption the prior year. This structure, which was ultimately adopted, significantly reduced revenue volatility while maintaining the equity of a consumption-based charge. The bonds received credit ratings of Aa3/AA- from Moody's/S&P thanks in large part to this structuring feature.

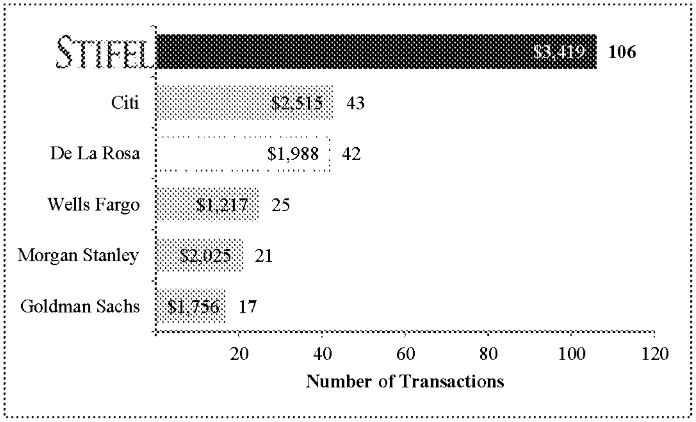
We have also included a case study highlighting Stifel's ability to pre-market, market and underwrite a recent high profile new issue for the Alameda Corridor Transportation Authority in Exhibit C.

4. *Firm Experience – California Water and Wastewater Bonds: As a separate Exhibit B in tabular form, provide a list of Water and Wastewater Agency Bond experience from January 2010 to the present with a grand total of the number of financings and par amount. Include the date, issuer name, par amount and series name/description.*

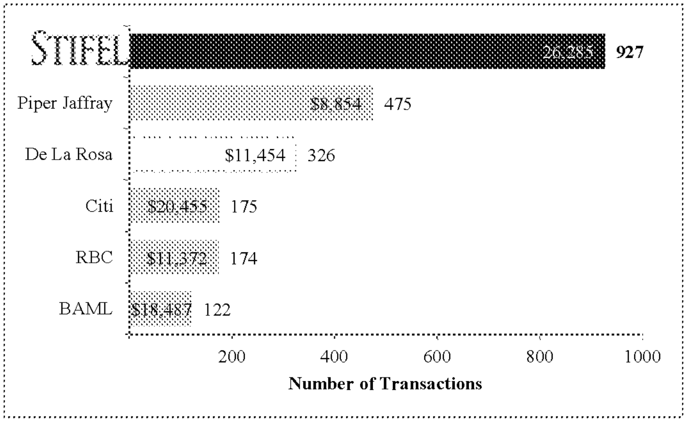
Stifel is the top senior manager of bonds issued by water and wastewater agencies in the California market, both as measured by number of transactions and dollar volume. Since January 2010 we have served as senior manager on 106 water and wastewater transactions in the state for over $3.4 billion. Stifel is also the top senior manager of all negotiated financings in the state of California as measured by number of transactions and dollar volume. Of particular relevance to the Contractors is the breadth of experience of our firm. Over many decades, we have led transactions for the largest State Water Contractor, some of the smallest State Water Contractors, and many agencies that fall in between.

Please see Exhibit B for the requested list of experience.

California Water and Wastewater Financings
Senior Managed Financings
1/1/2010 to Present



California New Issue Financings
Senior Managed Financings
1/1/2010 to Present



Source: SDC; Full credit to bookrunner (equal if joint); Par in columns in millions
Data from January 1, 2009 to March 6, 2014; Stifel has entered into an agreement to acquire De La Rosa and figures reflect combined entity

5. *Firm Status: Provide: your firm's level of Tier 1 Capital and provide your firm's Tier 1 common capital ratio for the most recent reported period along with the date as of which those numbers were current.*

Stifel has a strong capital position and maintains a leverage ratio far below our Wall Street competitors. Our Tier 1 capital position as of December 31, 2013 was $1,233,047,000 and our Tier 1 Common Capital Ratio was 26.7%. The table to the right highlights our common capital ratio versus a number of our peers. Stifel's conservative balance sheet is driven by our focus on client centric business lines rather than a reliance on highly leveraged prop positions. Our capital position has provided stability during periods of market volatility and allowed us to continue on an expansionary path as many firms have reduced staffing levels or exited business lines altogether.

Tier 1 Common Capital Ratios	
Stifel	**26.7%**
Goldman Sachs	14.6%
Morgan Stanley	12.8%
Citigroup	12.6%
BAML	11.2%
Wells Fargo	10.8%

Source: Most recent financial filings

Section Three

1. *As noted above, this financing will fund the participating funding State Water Project Contractors' share of the pre-construction costs. Assuming that the total pre-consruction costs are equal to $1.2 billion, and that the split between the State Water Project Contractors and the Central Valley Project Contractors will be 50/50, outline your recommendations as to the most efficient way to finance the "pre-construction" costs. Be sure to include timing, size of issue or issues, term of borrowing, structure, and costs (fees). Please include your rationale as to why your recommendation would result in the lowest cost of capital for the project and the contractors.*

Introduction. The Bay Delta Conservation Plan ("BDCP") will be one of the most ambitious infrastructure projects in California in decades and will rival the existing State Water Project itself in terms of scope and complexity. Though the Contractors and DWR generally support the project, Stifel understands that certain legal issues serve as impediments to DWR's ability to fund the project, including "pre-construction" costs, at this time. More specifically, DWR's legal counsel has concluded that BDCP is not on the list of approved projects that are eligible for funding, including through bond financing. To date, funding of pre-construction costs has been accomplished through a series of funding agreements with a sub-set of the contractors. DWR has billed such contractors for expenditures made to date, with the clear understanding that no DWR funds are currently being expended.

Need for Financing. Pre-construction costs (BDCP) and implementation costs (DHCCP) are expected to increase substantially in the coming years, and thus the Contractors are interested in financing such costs instead of paying for them on a current basis. Stifel further understands that DWR supports the Contractors in their efforts to fund pre-construction costs on an interim basis, and that DWR would ultimately take-out the pre-construction obligations after having secured legal framework to do so. The process of securing funding authorization for DWR is expected to take several years, will require legislation, and will likely face litigation. Therefore, the financing plan will need to be flexible enough to accommodate this uncertain schedule.

Size and Timing. Based on current estimates, the State Water Project Contractors will be responsible for approximately $600 million of pre-construction costs, representing a 50% share of the total $1.2 billion project costs. These funds are expected to be dispersed over a period of several years after existing funding is depleted in late 2014. Given the need to fund these expenditures over several years, it is prudent to finance the pre-construction costs over time rather than in a single issue. Stifel will work toward a goal of accessing the market with this inaugural issue in Q3 of 2014 so as to ensure that funds continue to be available for pre-construction. We do recognize that timing will be heavily influenced by the credit composition and legal structure that is ultimately undertaken.

Term and Mode. Under the proposed plan, the interim obligations issued by SWPCA will need to remain outstanding in some form until DWR has the authorization and ability to access the market for the BDCP project. With a traditional fixed-rate note, this can be accomplished in two general ways, with each having certain considerations related to the integration with a permanent financing.

- **Shorter term note.** 3 to 5-year interest only term with the potential to capitalize interest. Expectation to roll the Note forward if permanent financing is not in place by maturity. *We have shaded the 5-year note below as the Recommended Approach based on the goal of providing enough time to prepare the permanent financing at a very low cost of capital.*
- **Longer term note.** 7 to 10-year term with an optional redemption provision structured in 5-years. Though more costly, the longer term notes afford time flexibility with respect to the take-out.

	Maturity			
	3-years	5-years	7-years	10-years
Note Yield	0.50%	1.15%	2.00%	2.75%
Optional Redemption	n/a	4-years @ par	5-years @ par	5-years @ par
Capital Appreciation*	Optional	Optional	n/a	n/a

[illegible]

Callable Notes feature premium coupon structure. As an example, YTM for 5.00% 10-year Note with 5-year optional redemption provision equates to 3.74%. We anticipate bifurcating and offering 4.00% (money manager demand) and 5.00% coupons (bond fund demand).

2. *Please describe how the interim "pre-construction" financing its best integrated into the long-term financing described above. As noted, it is anticipated the California Department of Water Resources would be issuing providing the long-term financing. Please provide your firm's perspective on the efficiency of using traditional financing through the California Department of Water Resources versus other financing vehicles (e.g., SWPCA, public-private partnership, etc.)*

Interim Financing Considerations. The BDCP interim pre-construction financing presents certain relatively unique challenges with respect to integration. Most interim financing programs in the municipal space are undertaken to fund construction and/or development of revenue generating projects with an expectation that the interim financing will be taken out as a project comes on-line and revenues materialize. There is not typically a change to the security structure or obligator. Conversely, the proposed BDCP financing involves two separate issuers that will offer bonds secured by contract payments from different subsets of obligated parties under potentially very different security pledges. These factors require a well formulated plan including contingencies for legal hurdles, delays and potential roadblocks.

- **Different Issuers.** It is uncommon but not unheard of to have a pre-determined finance plan where one issuer is expected to refund the obligations of another. There is a need for administrative coordination between indenture trustee/paying agent, but we do not view the existence of separate issuers to be a significant impediment to the financing program.

Takeout Financing with Different Issuer

In 2013 our team sold an electric revenue refunding financing for the City of Riverside, which was used, in part, to refund obligations issued by the City of Corona. Riverside had previously purchased a power plant from Corona, and a takeout of Corona's debt issued to construct the power plant was part of the purchase price. No problems surfaced in the transaction relative to this issue, though there was a greater level of coordination required than usual.

- **Different Obligors.** As is contemplated in the anticipated plan of finance, the obligors for the two financings are expected to be different. It is expected that only a subset of the Contractors will participate in the interim financing, but all of the Contractors will necessarily be a party to DWR's permanent financing. There are key issues to work through regarding which entities participate in the project and the financing and to what degree.

Change of Obligated Parties

Stifel has more experience in this regard than any firm in the market. We are the national leader in the development market, where it is common practice for the obligated parties to change as a project is developed and comes on line. This dynamic requires that the initial issue provide diligence on the obligated parties at the time of the sale as well as the clear plan that will transition the obligation to other parties.

- **Timing Considerations.** Another key difference between the BDCP and most interim + permanent financing programs surrounds the timing of the takeout. In a conventional two-step program, there are certain measurable conditions (construction completion/project operation/revenue threshold) that once satisfied, allow for a permanent financing to proceed. BDCP's permanent financing is reliant on DWR obtaining legal authority to finance the projects. Because of this, at the time that the interim financing comes to market, there will be many known unknowns (legal and legislative challenges) that will need to be addressed to the extent that the security for the interim financing is at some level dependent on a permanent takeout financing.

Evaluating the Efficiency of DWR Takeout. DWR has issued 44 series of Water System Revenue Bonds since 1986, and has $2.4 billion outstanding with near-perfect ratings of Aa1/AAA. Though this bond financing program has generally been effective over time, the structure has some limitations based on the provisions that were common to the market nearly 30-years ago. For example, DWR's Master Resolution requires for the funding of a DSRF at 50% of the tax law maximum. This element of security is not required by the market for high grade providers of essential services. In addition, DWR operates on a "full cost recovery basis" through take-or-pay contracts with the Contractors. DWR's 1.25x rate covenant is a conventional feature for many utility enterprises but given the flow of funds is a materially adverse feature to each of the Contractors. This is because DWR does not operate like a typical water utility that has to estimate demand levels and set rates based on storage and hydrological conditions. Thus, Contractors are billed an amount sufficient to fund operations and maintenance plus 1.25x annual debt service in each year. The 0.25x of coverage (which is not used for other purposes) is applied as a credit the following year. The result is that the Contractors essentially pre-fund 25% of annual debt service perpetually.

Permanent Financing Recommendation: New DWR Subordinate Lien

As detailed above, DWR's Master Resolution which was created in 1986 contains provisions and covenants that best fit the municipal market at the time. Stifel believes that DWR may be able to meaningfully reduce the level of payments that Contractors make with respect to DWR bonds by establishing a new, subordinate lien that incorporates the modern provisions highlighted below.

- **Debt Service Reserve Fund.** Many highly rated water revenue bond issuers no longer use debt service reserve funds. We are confident that DWR could issue bonds without a debt service reserve fund and face no rating or interest rate penalty. The subordinate lien should provide DWR the option, but not the obligation to fund a DSRF for any subsequent bond sale.
- **Rate Covenant.** Stifel would argue that a sum-sufficient 1.0x rate covenant is adequate for DWR given the take-or-pay contracts and full cost recovery structure.
- **Implementation.** The new lien would be expected to be rated Aa2/AA+, one notch less than the existing Aa1/AAA ratings. However, DWR may be able to secure the same Aa1/AAA ratings if it closed off the senior lien, though this benefit may take some time to develop given the large amount of debt on the existing lien. Ultimately, though, DWR should be able to enjoy the Aa1/AAA ratings again, with timing being the main uncertainty.

Permanent Financing Alternative: SWPCA

The Contractors can explore a long-term permanent financing in the current market rather than utilizing a two-step process with DWR. If successful, this financing could be a model for financing the entire construction cost of the BDCP. However, securing permanent financing without DWR presents a number of complications. As a true operating entity with a strong balance sheet and take-or-pay contracts with the Contractors, DWR is a highly regarded credit. As a JPA, the SWPCA does not currently provide for the same level of strength. Below we have provided a long-term alternative for SWPCA.

Issuer and Participants. SWPCA's JPA agreement sets forth that bond indebtedness for any project must be approved by at least two-thirds of all Members (of the project) and by the Members who cumulatively represent at least 75% of the Maximum Annual Table A amounts. As discussed in greater detail within our response to Question 5, Metropolitan (46%) and Kern County Water Agency (24%) represent 70% of the total allocation. Santa Clara Valley Water District (2.4%) is the fourth largest participant but is an extremely well regarded credit. We believe these three agencies encompass the core of the credit under

Precedent for Contractors Financing

The SWPCA, Met and Kern are all parties to the DHCCP Agreement with a portion of the federal share having been funded by the San Luis & Delta-Mendota Water Authority. The financing structure utilized an arrangement that distinguished "Direct Payment" participants from "Financing Participants" within an Activity Agreement. Westlands ultimately represented a 62% share of the total financing but under the agreement secured 100% of debt service with a pledge of the District's net revenues. The other participants are obligated to collect or charge revenues or assessments for their share of the financing which are then remitted to the Trustee and used to reimburse Westlands.

The Central Coast Water Agency designed, financed, and constructed two reaches and now operates and maintains much of the Coastal Aqueduct portion of the SWP. These Regional Facilities were funded under a project agreement that included bonds issued by CCWA and secured by water purchase agreements. No single party was responsible for more than 25.3% of debt service so step-up provisions and transfer restrictions (BBB) were built into the structure.

the structure that is provided below.

Security. As with the federal DHCCP financing, we believe that smaller participants can have the option to directly fund or finance their share of the project. Entities that participate in the financing will covenant to collect and charge revenues or levy *ad valorem* assessments for these SWP-related costs in an amount that will pay principal and interest on their share of the bonds. Ultimately, in order to achieve double-A category ratings on the financing, a subset of the Contractors will need to stand behind the bonds in order to provide support in the event that one of the smaller agencies is unable to collect rates, charges and/or levies sufficient to satisfy their share of debt service. We offer that Met, KCWA and SCVWD provide the financial strength to ensure that this commitment garners the targeted rating. We also recognize that credit support will need to be structured in careful consideration of pre-existing authorization and indenture limitations. In our response to Question 5a, we have evaluated the option to utilize an O&M pledge (for Met, KCWA and SCVWD) with step-up provisions or a more conventional revenue or assessment-backed security structure. In any case, we do not anticipate the need for a debt service reserve fund. However, the flow of funds will need to ensure that revenues from the smaller participants are provided to the trustee on a timely enough basis to identify shortfalls and provide the backstop providers with sufficient time in which to cover the balance.

Financing Structure. This transaction will be designed as a permanent financing vehicle with level debt service and a term of 30-years. There is flexibility to utilize an interest only structure for the first several years and the Contractors may wish to explore an alternate call structure (5 or 7-years) to maximize optionality.

3. *Please provide a preliminary pricing scale as of March 3, 2014 assuming an "AA" underlying rating. Please provide coupons, yields and spreads to MMD AAA GO by maturity.*

The table below provides the requested preliminary pricing scale as of March 3, 2014 assuming that long term bonds are issued with an underlying rating in the double-A category. We have included coupons, yields and spreads to MMD for each maturity.

	Preliminary Pricing Scale			
Maturity (8/1)	Coupon (%)	Yield (%)	Spread to MMD	MMD as of 3/3/2014
2015	4.00	0.13	-0.02	0.15
2016	4.00	0.23	-0.02	0.25
2017	4.00	0.35	-0.06	0.41
2018	4.00	0.61	-0.05	0.66
2019	5.00	0.93	-0.03	0.96
2020	5.00	1.37	-	1.37
2021	5.00	1.73	0.02	1.71
2022	5.00	2.06	0.05	2.01
2023	5.00	2.29	0.07	2.22
2024	5.00	2.45	0.10	2.35
2025	5.00	2.61	0.12	2.49
2026	5.00	2.77	0.15	2.62
2027	5.00	2.92	0.17	2.75
2028	5.00	3.06	0.20	2.86
2029	5.00	3.22	0.25	2.97
2030	5.00	3.37	0.30	3.07
2031	5.00	3.46	0.30	3.16
2032	5.00	3.54	0.30	3.24
2033	5.00	3.61	0.30	3.31
2034	5.00	3.66	0.30	3.36
2039T	5.00	3.88	0.30	3.58
2044T	5.00	3.97	0.30	3.67

Note: "T" denotes Term Bond. Preliminary; subject to change.

4. Please describe any alternatives to a public issue to finance the "pre-construction" costs (e.g., private placement, line of credit, etc.) that you believe would be a more effective financing vehicle. Be sure to include the strengths and weaknesses of such financing vehicle.

Stifel has evaluated various options that are available for the Contractors to finance the pre-construction costs. Within our responses to Questions 3.1 and 3.2, we have identified and expanded upon many conventional bond financing techniques. Given the unique attributes of the proposed plan of finance, we have also evaluated financing vehicles that would better match the availability of funds with the timing of pre-construction costs. We believe that this can be accomplished by structuring a portion of the interim financing as a draw-down bond. The chief benefit of a draw-down structure is clear – interest does not accrue until funds are needed. This meaningfully reduces the carrying cost on the interim financing.

Stifel has engaged a major banking institution in exploratory talks regarding a structure that would provide for the placement of draw-down securities issued at a spread to the SIFMA index. We believe there is capacity for at least 50% of the $250 million first phase interim borrowing. The most important consideration for draw-down securities will be that unlike a revolving loan facility or commercial line of credit, any undrawn securities can not be reduced or eliminated as a result of litigation or other adverse events surrounding the project. We believe these terms can be secured under the credit structure that is outlined in our response to Question 5.

We have provided analysis for the draw-down bond in Exhibit D.

5. Please describe your recommended marketing approach for the bonds. At a minimum, include the following:

a. A description of the rating agency approach (e.g., which rating agencies, what credit strengths, credit challenges, and other relevant information would be needed to achieve at least a "AA" rating.)

The challenge for any multi-participant project is describing the individual components of security that encompass the pledge. Recognizing the goal of at least double-A category ratings, the structure will require either cross-collateralization of any weak participants or an outright pledge by double-A and above rated participants to provide support for up to 100% of debt service.

Rating Agency Selection. We suggest securing ratings from Moody's and S&P. We are not opposed to including Fitch, but do not anticipate any pricing benefit from a third rating. This is consistent with DWR's approach, which currently has ratings of Aa1/AAA.

Pledge Considerations for Metropolitan

1. Ad Valorem (Aaa/AAA/AAA)

- Highly regarded credit
- Legal limitations on ability to recover SWP costs

2. O&M Water Purchase

- Very strong pledge
- For BDCP, question on ability to tie costs to water purchases
- Explore framework for O&M pledges in electric space on distribution (non-generating) assets such as SCPPA STS

3. Water Revenue (Aa1/AAA/AA+)

- Highly regarded pre-existing credit
- Familiarity with investors and analysts
- Fully funded, program will impact existing credit

4. New Subordinate Revenue Lien

- New credit with modernized provisions could be established to fund SWP costs
- Most flexibility

Financing Participants. As Metropolitan is the largest Contractor and responsible for 46% of the Maximum Annual Table A allocation attributable to SWPCA members, the credit will by default feature a large and diverse regional economy. As we describe in our response to Question 5b below, there are many considerations to evaluate regarding the role of each agency in funding their respective share of project costs.

Security Structure and Legal Challenges. Another challenge in developing the credit story is the nature of the pledge that is provided to the bonds, both as a primary source of repayment and any cross-collateralization mechanism or backstop. The security will need to anticipate legal challenges to the collection of charges or assessments to make debt service payments on the project. We understand that Metropolitan, Kern County Water Agency and Santa Clara Valley Water District, with a combined share of 72% of the Maximum Annual Table A allocation are the most likely parties to directly secure a SWPCA financing. Below we discuss four potential pledge options for consideration and analyze through the view of Metropolitan, as the single largest financing participant.

1. *Ad Valorem* Pledge. The ideal pledge for the financing would be only a pledge of *ad valorem* property taxes with no recourse to any of the Contractors' rate-making powers. All of the Contractors have the ability to levy *ad valorem* taxes to pay for SWP-related costs, and many of them do. In most cases, this ad valorem pledge would be a stronger credit than each agency's revenue bonds credit, as illustrated with Metropolitan's slightly higher ratings on its GO bonds than its revenue bonds, and thus would be a better option for securing the highest ratings on the proposed financing.

However, Metropolitan's situation with respect to *ad valorem* property taxes is complicated due to the limitations instituted by the Metropolitan Water District Act that created the organization. Under the MWD Act, Metropolitan is limited from increasing the revenues generated by *ad valorem* property taxes without a public hearing and the finding that increasing such revenues is "essential to the fiscal integrity of the district." (This does not apply to Metropolitan's GO bonds which have separate voter authorization.) Metropolitan did just this for FY2014, freezing the tax rate at the FY2013 level of 0.0035%, citing current and future SWP payment obligations, among other reasons. Though Metropolitan has some flexibility with respect to increasing its *ad valorem* tax levy, it is possible that this limitation may preclude Aaa/AAA ratings.

2. *O&M Pledge.* The next best option would be to characterize the payments with respect to the BDCP project as an operations and maintenance cost similar to the other SWP-related charges. This would be analogous to Contractor payments with respect to DWR debt service, which is considered an O&M expense. Through this approach, Contractors could choose to levy *ad valorem* property taxes to fund this payment, or they could fund it through the operating revenues of their respective enterprises. This approach is similar to 1 above, but gives Metropolitan additional flexibility if it cannot increase its *ad valorem* tax levy sufficiently to cover the charges. Contractors receive two critical benefits from the O&M characterization: 1) the priority over debt service payments enhances the security of the financing; and 2) the impact on debt service coverage calculations is lower since no coverage is required on O&M payments.

We understand that Metropolitan's legal counsel has expressed concern with respect to the O&M characterization of the financing of pre-construction costs, particularly since the revenues are not going to pay for actual water delivered. However, we would argue that the pre-construction costs are necessary to ensure the continued delivery of water pursuant to the existing SWP contracts. An analogy is the financing of the Southern Transmission System Project by the Southern California Public Power Authority. While participants do not purchase power from STS Project, the project is necessary to deliver energy purchased under other contracts.

3. Net Water Revenue Pledge. A pledge of net system revenues would be the most straightforward security structure for the proposed financing. However, this structure would also have the greatest impact on the outstanding credits of the participants. Fully deployed, the pre-construction program would increase Metropolitan's revenue bond burden by nearly $300 million. More importantly, the impact would be much greater if SWPCA chose to finance actual BDCP construction costs through this mechanism, not just pre-construction costs. This level of funding, in the range of $3 billion to $5 billion for Metropolitan alone, would significantly impact existing credit ratings.

4. New Subordinate Lien Water Revenue Pledge. Finally, Metropolitan may want to consider a subordinate pledge of net revenues to secure the proposed financing. While slightly more costly in terms of interest rates, this option would give Metropolitan much more flexibility and would protect the ratings on the existing revenue-backed debt. As a pledge of revenues, the subordinate lien is considerably more flexible than other alternatives. This security can even be used in a similar fashion to a traditional letter of credit complete with substitution provisions. In fact, the Contractors could structure a long term bond issue wrapped by Metropolitan's subordinate lien pledge, the obligation for which could be substituted to DWR upon meeting certain conditions such as obtaining approval to bond finance BDCP costs.

b. A discussion of the credit – which agencies would best serve to secure the credit? How would you recommend positioning SWPCA to attract quality investors?

Agencies to Secure the Credit. Since SWPCA is not an operating agency and does not have a balance sheet, any transaction would necessarily be the compilation of various credits. This is in contrast to a financing issued by DWR, which is an operating agency with a large balance sheet. Because of this, credit analysts will need to review all of the agencies that participate in the financing and make their credit decisions based on the entire group. If a subset of the Contractors is willing to provide primary support for the financing, Stifel would propose selecting from the largest agencies in terms of Maximum Table A Amounts and assessed value. The table to the right includes Maximum Table A Amounts and ratings for all 22 member agencies in the SWPCA.

SWPCA Member	Max Table A[1]	% of Total	Credit Ratings
Metropolitan	1,911,500	46.6%	GO: Aaa/AAA/AAA Rev: Aa1/AAA/AA+
Kern County WA	982,730	23.9%	IDGO: Aa3/A
Antelope Valley-EKWA	141,400	3.4%	Rev: A2/AA-
Coachella Valley WD	138,350	3.4%	IDGO: Aa3/A
SBVWD	102,600	2.5%	Rev: AAA
Santa Clara Valley WD	100,000	2.4%	Prop: Aa1/AA+/AAA Rev: Aa1/AA/AAA
Castaic Lake WA	95,200	2.3%	Rev: AA/AA
Tulare Lake Basin WSD	88,922	2.2%	-
Mojave Water Agency	82,800	2.0%	GO: Aa3/AA- Rev: Aa3/AA/AA
Alameda County FC	80,619	2.0%	-
Central Coast WA[2]	70,486	1.7%	Rev: Aa3
Desert Water Agency	55,750	1.4%	Rev: AA
Dudley Ridge WD	50,343	1.2%	-
Solano County WA	47,756	1.2%	-
Alameda County WD	42,000	1.0%	Rev: Aa2/AAA
Napa County FCWCD	29,025	0.7%	-
San Gabriel MWD	28,800	0.7%	-
Palmdale WD	21,300	0.5%	Rev: A-/A+
San Gorgonio Pass WA	17,300	0.4%	-
County of Kings	9,305	0.2%	GO: A1
Crestline-LAWA	5,800	0.1%	-
Plumas County FCWCD	2,700	0.1%	-

[1] Source: Maximum Annual Table A Allocation Amounts (acre-feet) from DWR SWP Series AR Official Statement

[2] JPA representing San Luis Obispo CFC & WCD and Santa Barbara CFC & WCD

In evaluating agencies based upon the Maximum Table A allocation, the six largest form a diverse mix. Assessed values range from a high of $2.2 trillion for Metropolitan to a low of $17 billion for San Bernardino Valley MWD. Four have publicly offered debt outstanding for their overall system, while two do not. Though Kern has bonds outstanding, they are for only Improvement District 4, not the entire agency. Coachella has issued land-secured bonds in the past, but not agency-wide debt. Credit ratings (for the four of these agencies with public debt), are generally high, though Antelope Valley-East Kern has mid-tier ratings of A2/AA-. From a credit perspective, the two agencies that stand out are Metropolitan and Santa Clara Valley Water District. As we have discussed in our response to Question 5a, one key decision will be the pledge that is utilized to secure the financing. Metropolitan's revenue bond ratings are Aa1/AAA/AA+, but its general obligation (*ad valorem*) ratings are a pristine Aaa/AAA/AAA. Santa Clara Valley carries Aa1/AA revenue bond ratings, and though it does not have GO bonds, it carries Aa1/AA+/AAA ratings on several series of limited property tax backed bonds. Stifel believes that Santa Clara Valley would receive Aaa/AAA/AAA ratings for unlimited tax GO bonds, as the concerns expressed by Moody's and S&P on the current bonds reflect issues with property tax allocation by the District and the State, which would not be an issue with an unlimited *ad valorem* pledge. Further discussion of the choice of credit type is included below.

Kern County Water Agency and San Bernardino Valley Water District are also potential participants in the financing for two different reasons. KCWA is the second largest Contractor by Maximum Table A allowance, though it currently does not have public debt secured by water revenues. Its Improvement District No. 4 has ratings of Aa3/A, but those do not reflect the credit of the entire agency. San Bernardino Valley Water District is much smaller with respect to Maximum Table A Amount and assessed value, but does carry a triple-A rating from S&P.

Strategic Naming of Issuing Authority

SWPCA may want to consider changing the name of the organization to improve the marketability of the organization both to potential bond investors and to other stakeholders throughout California. While the current name is technically accurate, "State Water Project Contractors Authority" does not convey the level of essentiality and desirability that the organization may want in both selling bonds and conveying its message to the general public. The word "Contractors" in particular stands out and sounds like the organization represents private for-profit companies, and "Authority" could potentially also be improved upon. Options to consider include: "California State Water Agency," "California State Water Project Agency," "California Bay Delta Authority," and other similar variants. As an example, we recently served as sole manager for a financing for newly-christened "Silicon Valley Clean Water," a wastewater treatment JPA in the Bay Area. The organization's previous name was the "South Bayside System Authority," a name which accurately conveyed neither the organization's location nor service provided. DLR proposed the name change, but the Authority Commission ultimately decided on the new name for the purposes of improving the marketing of its bond issue and improving the organization's profile in the community.

c. *Describe the marketing leading up to the sale of the bonds, including the need for investor meetings, net roadshow, etc.*

While the final marketing program will ultimately depend on the credit and structure of the borrowing, there are certain tenants that Stifel will follow to best position the sale irrespective of the final terms of the financing. Our marketing initiative will canvass the full spectrum of investors and directly target both individual investors and institutions. Leading up to the sale we will work with our municipal syndicate desk, by far the most active in the California market, in order to tailor the marketing program to address specific pockets of demand and most efficiently distribute the bonds.

- **Individual Investor Teach-In.** Stifel distributes bonds directly to individual investors. We do not rely on distribution agreements or joint venture partners in order to reach this important investor class. Our Private Client Group maintains over 30 offices in California and one of our unique attributes is that many of our individual investor clients maintain accounts at the firm for the specific purpose of participating in municipal new issues.
- **Early Dissemination of Marketing Materials.** Stifel will work with the Contractors to prepare for the release of the collateral marketing materials as early as possible (i.e., rating reports, POS, Netroadshow, investor meeting materials, etc.); two weeks ahead of time would be optimal. This will enable credit analysts to obtain approval prior to the week of sale.
- **Hold a Netroadshow.** Stifel has led the Netroadshow presentation process for many recent inaugural credits and/or high profile financings. This effort can be a key tool in gaining early account approvals, which translates to an improved read and the ability to construct a well

Current Top Bondholders

Metropolitan	Amount ($000)	SCVWD	Amount ($000)
Vanguard	138,525	State Farm	35,045
PIMCO	130,507	Travelers	18,000
Liberty	50,595	PIMCO	11,690
Fidelity	43,000	Nuveen	6,785
BlackRock	39,934	Opus	2,730
Goldman	28,580	Northern Trust	1,500
Lord Abbett	25,465	Boston Mgmt	1,346
JP Morgan	24,713	Eaton Vance	1,346
Penn Mutual	23,950	Country Trust	1,305
AIG	20,000	Invesco	400

informed preliminary pricing. Ultimately this leads to the highest price and lowest yield on the bonds.

- **Reserve Ability to Visit Special Focus Accounts.** Leading up to the sale, there may be certain accounts that will benefit from a direct dialogue with the finance team. Stifel has led these meetings for some of the largest and most high profile issuers in the municipal market and it is an undertaking that we would be pleased to manage for the Contractors. On the previous page, we have provided the top-10 holders of Metropolitan and SCVWD's outstanding revenue bonds.

d. How would you envision SWPCA interacting with the underwriting desk and the sales force (if at all)?

The Contractors will regularly interact with Stifel's syndicate desk in the weeks leading up to the bond sale. Our senior underwriters will provide the finance team with not only market updates but insight regarding current market themes, timing and the tone from buyers of essential service credits. Stifel's banking team does not require an "investor liaison" to communicate with our fixed income sales department. Our senior bankers and Tier One sales professionals are in regular communication and have a strong understanding of our firm's coverage of issuers and investors alike. Stifel's institutional salesforce will interact with the Contractors in the event that certain accounts require specific attention. The salesforce will facilitate this interaction between the finance team and institutional investors in order to address the need and secure the order.

Section 4

In the format below (feel free to add lines as necessary), please provide your proposed not-to-exceed underwriter's discount expressed in dollars per bond and gross amounts assuming a par amount of $250 million.

In the tables below, Stifel has provided our proposed underwriter's discount based upon a $250 million long-term offering. We have also included proposed takedowns by maturity for an issuance of interim notes. We would like to highlight that our proposed levels for notes maturing after 5-years meet or exceed the proposed takedown for long-term bonds. This is due to the level of diligence and communication that will be required to complete the first component of a two-step financing program. With respect to our proposed draw-down bond recommendation, Stifel proposes an arranger/placement fee of 0.35% of the total committed value of such securities.

Underwriter's Discount (Permanent Financing)

	$ per bond	Total $ Amount
Takedown	$2.000	$500,000.00
Expenses (excluding counsel)	0.092	22,896.45
Est. Underwriter's Counsel Fee	0.120	30,000.00
TOTAL	**$2.212**	**$552,896.45**

Fees and expenses assume $250 million of par based on current market conditions.

Note Takedowns

Type of Note	Takedown
3-year	$1.25
5-year	2.00
7-10 year	2.25

Exhibit A – Resumes

Investment Banking Team	
Name	**Experience**
Jake Campos *Director* *Los Angeles, CA* Role: Lead Banker & Primary Contact 515 S. Figueroa St., Ste. 1800 Los Angeles, CA 90071 (213) 443-5017 jcampos@stifel.com	Mr. Campos joined Stone & Youngberg (now Stifel) from UBS in 2008, having served as senior banker on several billion dollars of senior managed financings for utilities, transportation agencies, and development projects in California and across the country. BS – California Polytechnic State University *Relevant Senior-Manager CA Experience* ✓ Santa Margarita Water District, Series 2013A, $57m ✓ Eastern MWD, Ref. Water & Sewer Revenue Bonds, Series 2012A, $50m ✓ Henderson (NV) Wastewater, Series 2012A, $72m ✓ Metropolitan WD of Southern California, Water Rev. Ref. Bonds, Series 2011C, $157m ✓ Cucamonga Valley Water District, Water Rev. Ref. Bonds, Series 2011A, $110m ✓ Sacramento District Sanitation District's Financing, Rev. Ref. Bonds, Series 2011A, $77m ✓ Metropolitan WD of Southern California, Water Rev. Ref. Bonds, Series 2009 A-2, $104m
Stephen E. Heaney *Managing Director* *Los Angeles, CA* Role: Co-Lead Banker & Backup Contact (213) 443-5001 sheaney@stifel.com	Mr. Heaney's public finance career spans more than three decades. During this time, he has served a banker for several billion dollars in public offerings. Steve recently finished his term on the MSRB where he served as Vice Chair. BA – Texas Tech University; MA in Public Administration – Syracuse University *Relevant Senior-Manager CA Experience* ✓ Moulton Niguel Water District, 2014 Refunding Bonds, $21m ✓ City of Los Angeles, Wastewater System Revenue Bonds, 2012-A, $157m ✓ City of Tustin, 2012 Refunding Water Revenue Bonds, $9m ✓ Santa Margarita Water District, Revenue Bonds, Series 2009A&B, $75m ✓ City of Los Angeles, Solid Waste Revenue Bonds, Series 2009A&B, $115m ✓ Moulton Niguel Water District, 2009 Certificates of Participation, $60m
Guillermo Garcia *Vice President* *San Francisco, CA* Role: Co-Lead Banker & Backup Contact 456 Montgomery St. 19th Fl San Francisco, CA 94101 (415) 217-3384 ggarcia@ejdelarosa.com	Mr. Garcia leads DLR's Utility Group and serves as lead or co-lead on all of the firm's major utility accounts. Prior to being an investment banker, he was a financial advisor and engineering consultant serving California utilities. BS, MS in Civil Engineering, & MBA – Stanford University. *Relevant Senior-Manager CA Experience* ✓ Metropolitan WD of Southern California, Water Rev. Ref. Bonds, Series 2013D, $87m ✓ Los Angeles DWP, Water System Revenue Bonds, Series 2013B, $380m ✓ Bay Area Water Supply & Cons. Agency, Revenue Bonds, Series 2013AB, $336m ✓ City of Los Angeles, Wastewater System Revenue Bonds, Refunding Series 2012A/C, $183m ✓ Metropolitan WD of Southern California, Water Rev. Ref. Bonds, Series 2012A, $181m ✓ CA Dept. of Water Resources, Water System Revenue Bonds, Series AJ, $217m ✓ CA Dept. of Water Resources, Water System Revenue Bonds, Series AH/AI, $190m ✓ East Bay Municipal Utility District, Water Revenue Refunding Bonds, Series 2010A $193m ✓ City of Fresno, Water Revenue Bonds, Series 2010A, $158m ✓ City of Los Angeles, Wastewater System Revenue Bonds, Refunding Series 2009A, $454m ✓ Los Angeles DWP, Water System Revenue Bonds, Series 2009B, $141m ✓ East Bay Municipal Utility District, Water Revenue Refunding Bonds, Series 2009A-2, $165m
Tom Jacob *Assistant Vice President* *Los Angeles, CA* Role: Quantitative Support (213) 443-5010 tjacob@stifel.com	Mr. Jacob has nearly 7 years of public finance experience. During his career, Tom has assisted municipal bond issuers with the sale of over $2 billion in par value. Mr. Jacob has participated in the structuring and issuance of 14 senior and co-managed transactions for $175 million of CA water, wastewater and revenue COP issues in the last five years. BA – University of California, Santa Cruz *Relevant Senior-Manager CA Experience* ✓ Moulton Niguel Water District, 2014 Refunding Bonds, $21m ✓ Santa Fe Springs Water Utility Authority, 2013 Water Revenue Bonds, $7m ✓ Oceanside PFA, Water Revenue Refunding Bonds, Series 2013A $20m ✓ West Basin MWD, Refunding Revenue Bonds, Series 2013A, $17m

Philip Voron *Analyst* *Los Angeles, CA* Role: Quantitative Support (213) 443-5075 pvoron@stifel.com	Mr. Voron joined Stifel's public finance department in 2013 and has provided financing and execution support on a wide variety of CA municipal credits including special tax, revenue and GO bonds. ✓ Member of Stifel's municipal general market group in Los Angeles ✓ Experience with financial analysis and transaction execution BSBA & MSF – Washington University in St. Louis

Underwriting Team

Name	Experience
Betsy Kiehn *Director* *San Francisco, CA* Role: Senior Underwriter	Ms. Kiehn joined Stone & Youngberg (now Stifel) in 2004. Ms. Kiehn makes commitments on over 100 senior managed issues totaling nearly $5 billion each year. Experience includes General Government, development, utilities and transportation for state and local issuers in the West. Betsy's experience with Water Districts includes the Metropolitan Water District of Southern California, Eastern Municipal Water District, Elsinore Valley Municipal Water District, and Mesa Water District, amongst others. BA – University of Vermont
One Montgomery St., 35th floor San Francisco, CA 94104 (415) 364-2791 bkiehn@stifel.com	*Relevant Senior-Manager CA Experience* ✓ Eastern Municipal Water District, Ref. Water & Sewer Revenue Bonds, Series 2012A, $50m ✓ Metropolitan Water District of Southern California, Water Rev. Ref. Bonds, Series 2011C, $15m ✓ Cucamonga Valley Water District, Water Rev. Ref. Bonds, Series 2011A, $110m ✓ Monte Vista Water District, Revenue Certificates of Participation, Series 2010A, $10m
Benjamin Stern *Partner* *Los Angeles, CA* Role: Senior Underwriter	Mr. Stern directed all underwriting at De La Rosa & Co. since joining the firm in 1990. Mr. Stern will serve as a senior underwriter in Stifel's Los Angeles office upon completion of the acquisition of De La Rosa. BS & MBA – University of California at Los Angeles
2121 Avenue of the Stars, Ste. 2100 Los Angeles, CA 90067 (310) 207-3616 bstern@ejdelarosa.com	✓ Metropolitan WD of Southern California, Water Rev. Ref. Bonds, Series 2013D, $87m ✓ Los Angeles DWP, Water System Revenue Bonds, Series 2013B, $380m ✓ Bay Area Water Supply & Cons. Agency, Revenue Bonds, Series 2013AB, $336m ✓ City of Los Angeles, Wastewater System Revenue Bonds, Refunding Series 2012A/C, $183m ✓ Metropolitan WD of Southern California, Water Rev. Ref. Bonds, Series 2012A, $181m ✓ CA Dept. of Water Resources, Water System Revenue Bonds, Series AJ, $217m ✓ CA Dept. of Water Resources, Water System Revenue Bonds, Series AH/AI, $190m ✓ East Bay Municipal Utility District, Water Revenue Refunding Bonds, Series 2010A $193m ✓ City of Fresno, Water Revenue Bonds, Series 2010A, $158m ✓ City of Los Angeles, Wastewater System Revenue Bonds, Refunding Series 2009A, $454m ✓ Los Angeles DWP, Water System Revenue Bonds, Series 2009B, $141m ✓ East Bay Municipal Utility District, Water Revenue Refunding Bonds, Series 2009A-2, $165m

Exhibit B – CA Water and Wastewater Agency Bonds (January 2010 – Present)

Dated Date	Issuer	Par ($ mils)	Issue Description	Series	Role
03/20/2014	Silicon Valley Clean Water	60.000	Wastewater Revenue Bonds	Series 2014	Sole
03/14/2014	So California Metro Water Dt	30.335	Water Revenue Refunding Bonds	2014 Series C 1-3	Co
03/14/2014	So California Metro Water Dt	95.935	Water Revenue Refunding Bonds	2014 Series A	Co
02/26/2014	Moulton Niguel Water Dt	21.315	Consolidated Refunding Bonds	Series 2014	Sole
12/17/2013	Eastern Municipal Water Dt	3.105	Special Tax Bonds	2013 Series	Sole
12/17/2013	Eastern Municipal Water Dt	5.180	Special Tax Bonds	2013 Series	Sole
12/05/2013	Los Angeles Dept of Wtr & Power	380.000	Water System Revenue Bonds	2013 Series B	Co-Lead
11/13/2013	Vallejo City-California	18.080	Water Refunding Revenue Bonds	Series 2013	Sole
10/15/2013	Calaveras Co Water Dt	2.065	Limited Obligation Imp Bonds	Series 2013	Sole
08/07/2013	Oceanside Pub Financing Auth	19.490	Water Revenue Refunding Bonds	Series 2013 A	Sole
08/07/2013	Eastern Municipal Water Dt	2.695	Special Tax Bonds	2013 Series	Sole
07/31/2013	Santa Margarita Water Dt	57.420	Special Tax Bonds	Series 2013	Sole
07/30/2013	Clovis City-California	31.810	Water Revenue Refunding Bonds	Series 2013	Sole
07/25/2013	Clovis City-California	12.500	Wastewater Revenue Ref Bonds	Series 2013	Sole
06/30/2013	So California Metro Water Dt	87.445	Special Var Rte Wtr Rev Ref Bonds	2013 Series D	Sole
06/27/2013	Western Riverside Wtr Wstwtr Au	54.175	Local Agency Revenue Ref Bonds	2013 Series A-1 & 2	Lead
06/27/2013	Western Riverside Wtr Wstwtr Au	24.750	Local Agency Rev Ref Bonds	2013 Series B	Lead
06/26/2013	Corona Utility Authority	20.890	Wastewater Revenue Bonds	Series 2013	Sole
06/13/2013	Eastern Municipal Water Dt	0.810	Special Tax Bonds	Series 2013	Sole
06/13/2013	Eastern Municipal Water Dt	3.675	Special Tax Bonds	Series 2013	Sole
06/13/2013	Eastern Municipal Water Dt	2.715	Imp Area Special Tax Bonds	Series 2013	Sole
06/13/2013	Eastern Municipal Water Dt	2.825	Special Tax Bonds	Series 2013	Sole
06/12/2013	Burlingame Financing Auth	14.260	Water & Wastewater Rev Ref Bonds	Series 2013	Sole
05/29/2013	Santa Fe Springs Water Utility Auth	6.890	Water Revenue Bonds	2013 Series	Sole
05/23/2013	West Basin Municipal Water Dt	17.165	Refunding Revenue Bonds	Series 2013 A	Sole
05/08/2013	Oceanside Pub Financing Auth	15.135	Sewer Revenue Refunding Bonds	Series 2013 A	Sole
05/08/2013	Norwalk Comm Facs Fin Auth	9.395	Water Revenue Bonds	Series 2013 A	Sole
03/28/2013	Sacramento City-California	215.195	Water Revenue Bonds	Series 2013	Co
03/26/2013	South Pasadena Pub Fin Auth	6.995	Water Revenue Refunding Bonds	2013 Series	Sole
03/05/2013	California Dept of Wtr Resources	183.960	Central Valley Proj Water Sys Rev	Series AM	Co
02/27/2013	Fairfield City-California	4.810	Water Revenue Refunding Bonds	Series 2013	Sole
02/27/2013	Bay Area Wtr Supply & Conserv Agcy	94.305	Revenue Bonds	Series 2013 B	Co-Lead
02/27/2013	Bay Area Wtr Supply & Conserv Agcy	241.475	Revenue Bonds	Series 2013 A	Co-Lead
02/08/2013	Malibu City-California	6.500	Special Tax Bonds	Series 2013	Sole
12/27/2012	So California Metro Water Dt	111.890	Water Revenue Refunding Bonds	Series 2012 G	Co
12/20/2012	California Poll Control Fin Auth	203.215	Water Furnishing Revenue Bonds	Series 2012	Co
12/20/2012	California Poll Control Fin Auth	530.345	Water Furnishing Revenue Bonds	Series 2012	Co
12/19/2012	Glendale City-California	35.000	Water Revenue Bonds	2012 Series	Sole
12/13/2012	Hesperia Jt Pub Finance Auth	26.735	Lease Revenue Bonds	2012 Series	Sole
12/11/2012	Santa Cruz Co (Felton) CFD #1	9.820	Special Tax Refunding Bonds	2012 Series	Sole
11/20/2012	Whittier Utilities Authority	10.085	Water Revenue Bonds	Series 2012	Sole
10/30/2012	Cucamonga Vlly Wtr Dt Fing Au	37.885	Water Revenue Bonds	Series 2012	Co
10/04/2012	So California Metro Water Dt	60.035	Water Revenue Refunding Bonds	2012 Series F	Co
10/02/2012	Concord City-California	10.080	Wastewater Revenue Ref Bonds	Series 2012	Lead
09/27/2012	California Dept of Wtr Resources	49.525	Water System Revenue Bonds	Series AN	Co
09/27/2012	California Dept of Wtr Resources	317.505	Water System Revenue Bonds	Series AO	Co
09/20/2012	Ripon City-California	3.350	Water Revenue Refunding Bonds	Series 2012	Sole
09/06/2012	Turlock Pub Fin Auth	51.915	Sewer Revenue Bonds	Series 2012	Sole
09/05/2012	California Dept of Wtr Resources	105.875	Central Valley Proj Water Sys Rev	Series AL	Co
09/05/2012	Lodi Public Finance Auth	17.105	Ref Wastewater Revenue Bonds	2012 Series A	Lead
09/05/2012	California Dept of Wtr Resources	105.875	Central Valley Proj Water Sys Rev	Series AL	Co
08/30/2012	Long Beach City-California	9.850	Second Lien Water Revenue Bonds	Series 2012 A	Sole
08/23/2012	Riverside Co CFD #04-2	19.665	Special Tax Refunding Bonds	Series 2012	Sole

Dated Date	Issuer	Par ($ mils)	Issue Description	Series	Role
08/23/2012	South Gate Utility Authority	34.170	Water Revenue Bonds	2012 Series	Sole
08/09/2012	Los Angeles Dept of Wtr & Power	322.000	Water System Revenue Bonds	2012 Series B	Co
08/01/2012	Corona Utility Authority	35.880	Water Revenue Bonds	2012 Series	Sole
07/19/2012	Eastern Municipal Water Dt	50.000	Ref Water & Sewer Rev Bonds	Series 2012 A	Sole
06/28/2012	So California Metro Water Dt	190.600	Water Revenue Refunding Bonds	2012 Series C	Co
06/28/2012	So California Metro Water Dt	89.460	Water Revenue Refunding Bonds	2012 Series E 1-3	Co
06/20/2012	Marin Municipal Water Dt	85.000	Subordinate Lien Water Rev Bonds	2012 Series A	Co
06/19/2012	Santa Maria City-California	2.055	Water & Wastewater Rev Ref Bonds	Series 2012 B	Sole
06/19/2012	Santa Maria City-California	48.064	Water & Wastewater Rev Ref Bonds	Series 2012 A	Sole
06/07/2012	Santa Rosa City-California	53.240	Wastewater Revenue Ref Bonds	Series 2012 A	Sole
06/05/2012	Eastern Municipal Water Dt	9.055	Special Tax Bonds	Series 2012	Sole
05/24/2012	Los Angeles City-California	183.365	Wastewater System Rev Ref Bonds	Ser 2012 A & Sub C	Lead
05/23/2012	Pismo Beach Public Fin Auth	5.710	Wastewater Revenue Ref Bonds	Series 2012	Sole
05/03/2012	San Diego Public Facs Fin Auth	188.610	Subordinated Water Rev Ref Bonds	Series 2012 A	Co
04/26/2012	Los Angeles City-California	157.055	Wastewater Sys Sub Rev Ref Bonds	Series 2012-A	Co
04/24/2012	El Paso De Robles City-California	6.355	Wastewater Revenue Ref Bonds	Series 2012	Sole
04/19/2012	Tustin Public Financing Auth	8.910	Refunding Water Revenue Bonds	Series 2012	Sole
04/19/2012	Oxnard Financing Authority	9.345	Water Revenue Refunding Bonds	Series 2012	Sole
04/19/2012	Imperial Public Financing Authority	8.550	Revenue Bonds	Series 2012	Co
04/19/2012	Imperial Public Financing Authority	10.065	Revenue Bonds	Series 2012	Co
04/11/2012	Beverly Hills Public Fin Auth	38.925	Water Revenue Refunding Bonds	2012 2nd Series A	Sole
04/04/2012	Escondido Jt Powers Fin Auth	27.390	Revenue Bonds	Series 2012	Sole
04/04/2012	Escondido Jt Powers Fin Auth	31.660	Revenue Bonds	Series 2012	Sole
03/20/2012	So California Metro Water Dt	181.180	Water Revenue Refunding Bonds	2012 Series A	Lead
03/13/2012	California Dept of Wtr Resources	36.370	Central Valley Proj Water Sys Rev	Series AK	Co
02/28/2012	Camrosa Water Dt	7.575	Water & Wastewater Ref Rev Bonds	Series 2012	Sole
02/22/2012	Salinas City-California	17.995	Sanitary Sewer System Rev Bonds	Series 2012	Lead
01/31/2012	San Luis Obispo-California	4.960	Water Revenue Refunding Bonds	Series 2012	Lead
12/08/2011	Burlingame Financing Auth	5.935	Water & Wastewater Rev Ref Bonds	Series 2011	Sole
11/17/2011	West Basin Municipal Water Dt	60.275	Refunding Revenue Bonds	Series 2011 B	Lead
10/13/2011	California Dept of Wtr Resources	216.930	Water System Revenue Bond	Series AJ	Lead
10/11/2011	Camrosa Water Dt	9.630	Water & Wastewater Revenue Bonds	Series 2011 A	Sole
09/29/2011	Western Municipal Water Dt	2.220	Special Tax Refunding Bonds	Series 2011	Sole
09/29/2011	Western Municipal Water Dt	6.220	Special Tax and Refunding Bonds	Series 2011	Sole
09/27/2011	So California Metro Water Dt	157.100	Water Revenue Refunding Bonds	2011 Series C	Lead
09/22/2011	West Basin Municipal Water Dt	34.190	Refunding Revenue Bonds	Series 2011A	Co
09/07/2011	California Dept of Wtr Resources	92.275	Central Vlly Wtr Swr Rev Bonds	Series AI	Lead
08/30/2011	Cucamonga Valley Water Dt	109.475	Water Revenue Refunding Bonds	2011 Series A	Lead
08/30/2011	Lake Co Public Finance Authority	4.500	Wastewater Revenue Bonds	Series 2011	Sole
08/10/2011	Santa Margarita Water Dt	38.710	Special Tax & Refunding Bonds	Series 2011 A & B	Sole
07/20/2011	Eastern Municipal Water Dt	56.255	Ref Water & Sewer Rev Bonds	Series 2011 A	Co
07/07/2011	San Bernardino Vlly Muni Wtr Dt	8.565	Rev Certificates of Participation	Series 2011 A	Sole
07/06/2011	Contra Costa Water Dt	46.705	Water Revenue Refunding Bonds	Series P	Lead
07/06/2011	Contra Costa Water Dt	59.820	Water Revenue Notes	Series B	Lead
06/30/2011	So California Metro Water Dt	167.855	Water Revenue Refunding Bonds	2011 Series B	Co
06/07/2011	Mountain House Public Fin Auth	10.000	Utility System Revenue Bonds	Series 2011	Sole
05/26/2011	Riverside City-California	59.000	Refunding Water Revenue Bonds	Issue of 2011 A	Sole
05/25/2011	Elsinore Valley Muni Water Dt	25.485	Var Rte Ref Cert Of Participation	Series 2011 A	Sole
05/11/2011	San Mateo City-California	31.990	Sewer Revenue Bonds	2011 Series A	Sole
04/05/2011	Watereuse Finance Authority	3.345	Refunding Revenue Bonds	2011 Series A	Sole
01/20/2011	Dublin San Ramon Services Dt	35.620	Water Revenue Refunding Bonds	2011 Series	Sole
12/29/2010	Covina Public Finance Auth	15.000	Water Revenue Bonds	Series 2010	Lead
12/22/2010	So California Metro Water Dt	250.000	Water Revenue Bonds	2010 Series A	Co
11/23/2010	Moulton Niguel Water Dt	8.965	Certificates of Participation	2010 Series	Sole

Dated Date	Issuer	Par ($ mils)	Issue Description	Series	Role
11/09/2010	California Dept of Wtr Resources	97.675	Water System Revenue Bonds	Series AH	Lead
10/28/2010	Monte Vista Co Water Dt	9.965	Rev Certificates of Participation	Series 2010 A	Sole
10/28/2010	Lodi Public Finance Auth	9.015	Water Revenue Bonds	Series 2010 A	Sole
10/28/2010	Lodi Public Finance Auth	29.650	Water Revenue Bonds	Series 2010 B	Sole
10/28/2010	Western Muni Wtr Dt Facs Au	8.485	Water Revenue Bonds	Series of 2010 A	Sole
10/28/2010	Western Muni Wtr Dt Facs Au	42.755	Water Revenue Bonds	Series of 2010 B	Sole
10/28/2010	Anaheim Public Finance Auth	4.835	Revenue Bonds	Series 2010 A	Sole
10/28/2010	Anaheim Public Finance Auth	29.690	Revenue Bonds	Series 2010 B	Sole
10/21/2010	Los Angeles City-California	89.600	Wastewater System Revenue Bonds	Series 2010 B	Co
10/21/2010	Los Angeles City-California	177.420	Wastewater System Revenue Bonds	Series 2010 A	Co
10/21/2010	Los Angeles City-California	89.600	Wastewater System Revenue Bonds	Series 2010 B	Co
10/21/2010	Los Angeles City-California	177.420	Wastewater System Revenue Bonds	Series 2010 A	Co
10/13/2010	So California Metro Water Dt	39.485	Waterworks GO Refunding Bonds	2010 Series A	Co
10/12/2010	Coachella Valley Water Dt	0.787	Limited Obligation Imp Bonds	Series 2010	Sole
09/28/2010	Long Beach City-California	22.740	Water Revenue Refunding Bonds	Series 2010 A	Sole
08/11/2010	Sacramento Co Sanit Dt Fin Auth	15.930	Revenue Bonds	Sereis 2010 B	Co-Lead
08/11/2010	Sacramento Co Sanit Dt Fin Auth	110.690	Revenue Bonds	Sereis 2010 A	Co-Lead
07/22/2010	So California Metro Water Dt	88.845	Water Revenue Refunding Bonds	2010 Series B	Co
06/30/2010	Contra Costa Water Dt	127.630	Water Revenue Notes	Series A	Lead
06/30/2010	San Diego Public Facs Fin Auth	123.075	Water Revenue Refunding Bonds	Series 2010 A	Co-Lead
06/29/2010	Castaic Lake Water Agency	70.595	Refunding Revenue COPs	Series 2010 A	Sole
06/29/2010	Sunnyvale City-California	24.085	Water Revenue Bonds	Series 2010	Sole
06/29/2010	Sunnyvale City-California	35.380	Wastewater Revenue Bonds	Series 2010	Sole
06/17/2010	South Coast Water Dt Financing Au	17.485	Refunding Revenue Bonds	Series 2010 A	Co
06/17/2010	South Coast Water Dt Financing Au	19.350	Revenue Bonds	Series 2010 B	Co
06/08/2010	San Francisco Public Util Comm	47.050	Wastewater Revenue Bonds	2010 Series A	Sole
05/26/2010	Marin Municipal Water Dt	31.850	Water Revenue Bonds	2010 Series A	Sole
05/13/2010	Garden Grove Public Fin Auth	3.195	Water Revenue Bonds	Series 2010 C	Sole
05/13/2010	Garden Grove Public Fin Auth	4.125	Water Revenue Bonds	Series 2010 B	Sole
05/13/2010	Garden Grove Public Fin Auth	9.305	Water Revenue Bonds	Series 2010 A	Sole
05/06/2010	Diablo Water Dt	4.200	Water Revenue COPs	2010 Series	Sole
04/28/2010	Brea Public Fin Authority	2.410	Water Revenue Bonds	2010 Series A	Sole
04/28/2010	Brea Public Fin Authority	9.885	Water Revenue Bonds	2010 Series B	Sole
04/21/2010	Eastern Municipal Water Dt	1.690	Special Tax Bonds	Series 2010	Sole
04/06/2010	Fairfield-Suisun Sewer Dt	12.980	Sewer Revenue Refunding Bonds	Series 2010	Sole
03/18/2010	Gilroy City-California	23.375	Wastewater Revenue Ref Bonds	Series 2010	Lead
03/17/2010	Carmichael Water Dt	28.550	Water Revenue Refunding COPs	Series 2010	Sole
03/10/2010	Central Basin Municipal Water Dt	37.935	Revenue Refunding COPs	Series 2010	Sole
02/23/2010	East Bay MUD	400.000	Water System Sub Revenue Bonds	Series 2010 B	Co
02/11/2010	Oxnard Financing Authority	16.455	Water Revenue Project Bonds	Series 2010 A	Sole
02/11/2010	Oxnard Financing Authority	83.670	Water Revenue Project Bonds	Series 2010 B	Sole
02/03/2010	Fresno City-California	66.810	Water System Revenue Bonds	2010 Series A-1	Lead
02/03/2010	Fresno City-California	91.340	Water System Revenue Bonds	2010 Series A-2	Lead
02/03/2010	East Bay MUD	192.830	Water System Sub Rev Ref Bonds	Series 2010 A	Lead
01/28/2010	Thousand Oaks-California	11.690	Wastewater Revenue Ref Bonds	Series 2010	Sole
Total	**152 Transactions**	**$9,370 million**			

Source: SDC. Data from 1/1/2009-3/6/2014. Negotiated and Competitive Transactions. Stifel transactions in blue. De La Rosa Transactions in red. In cases of overlap Stifel role is displayed. Par Amount may differ based on allocation method.

Exhibit C – Marketing Case Study

Alameda Corridor Transportation Authority
$248,325,000 Tax-Exempt Senior Lien Revenue Refunding Bonds, Series 2013
Bookrunning Senior Manager

In 2012 Stifel was appointed to serve the Alameda Corridor Transportation Authority as senior manager on its tax-exempt revenue refunding bonds. This transaction represented the first time ACTA had been in the market since 2004. The Alameda Corridor is one of the nation's most significant rail infrastructure projects to have been completed over the last 20 years. The DOT loan that helped to fund construction served as the model for the TIFIA program. As senior manager, Stifel worked with PFM and the co-senior manager (BAML) to manage the credit agency update in New York, a process that resulted in the removal of a negative outlook on the senior lien.

Stifel led an aggressive marketing campaign for ACTA the week before the sale which included investor luncheons in Boston and New York and in-person meetings with tier-one institutional buyers in Chicago, San Francisco and Los Angeles. In addition, we facilitated investor calls with over a dozen targets. In all, the marketing campaign achieved direct communication with over 50 institutional buyers including all of ACTA's existing top holders.

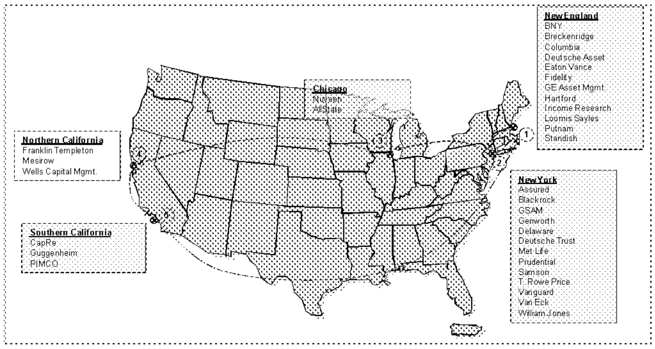
Roadshow Presentation

Alameda Corridor Transportation Authority
(Los Angeles County, California)

New Issue Investor Information
Tax-Exempt Senior Lien Revenue Refunding Bonds
Series 2013A

January 2013

Roadshow Meetings



The scope and timing of the marketing campaign led to early credit approvals and provided our desk with feedback that allowed us to be much more aggressive in structure than any of the competing transactions in the market. In fact, as a A3/A-/A credit the 2013A bonds realized yields below those of competing large national transactions one to two notches higher (with the same coupon structure). Further demonstrating the benefit of the marketing campaign is that while the general municipal market tone was slightly negative on the day of pricing, we were able to open the order period with an aggressive scale and re-price the bonds with yields of 5 to 10 basis points lower as the order period was completed.

Exhibit D – Draw Down Bond Analysis

Alternative Scenario. Stifel has developed an alternative scenario that incorporates a $125 million floating rate draw-down bond to provide approximately 50% of the interim borrowing. The draw-down bond will accrue interest at a floating rate as funds are drawn. The balance of the financing will be funded with a fixed rate note as described in Section 3.2 and both components have a matched maturity of 5 years. We have assumed a closing date of July 1, 2014 and a balloon maturity on July 1, 2019.

- **Fixed Rate Portion.** Proceeds of the note would be received upon the closing of the transaction on July 1, 2014 with debt service accruing from that point forward. Debt service payments would begin in semi-annual payments after the close of the transactions with the first payment due on January 1, 2015. As shown in the analysis below, debt service would remain level until the maturity of 7/1/2019 when the debt service would include the $125 million maturity amount.
- **Floating Rate Portion.** The second portion of the transaction would be a $125 million 5-year note that requires the issuer to draw five semi-annual payments of $25 million beginning July 1, 2015. The debt service would not accrue until the funds are drawn, which results in a smaller incremental debt service payment that begins on January 1, 2016. The debt service payments of this structure are significantly lower because the issuer is not paying the interest on the entire $125 million immediately, but rather a gradually portion of said amount. Once all $125 million has been drawn, the debt service becomes level just as in the prior fixed rate structure.

Alternative Case – Fixed Rate Portion

Date	Construction Fund	Principal Outstanding	Maturity Amount	Rate [1]	Interest	Debt Service
7/1/2014	$125,000,000	-	-	-	-	-
1/1/2015	-	$125,000,000	-	1.15%	$718,750	$718,750
7/1/2015	-	125,000,000	-	1.15%	718,750	718,750
1/1/2016	-	125,000,000	-	1.15%	718,750	718,750
7/1/2016	-	125,000,000	-	1.15%	718,750	718,750
1/1/2017	-	125,000,000	-	1.15%	718,750	718,750
7/1/2017	-	125,000,000	-	1.15%	718,750	718,750
1/1/2018	-	125,000,000	-	1.15%	718,750	718,750
7/1/2018	-	125,000,000	-	1.15%	718,750	718,750
1/1/2019	-	125,000,000	-	1.15%	718,750	718,750
7/1/2019	-	-	125,000,000	1.15%	718,750	125,718,750
Total	**$125,000,000**		**$125,000,000**		**$7,187,500**	**$132,187,500**

[1] Interest Rate Assumption based on 5-year cost of capital on page 5. All analysis preliminary; subject to change.

Bond Summary Statistics

Fixed Rate Bond Statistics

Delivery Date: 7/1/2014
Par Amount: $125,000,000
First Interest Payment Date: 1/1/2015
Final Maturity Date: 7/1/2019

Carrying Cost (%): 1.15%
Carrying Cost ($): $7,187,500
Total Debt Service: $132,187,500

Alternative Case – Floating Rate Portion

Date	Draw Schedule	Principal Outstanding	Maturity Amount	Rate [1]	Interest	Debt Service
7/1/2014	-	-	-		-	-
1/1/2015	-	-	-	1.20%	-	-
7/1/2015	25,000,000	-	-	1.20%	-	-
1/1/2016	25,000,000	25,000,000	-	1.20%	150,000	150,000
7/1/2016	25,000,000	50,000,000	-	1.20%	300,000	300,000
1/1/2017	25,000,000	75,000,000	-	1.20%	450,000	450,000
7/1/2017	25,000,000	100,000,000	-	1.20%	600,000	600,000
1/1/2018	-	125,000,000	-	1.20%	750,000	750,000
7/1/2018	-	125,000,000	-	1.20%	750,000	750,000
1/1/2019	-	125,000,000	-	1.20%	750,000	750,000
7/1/2019	-	-	125,000,000	1.20%	750,000	125,750,000
Total	**$125,000,000**		**$125,000,000**		**$4,500,000**	**$129,500,000**

[1] Interest Rate Assumption based on SIFMA average as of March 17, 2014 plus 100 basis points. All analysis preliminary; subject to change

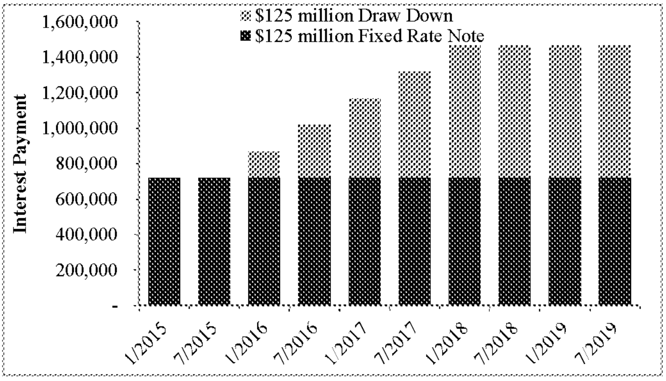
Bond Summary Statistics

Floating Rate Bond Statistics

Delivery Date: 7/1/2014
Par Amount: $125,000,000
First Interest Payment Date: 1/1/2016
Final Maturity Date: 7/1/2019

Carrying Cost (%): 1.20%
Carrying Cost ($): $4,500,000
Total Debt Service: $129,500,000

Alternative Case – Interest Payment Schedule



Base Case – Interest Payment Schedule

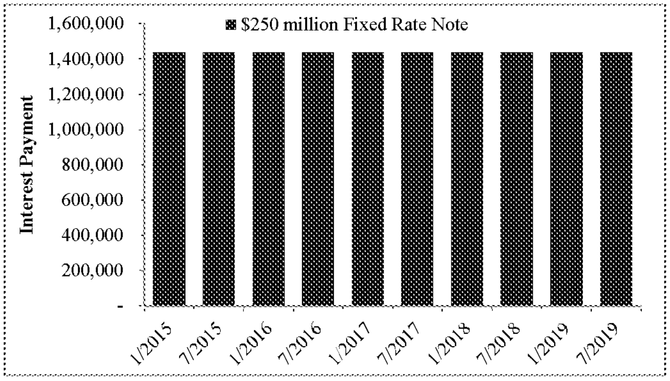


Exhibit B

Review Status of Bay Delta Conservation Plan Cost Allocation Discussions

Special Committee on Bay-Delta

Item 3c, September 23, 2014

Presentation

- Background
  - Cost Information
  - CVP/SWP Split
- Cost Allocation Alternatives
- Issues & Next Steps

Background

BDCP Cost Allocation
Funding Agencies

Ecosystem Restoration

State of California

Federal Government

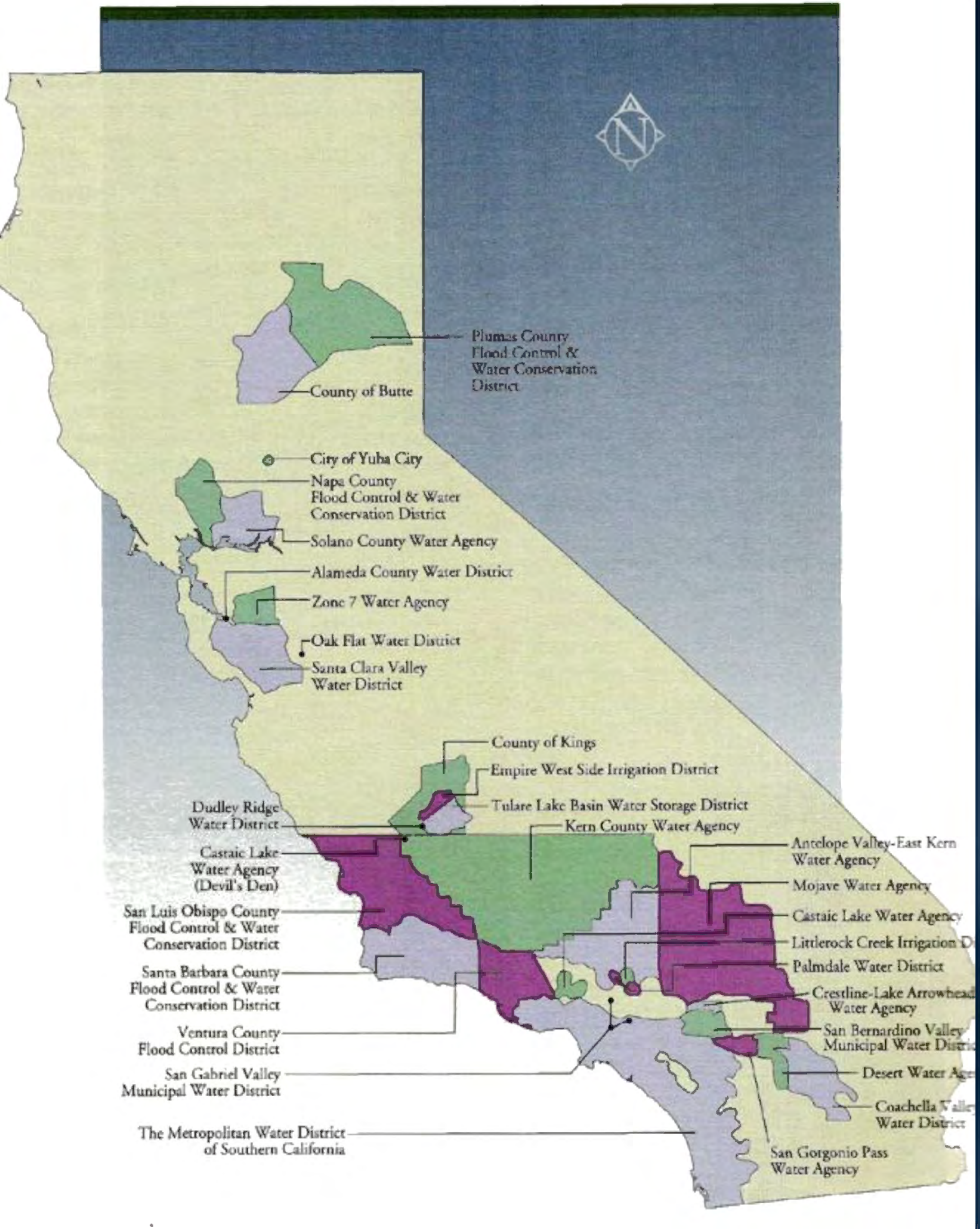
Conveyance, Mitigation, & Contribution to Recovery

Central Valley Project

- Ag
- Urban
- Exchange
- Refuge
- Settlement

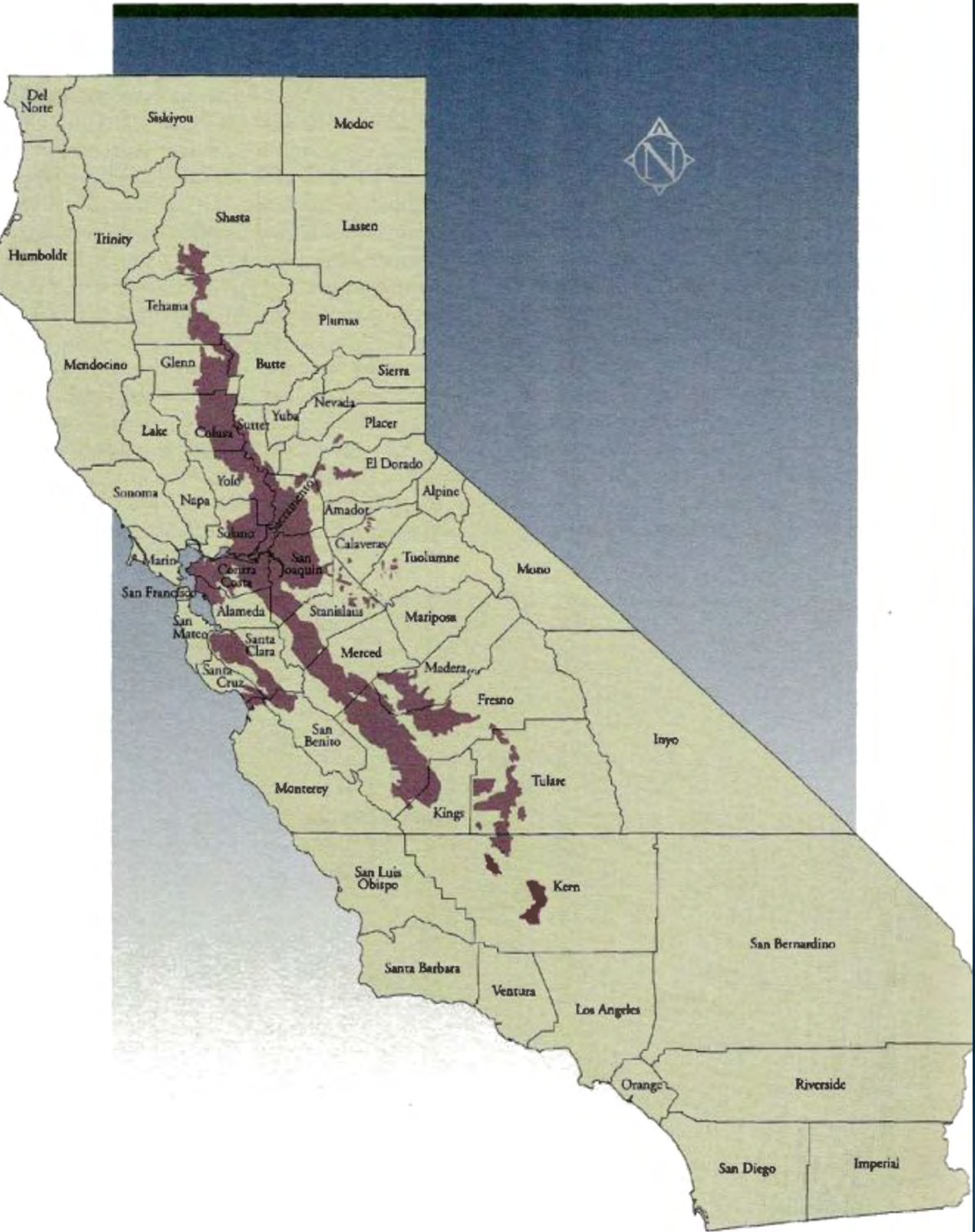
State Water Project

- Ag
- Urban



State Water Project (SWP)

- Upper Feather River
- North Bay Area
- South Bay Area
- San Joaquin Valley
- Central Coast
- Southern California



Central Valley Project (CVP)

- Sacramento Valley
- Bay Area
- San Joaquin Valley

Cost Information

Bay Delta Conservation Plan

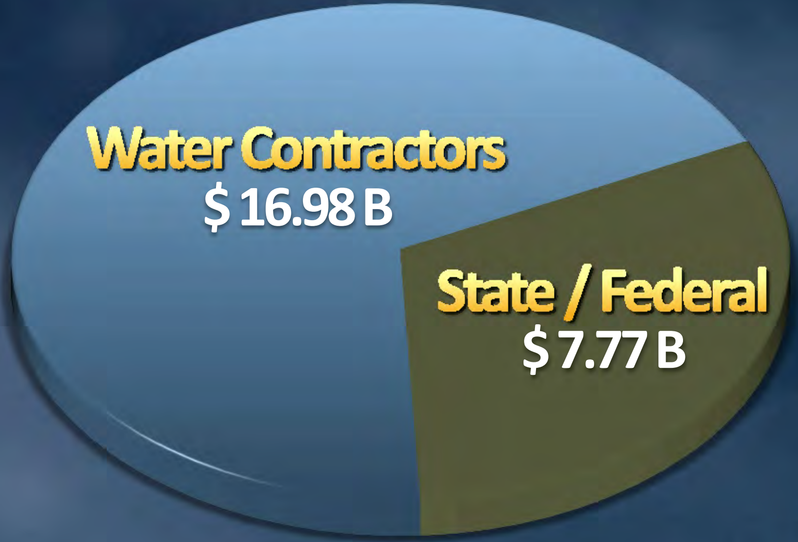
Preliminary Cost Analysis

Improvements	Capital	O&M (Total 50 Years)	Total
Conveyance	$14.57 billion	$1.46 billion	$16.03 billion
Eco-Restoration & Other Stressors	$5.28 billion	$3.44 billion	$8.72 billion
TOTAL	**$19.85 billion**	**$4.90 billion**	**$24.75 billion**

Estimated costs from BDCP Public Draft Chapter 8 (Dec 2013) in undiscounted 2012 dollars.

Central Valley Project / State Water Project

Estimated Costs & Split



CVP Contractors
$6,951,000 [~40%]

SWP Contractors
$10,030,000 [~60%]

- Split based on average water deliveries

2012 Dollars

Cost Allocation Alternatives

State Water Project

BDCP Cost Allocation Alternatives

- SWP “Table A” Contract Approach
  - Participation based on existing Table A contract amount
  - Payments based on fixed & variable water delivery costs
  - Additional provisions for water transfers
- Subscribed Capacity Approach
  - Participation based on desired capacity amount
  - Payments based on fixed & variable water delivery costs
  - Additional provisions for water transfers
- Payments on Deliveries
  - All payments based on delivered water, year-end reconciliation
  - Similar to existing CVP approach

State Water Project

BDCP Cost Allocation Criteria

- Agreement among contractors
- Simple to implement
- Equitable to all contractors

State Water Project

BDCP Cost Allocation Alternatives

SWP 'Table A' Contract Approach	
Cost Allocation	• SWP "Table A" contract • Except for North of Delta contractors
Water Allocation	• SWP Table A amounts
Description	• Provides for reduced participation for North of Delta only • Includes provisions for contractor-to-contractor annual/multi-year transfers, and exchange programs • Contract amendment likely needed to reflect different cost allocations, supply deliveries, and transfer/exchange provisions
Summary & Issues	• Allocation similar to existing contract approach • Obligation of individual agency to work out water transfer and exchange agreements

State Water Project

BDCP Cost Allocation Alternatives

Subscribed Capacity Approach	
Cost Allocation	• Contractors subscribe to Delta tunnel capacity • Except for North of Delta contractors
Water Allocation	• Subscribe for tunnel capacity based on water supply needs • Remaining water supply benefits reallocated through transfers/exchanges
Description	• Includes provisions for contractor-to-contractor annual/multi-year transfers, and exchange programs • Contract amendment likely needed to reflect different cost allocations, supply deliveries, and transfer/exhange provisions
Summary & Issues	• Those who don't fully participate face unreliable thru-Delta supplies due to regulations or catastrophic events • More reliable water transfers through tunnel facility • More access to unregulated or flood flows through tunnel

Key in Determination of Alternative

Contractor's Participation May Determine Best Alternative

	Participation		
	0 %	100 %	200 %
Contractor 1		●	
Contractor 2		●	
Contractor 3		●	
Contractor 4	●		
Contractor …		●	
Contractor …		●	

"Table A" Contract Approach

Participation		
0 %	100 %	200 %
●		
	●	
●		
		●
	●	
		●

Subscribed Capacity Approach

Metropolitan Water District

Cost Allocation "Example"

	No BDCP	100% Participation	110% Participation
Existing SWP Charge	$495 mill	$495 mill	$495 mill
Incremental BDCP Charge	$0 mill	$412 mill	$453 mill
Total	**$495 mill**	**$907 mill**	**$948 mill**
Average SWP Deliveries	960,500 af	960,500 af	960,500 af
Incremental BDCP	0 af	431,000 af	474,000 af
Total	**960,500 af**	**1,391,500 af**	**1,434,500 af**
Existing SWP Charge	$ 515 /af	$ 515 /af	$ 515 /af
Incremental BDCP Charge	--	$ 956 /af	$ 956 /af
Total	**$ 515 /af**	**$ 652 /af**	**$ 661 /af**

MWD Tier 1 Treated ($847/af) with Delta Improvements = $985 to $1,013/AF

- *Rate impact August 2013 analysis: 1.5% to 2% per year for 10 years ($138 to $166 per acre feet increase)*
- *BDCP costs preliminary; Existing SWP costs based on 2014-15 Statement of Charges includes power and O&M*
- *Water supply based on DWR CALSIM modeling of average Table A & incremental BDCP allocations*

State Water Project
Cost Allocation Consensus Principles

- New conveyance has definable benefits
- Participants have proportional share in tunnel capacity
- Available capacity/supply due to participation level can be purchased by other agencies on an at-cost basis
- Contract model assumes high level of participation

Summary

- "Table A" Contract Approach
  - Start with Table A assigned apportionment
  - Obligation of individual agency to work out water transfer agreements
- Subscribed Capacity Approach
  - Each agency identifies/chooses capacity need in new facility
  - If less then Table A contract, SWP contractors need to work out water transfer agreements to fully subscribe

Next Steps

- Contractor Principles of Agreement on Cost Allocation Framework
- BDCP Interim Funding Agreement
- SWP Contract Amendments negotiations (in public)
- CEQA documentation for Contract Amendments
- SWP Contract Amendments signed

The Delta

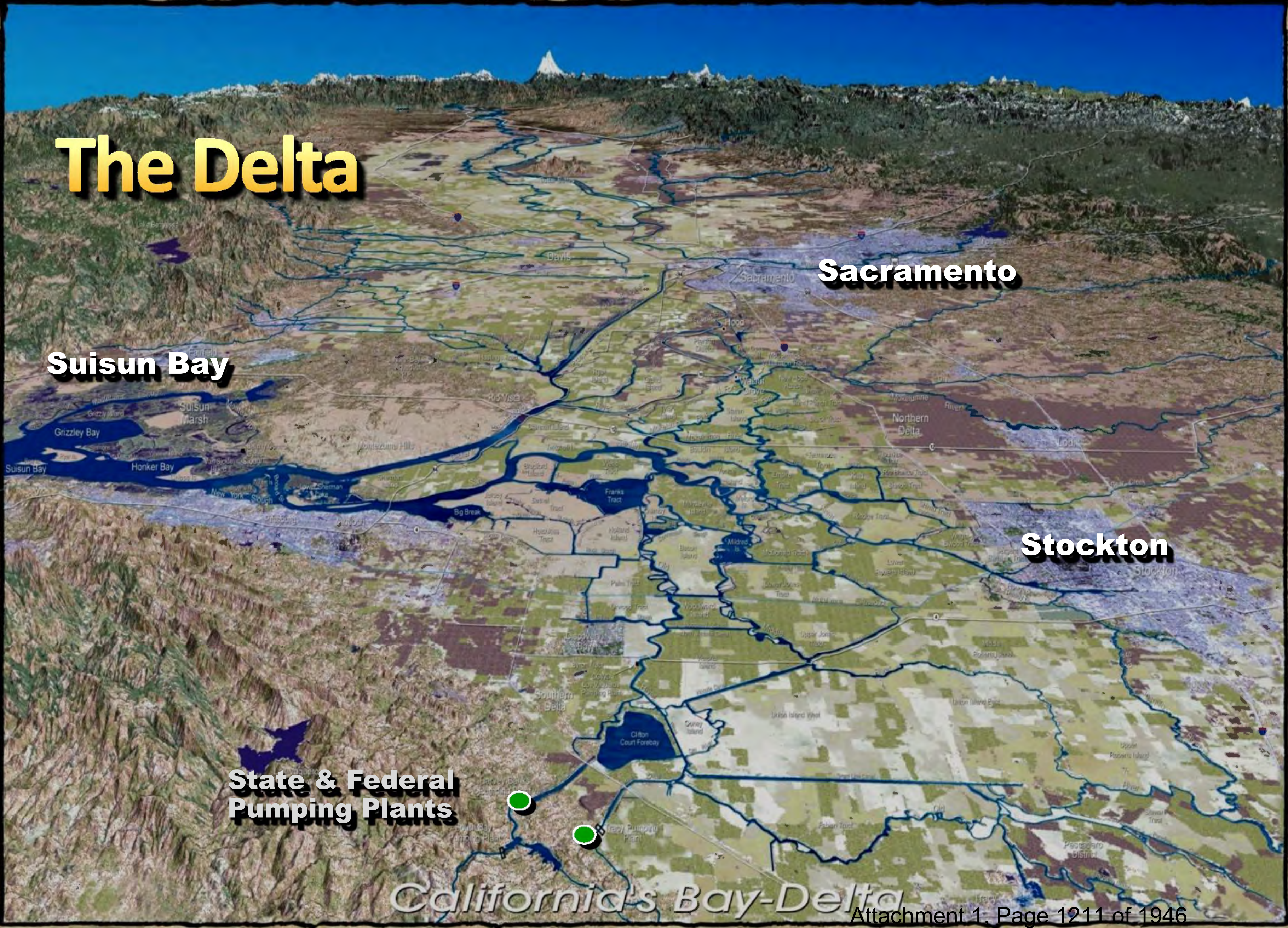

Sacramento
Suisun Bay
Stockton
State & Federal Pumping Plants
Grizzley Bay
Suisun Marsh
Suisun Bay
Honker Bay
Montezuma Hills
Davis
Sacramento
Rio Vista
Franks Tract
Big Break
Northern Delta
Lodi
Stockton
Southern Delta
Clifton Court Forebay
Tracy Pumping Plant
California's Bay-Delta

Exhibit C

Resolution of Issues Necessary to Inform a Development of a Business Case to Support a Decision on Continued Funding for the Bay Delta Conservation Plan and the Delta Habitat Conservation and Conveyance Program

September 23, 2013

Transmittal of the BDCP and the DHCCP to the federal agencies on October 1, 2013 starts the process of publication in the Federal Register. The current schedule for publication in the Federal Register is November 15, 2013. On that date the BDCP will become a public draft and the 120-day formal public review period will begin. Between October 1 and December 31, 2013 it is necessary to resolve several outstanding issues to support development of a business case for continued funding of the BDCP and DHCCP. The Kern County Water Agency staff has developed the following list of issues that need to be resolved prior to December 31, 2013, and in order to facilitate a decision to continue funding should be resolved as soon as possible before December 31.

Federal Process Issues

1. **When and how will a BiOp be competed for the BDCP** – DoI previously stated that I might take as much as three years if they determine that they have to do a BiOp that includes the entire CVP and SWP and not just the Delta division

2. **NMFS BiOp for Oroville FERC relicensing** – NMFS completed a draft of its BiOp for the Oroville FERC relicensing project. However, the results of that BiOp aren't known and ICF has not been able to incorporate them into the BDCP. As a result there is concern that the Oroville FERC BiOp may be inconsistent with the BDCP.

State Process Issues

3. **Planning Agreement** – Need to determine if a new Planning Agreement is required/needed/wanted and if so who will be the signatories.

4. **SWP contract extension**- - DWR and the SWP Contractors need to come to agreement on a contract extension that matches the term of the BDCP and provides the SWP Contractors with a more appropriate role in managing SWP expenses.

5. **Decision on Design-Build** – Is design-build a viable option for the BDCP from an engineering perspective and if so can it be employed if DWR constructs the project? If a JPA constructs the project?

6. **Strategy for SWRCB review and approval** – The SWRCB will review and approve, modify or deny permits necessary for the BDCP. The strategy for moving the BDCP through the SWRCB should be clearly laid out and understood.

7. **Delta Stewardship Council** – The DSC must review BDCP and incorporate it into the Delta Plan. The strategy for moving the BDCP through the DSC should be clearly laid out and understood.

Financing or Cost Allocation Issues

8. **Financing** –This issued comes in two flavors:
    a. **Interim financing** – Need a determination on how the project will be financed in the near-term.
    b. **Long-term financing** – Need to have clear decision on how to financing the costs, using a process that builds confidence that all options have been explored, using financial experts with significant experience in financing very large public infrastructure.

9. **Cost allocation** – This issue also comes in three flavors:
    a. Cost allocation between the State/Fed sources and the PWAs.
    b. Cost allocation between the CVP and the SWP
        i. Friant/exchange contractor issue
    c. Cost allocation among the SWP contractors.
        i. Opt-in/Opt-out – This issue has developed in to a discussion about what an individual contractor can do with the assets they acquire as a participate in the BDCP. These discussions have started in general casual settings, but need to be formalized.

10. **Coordinated Operations Agreement** – The COA issues must be resolved among the CVP and SWP and a decision on how to move forward (legislation, simple amendment, etc…)

Implementation Issues

11. **Implementation Agreement** – Development of the Implementation Agreement has been stalled for several years. CVP and SWP Permittees developed several versions of the IA, including a complete version that should be acceptable and shared it with the state. State and federal agencies developed a separate IA but it is not has not been made available to the PWAs.

12. **Final decision on use of a JPA to construct** - The Permittees have discussed and are in the final stages of developing a joint entity capable of constructing the new conveyance facility. The details of this new entity are not yet worked out, but efforts are in place to do so. The details of the joint entity and how it will operate should be worked out and agreed to prior to a decision on continued funding for the BDCP and DHCCP.

13. **Enhanced Environmental Flow** - Complete the structure for the Enhanced Environmental Flow Program. At a minimum determine:
    a. How much money will the State and Federal government be providing ($1 - $1.5 billion)?
    b. What is the split?
    c. What is the mechanism for the transfer of funds to the PWA's? (How do you know it's a "real deal")
    d. How will the PWA's acquire the water and/or other assets? (What's the decision making process?)
    e. What happens if the PWA's acquire the water and don't get reimbursed? (How can we insure that the acquired water isn't just taken through regulatory actions?)

14. **Supplemental Adaptive Management Fund** - Complete the structure for the Supplemental Adaptive Management Fund

a. What is the size of the fund? (at least $450 million)
b. What is the split between federal, state and PWA's?
c. What is the mechanism for transfer of funds to the appropriate vehicle for holding the funds? (How do you know it's a "real deal"?)
d. If assets are required, who will acquire the water and/or other assets? (What's the decision making process?)
e. What happens if the PWA's provide funding and the state and/or federal government don't?

Exhibit D

State Water Project Contractors Authority

Response to Request for Qualifications and Proposals for Underwriting Services

March 19, 2014

Submitted By:
Morgan Stanley
555 California Street, Suite 2200
San Francisco, CA 94104

Morgan Stanley

March 19, 2014

Mary Lou Cotton, General Manager
State Water Project Contractors Authority

Dear Ms. Cotton:

On behalf of Morgan Stanley (the "Firm"), we are pleased to respond to the State Water Project Contractors Authority's (the "Authority" or "SWPCA") Request for Qualifications and Proposals for Underwriting Services. Based upon our deep experience, credit and structuring expertise, vast distribution system and capital base, we are confident that Morgan Stanley can provide superior service to SWPCA to deliver excellent results. Below we provide an executive summary of our proposal, which also highlights why Morgan Stanley is well qualified to provide significant value to the Authority as senior manager on its inaugural financing.

Leading Water Utility and First Time Issuer Expertise. Morgan Stanley has extensive water and sewer utility financing experience. Since 2010, the Firm has led over $43 billion of water and wastewater financings nationally, with $5 billion in California. We are ***ranked #2 in long-term, negotiated California water and wastewater issuance during this time***. Our core banking team, led by John Sheldon and Margie Backstrom, has over 100 years of municipal finance experience working with all types of issuers, including many of the largest and/or most complex California utility debt issuers. Our team has also worked with a number of issuers on their inaugural financings – in the water/wastewater sector alone, these issuers include the South Placer Wastewater Authority, Monterey County Financing Authority, San Luis Obispo Financing Authority and Livermore-Amador Valley Water Management Agency – all of which involved multiple obligors and joint powers authorities. As a first time issuer, marketing and investor outreach will be critical and Brian Wynne will lead an extensive process leveraging his 30 years of underwriting experience and utilizing our investor relations and credit research professionals to ensure all potential buyers understand the credit thoroughly enough to place aggressive orders.

Past High Quality Service to DWR and SWPCA Members. Morgan Stanley has provided consistent banking coverage to the California Department of Water Resources ("DWR") as well SWPCA members, including Metropolitan Water District of Southern California ("Metropolitan") and Santa Clara Valley Water District ("SCVWD"). For over 10 years, we are the leading underwriter to DWR, Metropolitan and Santa Clara Valley Water District, managing over $1.3 billion in debt offerings for DWR's water credit, $1.7 billion in par value for Metropolitan and serving as senior manager on SCVWD's 2006 and 2007 water revenue financings. As such, we bring a unique understanding of critical credit and structuring issues that will impact SWPCA's proposed financing(s).

Structuring and Credit Expertise. Based upon SWPCA's RFP, our direct financing experience with DWR, Metropolitan and SCVWD, publicly available information and discussions with various parties, we have developed a good understanding of the potential financing issues facing the state water contractors as the Authority and its members develop a plan to fund pre-construction and future construction costs for the BDCP. We have outlined an interim financing plan that would currently deliver an approximate 1.50% cost of funds with capitalized interest to eliminate near term payments and flexible redemption provisions to respond to a variety of scenarios after pre-construction. Importantly, it relies on Metropolitan's and SCVWD's strong credit quality to access the capital markets efficiently, but also allows for a flow of funds through DWR's current billing procedures to allow the funding contractors to collect their contributions for amortized costs just as they have on a pay as you go basis to this point. The interim financing we propose easily integrates into the anticipated long term financing construct through DWR, or others as necessary.

Strength of Morgan Stanley's Distribution System and Capital Position. Morgan Stanley offers its clients one of the largest distribution systems of any firm, combining first-tier coverage of institutional investors, a large presence in the secondary market for municipal securities, and extensive high-net-worth and traditional retail channels. The ***Firm's retail system – Morgan Stanley Wealth Management ("MSWM") – is the largest in the nation***, with 16,500 financial advisors covering 5.6 million accounts with assets totaling more than $1.5 trillion. This system includes 79 offices in California with 2,302 advisors who cover 936,303 accounts with total assets of $269.6 billion, including $30.3 billion of directly held municipal securities. Retail investor participation can help reduce the Authority's borrowing cost, even for short term financings. In support of this massive distribution system that will drive demand and lower cost for the Authority's offering, we would also support the Authority's debt as necessary through one of the largest and most liquid capital positions in the industry, with Tier 1 Capital of $61 billion as of December 31, 2013.

Thank you for the opportunity to respond to the Authority's request for qualifications and proposals and please do not hesitate to contact us if we can provide further information.

Sincerely,

John Sheldon
Managing Director

Margie Backstrom
Executive Director

State Water Project Contractors Authority
Response to Request for Qualifications and Proposals for Underwriting Services

March 19, 2014

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Morgan Stanley & Co. LLC is providing the information contained in this document for discussion purposes only in anticipation of serving as underwriter to State Water Project Contractors Authority (the “Authority”). The primary role of Morgan Stanley & Co. LLC, as an underwriter, is to purchase securities, for resale to investors, in an arm’s-length commercial transaction between the Authority and Morgan Stanley & Co. LLC and that Morgan Stanley & Co. LLC has financial and other interests that differ from those of the Authority. Morgan Stanley & Co. LLC is not acting as a municipal advisor, financial advisor or fiduciary to the Authority or any other person or entity. The information provided is not intended to be and should not be construed as “advice” within the meaning of Section 15B of the Securities Exchange Act of 1934. The Authority should consult with its own financial and/or municipal, legal, accounting, tax and other advisors, as applicable, to the extent it deems appropriate.

This information was prepared by Morgan Stanley sales, trading, banking or other non-research personnel. This is not a research report and the views or information contained herein should not be viewed as independent of the interest of Morgan Stanley trading desks. Such interest may conflict with your interests and recipients should be mindful of such potential conflicts of interest when reviewing this information. The views of the trading desk may differ from those of the Research Department or others at Morgan Stanley. Morgan Stanley may deal as principal in or own or act as market maker or liquidity provider for the securities/instruments (or related derivatives) mentioned herein. The trading desks may engage in a variety of trading activities (which may conflict with the position an investor may have) before or after providing this information, including accumulation of a position in the subject securities/instruments based on the information contained herein or otherwise. Morgan Stanley may also perform or seek to perform investment banking services for the issuers of the securities and instruments mentioned herein. Morgan Stanley is not a municipal advisor and the opinions or views contained herein are not intended to be, and do not constitute, advice, including within the meaning of Section 975 of the Dodd-Frank Wall Street Reform and Consumer Protection Act. Please see additional important information and qualifications at the end of this material.

2.1 Contacts

Morgan Stanley & Co. LLC ("Morgan Stanley" or "the Firm") has served as the one of the world's premier investment banks to governments, corporations and investors since 1935. Morgan Stanley has over 55,000 employees in 830 offices in 40 countries and is headquartered in New York City, with 4,227 employees in California. Morgan Stanley ranks among the top firms in underwriting fixed income securities globally. Of note, ***the Firm is also a top underwriter of municipal financings nationally, having senior managed 144 transactions for a total of $18 billion in par amount in 2013 alone.***

John Sheldon, Managing Director and Head of the Western Region Infrastructure Group, will serve as the lead banker and day-to-day contact person for the Authority's engagement. John began his municipal finance career in 1989 and joined Morgan Stanley's Public Finance department in 1997. ***John provides the Authority with a unique understanding of the workings of water utility financings and the specific challenges they face, having led financings for most of the major water utility systems in California,*** including for Metropolitan, Santa Clara Valley Water District ("SCVWD"), California Department of Water Resources ("DWR"), East Bay MUD, San Francisco Public Utilities Commission, City of San Diego Water Utility and Contra Costa Water District. John has also served as lead banker on financings by many new California water/wastewater issuers, including inaugural financings by such issuers as South Placer Wastewater Authority, Monterey County Financing Authority, San Luis Obispo Financing Authority and Livermore-Amador Valley Water Management Agency, all of which were multi-obligor JPA transactions with complex structures. ***Margie Backstrom, Executive Director,*** will serve as the backup banker for this engagement. Margie has 15 years of municipal finance experience and works extensively with a broad range of issuers on the West Coast. Her experience includes senior managed financings for California water utilities such as DWR, East Bay MUD, SCVWD, Marin Municipal Water District and the City of San Diego Water System.

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Margaret.Backstrom@morganstanley.com

2.2 Resume and References

References. Morgan Stanley has an extremely strong record of serving water and wastewater issuers in California as well as nationally. We encourage the Authority to contact our references concerning the high quality of services that we consistently provide to our clients.

Client References

Issuer	Metropolitan Water District of Southern California	Santa Clara Valley Water District	California Department of Water Resources	East Bay Municipal Utility District
Contact	**Gary Breaux**	**Darin Taylor**	**Perla Netto-Brown**	**Eric Sandler**
Title	*Chief Financial Officer*	*Senior Project Manager*	*Chief, Division of Fiscal Services*	*Director of Finance*
Email	gbreaux@mwdh2o.com	dtaylor@valleywater.org	pnetto@water.ca.gov	esandler@ebmud.com
Phone	(213) 217-6139	(408)630-3068	(918) 653-9836	(510) 287-0310
Address	700 North Alameda Street Los Angeles, CA 90012	5905 Winfield Blvd San Jose, CA 95123	1416 Ninth Street, 8th Floor Sacramento, CA 95814	375 Eleventh Street Oakland, CA 94607

Finance Team. In addition to ***John*** and ***Margie***, Morgan Stanley has assigned an experienced group of professionals to work with the Authority. ***Richard Weiss,*** Executive Director, is one of the leading municipal water and wastewater financing specialists in the country and has over 27 years of experience covering major water utilities. ***Dennis Farrell*****,** Executive Director and Former Head of Moody's Public Finance Group, will assist with developing effective credit strategies for the Authority. ***Dan Kurz*****,** Associate, ***Richa Pandey***, Analyst, and ***Renuka Lakshmanan*** Analyst, will provide analytical and execution support. ***Craig McKenna*****,** Managing Director, and ***Safdar Mirza*****,** Executive Director, will oversee all quantitative analyses.

Morgan Stanley has also assigned its most experienced marketing, sales, and underwriting professionals to work with the Authority. ***Brian Wynne***, Managing Director, would lead underwriting engagements for SWPCA and would be assisted in this capacity by ***Glen Balanoff*****,** Executive Director and ***Luke Hale***, Executive Director. ***Tom Keays*****,** Executive Director, is the Department's lead credit specialist serving investors and will coordinate the Authority's investor relations program. ***J.R. McDermott*****,** Managing Director, ***Drew Rowley***, Vice President, and ***Kristen Weiss*****,** Vice President will underwrite and remarket any of the Authority's short-term financings, in coordination with Brian. Finally, ***Nigel Key***, Managing Director, ***Daniel McCormick***, Executive Director, and ***Robert Riglietti***, Executive Director, will coordinate marketing and distribution to institutional and retail investors. We have enclosed an organization chart of our team and resumes for each of the team members in Exhibit A.

2.3 Case Studies

Morgan Stanley has significant experience structuring and marketing water and wastewater financings for California issuers. Our Firm has served as an underwriter on 44 water and sewer utility financings totaling $5.7 billion for California issuers since 2010, a subset of the 297 of water and sewer financings totaling $41.3 billion nationally during the same period. Of the California issues, 27 totaling $3.0 billion of par were senior managed financings. This includes senior managed financings for DWR, as well as for some of the Authority's members, including Metropolitan and SCVWD. In fact, Morgan Stanley's unique experience as the leading underwriter to DWR, Metropolitan and SCVWD during the past 10 years provides us with the unique experience of having worked closely with the two primary participants for SWPCA's proposed financing, as well as with the potential issuer anticipated to execute the long term financing for the BDCP. Our understanding of Metropolitan's and SCVWD's capital structure, flow of funds and credit profile will be instrumental to creating an efficient and low cost interim financing strategy. Similarly, our knowledge of DWR's debt profile, Statement of Charges, flow of funds and credit structure will be helpful to working with the Authority to ensure any potential long term financing plan integrates seamlessly with the interim financing. Finally, we also have deep expertise working with first time issuers, particularly JPAs with multiple parties/obligors. We summarize our work with DWR and Metropolitan below and provide case studies for SCVWD and South Placer Wastewater Authority in Exhibit B.

State of California Department of Water Resources. John Sheldon and Margie Backstrom have led Morgan Stanley as senior manager on five financings for DWR's water credit since 2001 for a total par amount of approximately $1.3 billion. The financings are secured by water supply contracts between DWR and its 29 contractors. Recent financings led by Morgan Stanley include the Department's $367 million of 2012 Series AN and AO Water Revenue Refunding Bonds, $216 million of 2011 Series AJ Water Revenue Refunding Bonds, $288 million of 2009 Series AF Water Revenue Bonds, $112 million of 2005 Series AD Water Revenue Bonds, and $272 million of 2004 Series AC Water Revenue Bonds. Below, we highlight our most recent senior managed transaction for DWR.

On September 19, 2012, Morgan Stanley served as joint-bookrunner for $367 million of DWR's Water System Revenue Bonds, Series AN and AO. The Series AN bonds were issued to advance refund a portion of the Series AD Water System Revenue Bonds on a tax-exempt basis and to retire outstanding commercial paper notes, while the Series AO bonds were issued to advance refund Series AC and AD Water System Revenue Bonds on a taxable basis. ***Morgan Stanley extensively pre-marketed this financing, including a pre-recorded investor roadshow presentation, which was viewed by 33 investors, 10 of whom ultimately purchased the bonds.*** The transaction received strong investor demand, resulting in $225 million of orders for Series AN and $612 million of orders for Series AO. ***Morgan Stanley's extensive pre-marketing efforts facilitated a transaction that was 2 to 8 times oversubscribed in some maturities, allowing yields to be lowered by up to 6 basis points and upsizing the transaction by $31 million.*** In addition, to minimize the Department's interest cost and ensure an orderly sale process, Morgan Stanley committed to underwrite approximately $13 million of bonds. Ultimately, the refunding bonds generated $30 million of gross savings and $26.5 million of present value savings (or 8.90% of refunded par amount).

Metropolitan Water District of Southern California. Morgan Stanley has been a senior manager in Metropolitan's underwriting pool for many years. We have served as an underwriter to Metropolitan on 28 negotiated financings totaling nearly $3.9 billion, of which ***the Firm has senior managed 13 financings totaling $1.7 billion.*** Recent financings led by Morgan Stanley include rolls of the District's 2011 Series A SIFMA Notes in December 2013, April 2013, January 2013 and March 2012, and its initial placement in 2011, $111.9 million of 2012 Series G Water Revenue Refunding Bonds, $167 million of 2011 Series B Water Revenue Refunding Bonds, $250 million of 2010 Series A Water Revenue Bonds, $219 million of 2009 Series B and C Revenue Refunding Bonds, $78 million of 2008 Series C Water Revenue Bonds and $81 million of 2007 Series B Water Revenue Refunding Bonds. We detail our most recent senior managed fixed rate transaction below.

On November 14, 2012, Morgan Stanley priced the Metropolitan Water District of Southern California's $111.89 million Water Revenue Refunding Bonds, 2012 Series G. The bonds were issued to advance refund water revenue bonds for debt service savings and to restructure a portion of Metropolitan's outstanding variable rate bonds, and were structured without a reserve fund. To stimulate demand among both retail and institutional buyers, Morgan Stanley suggested ***giving retail investors order priority for up to 50% of each maturity***. In addition, the refunding was structured with ***bifurcated coupons*** in the eight and ten year maturities in order to appeal to both retail and institutional investors. Although, pricing was originally scheduled to begin with a retail order period on Wednesday followed by institutional pricing on Thursday, the bonds were met with high demand from retail investors and strong interest by institutional investors, and Morgan Stanley was able to ***accelerate pricing*** and complete the transaction in a single day. Ultimately, the transaction was ***4.24 times oversubscribed***, and Morgan Stanley was able to ***reduce spreads by up to 5 basis points*** on the day of pricing, resulting in an attractive all-in TIC of 2.78%.

2.4 Firm Experience – California Water and Wastewater Bonds

Morgan Stanley is a leading underwriter of water and wastewater programs in California and nationally. In fact, ***Morgan Stanley ranks as the #2 underwriter of long-term, negotiated water and wastewater utility financings in California since 2010.*** The Firm has a particularly strong presence with water and wastewater financings in California, having managed 44 water and wastewater utility financings in California totaling nearly $5.7 billion, including 27 senior managed transactions totaling $3.0 billion. Recently, we have served as senior manager to DWR, Metropolitan, SCVWD, East Bay MUD, Contra Costa Water Authority, West Basin Municipal Water District, Irvine Ranch Water District, Imperial Irrigation District, and South Placer Wastewater Authority, among others. In all of these examples, John Sheldon and other members of our team assigned to serve the Authority led our efforts. We provide a complete list of the Firm's national water and wastewater experience since 2010 in Exhibit B, with our California financings highlighted.

2.5 Firm Status

Morgan Stanley maintains one of the largest and most liquid capital positions on Wall Street. As of December 31, 2013 (date of most recent annual report), the Firm reported $61.007 billion of Tier 1 Capital, resultinga in a Tier 1 Common Capital Ratio of 12.8%. Furthermore, as of December 2013, the Firm reported $5.627 billion of excess net capital, which allows ***the Firm to incur a total municipal underwriting liability of over $81 billion.***

The willingness of an institution to commit capital to underwrite clients' bonds is instrumental to the completion of a financing at the lowest cost. The adjacent table shows recent examples of the Firm's willingness to underwrite bonds. Particularly in the case of an inaugural financing, a strong capital position will be necessary to help support the bonds in both a primary and secondary market.

Recent Morgan Stanley Underwriting Commitments

Pricing Date	Issuer Name	Total Par ($'000)	Amount Underwritten ($'000)	Underwritten (%)
2/26/2014	Massachusetts Housing Finance Agency	19,020	480	3%
2/21/2014	Metropolitan Transportation Authority	400,000	12,590	3%
2/13/2014	Old Adobe Union School District	8,000	855	11%
2/13/2014	State of New York Mortgage Agency	160,120	1,645	1%
1/08/2014	Twin Rivers Unified School District	38,999	1,065	3%

Section Three

3.1 Pre-Construction Cost Recommendations

Assuming a total pre-construction cost of $1.2 billion over the next 2 to 3 years, we focus our response to this question on the 50% of costs ($600 million) that would be funded by the participating State Water Project Contractors ("SCs"). It is our understanding that the participating federal Central Valley Project Contractors will deliver their share of pre-construction costs through another Delta-Mendota / Westlands transaction (or some other means), separate and apart from SWPCA and the SCs. Below, we outline the key assumptions underlying our analysis with respect to a SCs interim financing of their share of pre-construction costs, structuring alternatives and an efficient financing structure based upon the alternatives. We also provide estimated financing results that support our rationale for a low cost of financing that also minimizes risk to the SCs. The discussion in our response to this question is further informed by our responses to Questions 3.2 and 3.5(a) below, as the long term financing of the BDCP and credit aspects of the interim financing are relevant to our analysis of the most efficient and viable interim financing structure. As a result, our responses to Questions 3.1, 3.2 and 3.5(a) should be considered as an integrated plan for the interim financing based upon currently available information.

Assumptions. The table below outlines the basic assumptions that we have used in determining alternatives that the SCs could reasonably consider with respect to the interim financing of pre-construction costs. While we recognize that certain issues may have not been resolved or require additional analysis, we derived our assumptions based upon the Authority's Request for Proposals, public documents that we have reviewed (for example, current State Water Contracts between the Department of Water Resources and the SCs ("SWCs"), First Amendment to the Memorandum of Agreement ("MOA") Regarding Collaboration on the DHCCP / BDCP, Supplemental Funding Agreements, various individual SCs' Board reports, and EIR/EIS for the BDCP) and answers to questions we have asked pursuant to the Authority's RFP. Clearly some or all of these assumptions will change over time, so we have constructed our financing plan to provide flexibility as conditions change.

Assumptions for SC's Interim Financing

Issuer	• SWPCA (or "Authority"), per the RFP
Participants / Obligors for Authority Issue ("Participants")	• Metropolitan Water District of Southern California and Santa Clara Valley Water District (still under consideration by several other SCs) • The proportion of debt secured by each participant is based upon each Participant's SWC Maximum Annual Table A Amount relative to the other Participants' SWC Maximum Annual Table A Amount (or some other reasonable methodology)
Other Participants in Pre-Construction Costs ("Contributors")	• Group of up to 14 other SCs who have been funding planning costs to date, per the RFP • It is anticipated that the group of SCs that contribute to funding but do not directly secure the interim pre-construction financing would provide their respective shares through DWR's Statement of Charges for the State Water Project; we understand that Supplemental Funding Agreements (or amendments thereto) are being drafted currently
Projected Term and Annual Pre-Construction Expenditures	• Approximately 3.5 years, as follows (based approximately upon Westlands / SLDMWA Board items) – $6.5 million in July through December 2014, $151.5 million in 2015, $217.5 million in 2016 and $224.5 million in 2017
Capitalized Interest	• Tax law permitting, through 2017, concurrent with pre-construction cost expenditures, thereby reducing financial burden on SCs until construction is projected to commence – This assumption is based upon receiving a Record of Decision ("ROD") on the BDCP at the end of 2014 and up to 3 years of litigation induced delays
Redemption	• Required to be available by the end of 2017, which we make concurrent with the capitalized interest period assumption (could be sooner)

Alternatives and Low Cost / Minimum Risk Option. Based upon the assumptions outlined above and the discussion of long term financing options outlined in our response to Question 3.2, the Authority and the SCs could consider several structuring alternatives to provide interim financing of the pre-construction costs. Below we have outlined key structure features, alternatives within each category and our rationale for why one alternative may be superior to the others.

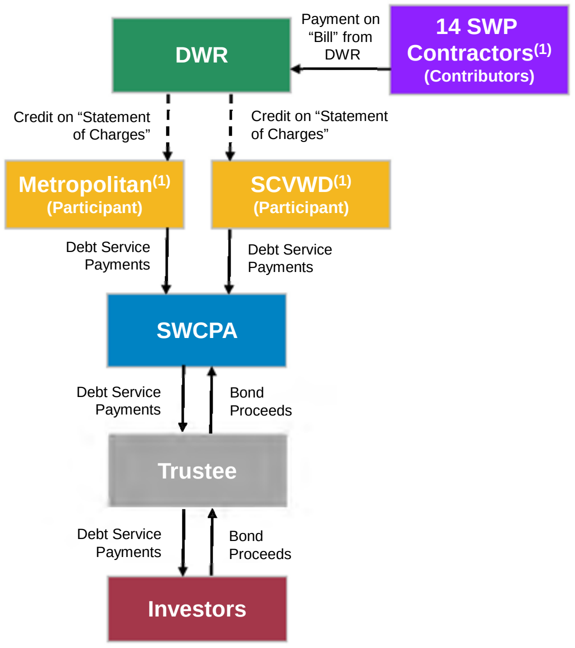
Issuer and Participants. As noted above, the Authority's RFP indicates that it will be the issuer, with the financing Participants (and underlying obligors on debt issued) identified so far as Metropolitan and SCVWD. The most obvious potential issuers besides the Authority are DWR, given its central State Water Project roles, and Metropolitan, due to its relative use of and payment toward SWP costs. However, it is our understanding that DWR is not in a position to issue debt for pre-construction activities given the project's current stage (pre-Record of Decision) and bond counsel's position that a validation process would be required to confirm its ability to issue debt at this stage, which would likely invite litigation. Based upon our understanding that Metropolitan will be by far the largest Participant in the debt offering to fund pre-construction costs, coupled with its strong market access and familiarity with the debt markets, it could be the potential issuer. However, it would need to benefit from the funding agreements that each participating SC has or is developing with DWR for funding pre-construction costs on an amortized basis (versus pay-as-you-go). If it does not, then Metropolitan would need additional legal agreements (pertaining to repayment, etc.) between itself and the other SCs, which we assume could be time consuming. Additionally, we assume there could be sensitivity to one contractor acting as issuer, as opposed to an authority comprised of multiple SCs.

Finally, while the SCs could utilize several different joint powers authorities to issue debt on their behalf, clearly SWPCA is uniquely positioned to perform this function, given its membership of 22 SCs, including the 16 SCs who have been funding planning costs to date and the subset of these agencies who will ultimately secure the financing.

Security. Securing the interim financing is critical, as the stronger the security the better the credit quality of the financing instrument and the lower the cost of borrowing. Additionally, a stronger security structure will provide more efficient access to the capital markets through different products, which is critical given the interim nature of the pre-construction cost financing. It is our understanding that currently Metropolitan and SCVWD would both agree to secure a share of the borrowing, likely based upon their relative Table A amounts, with potentially one or two other contractors still considering their participation. As Metropolitan's revenue bonds are currently rated AAA/AA+/Aa1 and SCVWD's water revenue bonds are rated AA/−/Aa2 (S&P/Fitch/Moody's), both Participants enjoy very strong senior lien bond ratings. As a result, assuming that a lower rated, non-credit enhanced SC does not participate, the financing will benefit from the combination of two very creditworthy obligors. Each of these Participants will need to decide how to secure its share of the debt service, which could theoretically be sourced as an O&M payment, an additional debt obligation on parity with existing senior lien debt or on a subordinate basis to such debt. In SCVWD's case, it could simply be from property taxes levied to pay for its State Water Project costs, however the choice of repayment source and/or lien will impact the credit ratings and we elaborate in greater detail on credit issues in our response to Question 3.5.a. For purposes of the interim financing, we assume a construct that will result in at least a AA rating, as indicated in the RFP.

Flow of Funds. While the Authority would be the issuer of the interim funding debt, the Participants will provide the security for the debt, as noted above, and the flow of funds will also reflect this arrangement. Practically, it is intended that capitalized interest through the pre-construction period would relieve the Participants of making payments from their revenues until the interim financing is retired. Regardless, the flow of funds will still need to be defined in the event payments are required after the capitalized interest period and to the extent the debt is not retired (either because construction is further delayed, the project does not move forward at all or the debt remains cost effective and is intended to be left outstanding as part of the overall BDCP long term financing plan). Should this situation occur, the debt would be serviced directly by payments from the Participants to the Authority, likely via assignment to a trustee. However, we recognize that most (or all) Contributors and perhaps the Participants would like to utilize DWR's Statement of Charges as the billing mechanism for the amortized cost of the interim (and the construction) financing, just as they have used this process for pay as you go funding of past BDCP related planning costs, and that the mechanism to build financing costs into the supplemental funding agreements is in process. This construct allows many of the SCs to continue levying a tax or assessment for costs related to a DWR project that is reflected in a single "bill" from DWR. Unlike past pay as you go payments, however, for amortized costs where the Participants are ultimately securing the debt service, the Contributors who fund pre-construction costs through payments made via DWR's Statement of Charges would be billed their share of the debt service costs, while Participants would receive a "credit" on their Statement of Charges to

Potential Flow of Funds



(1) As described, DWR's Statement of Charges could also be used for the Participants' flow of funds, but ultimately the Participants secure the interim financing.

reflect such proportional payments from the Contributors. The adjacent chart shows a potential flow of funds in relation to the interim financing, should it get extended for any reason (ignoring capitalized interest, which would simply flow from the trustee to investors). Additionally it should be noted that a similar flow of funds could be used for the construction financing should it be executed with a JPA issuer similar to the interim financing.

One final point on the flow of fund mechanics is that currently DWR bills the SCs on July 1 of each year for estimated SWP costs (capital and minimum O&M) for the following calendar year, with capital-related payments, including debt service, due on January 1 and July 1 during that calendar year and O&M payments due monthly, with true-ups occurring in the following year. While this process results in approximately a two year delay in reconciling costs and receipts for DWR and the SCs, fixed cost capital payments such as projected debt service are generally paid in full during the calendar year incurred. As a result, the Participants could also theoretically use the DWR Statement of Charges to handle payments to SWPCA on the interim financing (to avoid two bills for SWP related costs and incorporate such costs into property tax collections related to SWP costs), however the payment dates on the interim financing would have to be set to reflect such funds flow. From a credit perspective, however, the Participants will be securing such payments and therefore would be responsible for any shortfall or delays in such payments from DWR.

Type of Borrowing. Given the expected strong credit quality of the interim financing, SWPCA and its members could consider variable rate or fixed rate debt, both of which would find strong access to buyers in the municipal capital markets. Fixed rates provide certainty of payment and may hedge against rising rates when the debt is projected to be retired with permanent financing (that is, we assume it could be left outstanding and serviced efficiently once construction financing begins, if desired), while variable rates typically provide the lowest cost of financing over long periods of time and superior redemption flexibility. However, given that interest on the debt is expected to be capitalized through the pre-construction period so that Participants and Contributors do not actually make payments until there is more certainty on the project and construction of CM1 begins, some form of fixed rate funding will enable capitalized interest to be financed most efficiently. While perhaps a remote possibility that the interim financing requires the Participants and Contributors to pay debt service (rather than refinanced by the end of the capitalized interest period), variable rate debt may also create unnecessary complications related to rate setting and true-up for DWR's Statement of Charges in relation to the Participants and Contributors.

Based on fixed rate debt providing strong benefits to the mechanics and efficiency of funding pre-construction costs, it makes sense to focus on a form of such debt that is expected to be retired / refinanced in the next 3 to 4 years. While long term fixed rates remain historically low, the yield curve also remains very steep and the difference between a 3 to 5 year cost of funds and a 30 year cost of funds is substantial. To stay short on the yield curve and benefit from low short term rates, the interim financing could benefit from a fixed rate financing in the 3 to 5 year range. To accomplish this type of funding, the Authority and its team should consider fixed rate put bonds with a mandatory tender in the 3 to 5 year range, which could be rolled for additional periods should construction be delayed beyond such dates or redeemed early should construction begin sooner. In the table below, we provide a current market comparison of the cost of funds assuming a 30 year fixed rate debt financing and two tenors of put bonds with two alternative mandatory tender structures. As shown, a 3 and 5 year put bond cost of funds outperforms a 30 year cost of funds by up to 3.35% and 2.69%, respectively, in the current market. Assuming that put bonds are remarketed at the 20 year average of 3 or 5 year MMD at each mandatory tender date, the cost of funds for 3 and 5 year put bonds are lower than the 30 year cost of funds by up to 1.74% and 1.47%, respectively. While we show both hard and soft put pricing, the type of put utilized, which could also be structured with "term out" features, would be highly dependent upon the SCs risk tolerance for retiring that debt over time rather than through a refinancing.

Comparison of Funding Costs

	30 Year Fixed Rate Bonds	Put Bonds			
		3 Year Tenor		5 Year Tenor	
		Hard Put	Soft Put	Hard Put	Soft Put
Indicative Interest Rate	4.09%	3Y MMD + 8 bps	3Y MMD + 18 bps	5Y MMD + 12 bps	5Y MMD + 22 bps
Commitment Period / Avg. Life	20.3 Years	3 Years	3 Years	5 Years	5 Years
Annualized Upfront Cost (1)	3 bps	9 bps	9 bps	6 bps	6 bps
All-in TIC (through Initial Put Period)	4.12%	0.77%	0.87%	1.43%	1.53%
All-in TIC Assuming Put Bonds are Remarketed at 20 Year Average of 3 / 5 Year MMD					
All-in TIC (with Remarketing)(2)(3)	4.12%	2.38%	2.48%	2.64%	2.74%

(1) Upfront Costs annualized over the commitment period for each product. Assumes cost of issuance of $500,000 for each product; average takedown of $3.19/bond for fixed rate bonds; takedowns of $2/bond and $2.50/bond for 3 and 5 year put bonds, respectively.

(2) Assumes put bonds are remarketed at the 20 year average of 3 or 5 year MMD at each mandatory tender date.

(3) Includes Refinancing cost of $250,000 for the put bonds at each mandatory tender date (every 3 or 5 years).

Term of Borrowing. While the interim borrowing could use a variety of terms, using a long dated final term would be beneficial to the overall structure in the event the debt could not be retired as planned for any reason. In this case, amortizing payments over a 30 to 40 year period would alleviate the chance of any Participant or Contributor having to make substantial payments in a short period of time if a short final term were used. This approach lends further support to considering put bonds, where a long nominal maturity may be utilized with puts that could be rolled or retired periodically.

Redemption Feature. If the SWPCA or the Participants/Contributors believe it is possible that the interim borrowing will remain outstanding well beyond the projected interim pre-construction period, then the interim borrowing could be structured as fixed rate long term debt with a standard 10 year call feature at no additional cost for that level of redemption flexibility. However, the RFP indicates that pre-construction is expected to last 2 to 3 years, so we anticipate that the debt will most likely be retired in the next 2 to 4 years, assuming a cushion of 1 year for potential delays. If this is the case, it would be prudent to utilize a short call provision to be able to retire the interim debt efficiently, however this approach can be relatively expensive with long term fixed rate bonds. Alternatively, if a shorter term structure is utilized, a shorter call becomes much less expensive. The adjacent table provides the estimated additional cost of using a 3 and 4 year call on 30 year fixed rate debt, and on 4 and 5 year put bonds (there would be no cost for a call 3 to 6 months prior to the tender date), assuming par couponing. As shown, the cost of adding a call feature a year or two prior to short dated put bonds is much less expensive than using a short call on long dated fixed rate debt, particularly on a long term basis.

Additional Cost of Early Call Option

YTM Spread (in Basis Points)

	Fixed Rate Bonds[1]	4 Year Put Bond	5 Year Put Bond
3 Year Par Call	+ 20	+ 10	+ 10
4 Year Par Call	+ 28	N/A	+ 20

(1) Illustrative example for a 20 year maturity

Size of Financing. While the size of the interim financing is described as $250 million to $300 million in the RFP, with the potential for up to $600 million of pre-construction costs over the next 2 to 3 years, the interim financing could be larger initially or broken up into multiple borrowings as anticipated in the request. The decision points on the size of financing become one of cost and efficiency. With investment rates at very low levels, negative arbitrage on the construction fund and capitalized interest fund will raise the "effective yield" of the borrowing (a cost metric that incorporates return on the debt proceeds prior to spending). For a put bond financing, the negative arbitrage would be much less than with a long term fixed rate financing in the current market, so a larger initial financing may be prudent to reduce the need for another financing within a year or even two of the first. For illustrative purposes, we calculated the effective cost of funds based upon executing one financing versus two financings to fund the projected pre-construction costs outlined in our assumptions above. We have assumed that the first financing is executed in July 2014 and the second one in July 2015. For the put bonds, this implies a 4.5 year put bond followed by a 3.5 year put bond, such that they are both due at the end of 2018 (to be conservative rather than have them due in 2017). Our analysis assumes that the put bonds are remarketed at the 20 year average of 3 or 4 year MMD at each mandatory tender date over 30 years.

As the table below shows, the effective cost of funds is significantly lower for put bonds as compared to long term fixed rate bonds due to the significantly large value of negative arbitrage associated with the latter. The breakeven rates imply that issuing fixed rate bonds over put bonds will only become a more efficient strategy if interest rates rise by more than 1.97% to 2.12% by July 2015. Between the two put bond scenarios, the lower effective cost of funds is associated with executing two financings. However, the breakeven rate for this scenario is quite low, that is, if rates rise by more than 15 basis points by July 2015, the Authority will be better off executing one put bond financing for $600 million in July 2014. The ultimate decision, however, will be dependent upon expenditure projections, the Authority, the SCs and its financing team's interest rate views over the next 1.5 years and its risk tolerance for potentially rising interest rates.

Comparison of Financing Alternatives – Effective Cost of Funds

Issuance Timing and Product Considerations

Single Financing in 2014 vs. Two Financings in 2014 and 2016; Long Term Fixed Rate Bonds vs. Put Bonds

	Fixed Rate Bonds		Put Bonds	
	One Financing	**Two Financings**	**One Financing**	**Two Financings**
Issue Date(s)	7/1/2014	7/1/2014 7/1/2015	7/1/2014	7/1/2014 7/1/2015
Term / Initial Put Period	30 Years	#1 - 30 Years #2 - 30 Years	4.5 Years	#1 - 4.5 Years #2 - 3.5 Years
Final Maturity	12/1/2044	12/1/2044	12/1/2044	12/1/2044
Debt Service Structure	Level	Level	Level	Level
Deposit to Project Fund - Fin #1	$600,000,000	$300,000,000	$600,000,000	$300,000,000
Deposit to Project Fund - Fin # 2	$0	$300,000,000	$0	$300,000,000
All-in TIC (through Initial Put Period)	–	–	1.22%	1.14%
Financing Results: Assumes Put Bonds Remarketed at 20-Year Average of 3 / 4 Year MMD				
Average Life	20.3 Years	20.6 Years	19.6 Years	19.8 Years
All-in TIC (with Remarketing)(1)(2)	4.12%	4.12%	2.51%	2.47%
Value of Negative Arbitrage	0.73%	0.53%	0.36%	0.26%
Effective Yield	4.84%	4.65%	2.87%	2.72%
Breakeven Rate (vs.One Financing)	–	-0.20%	–	-0.15%
Breakeven Rate (vs.Fixed Rate Bonds)	–	–	-1.97%	-2.12%

(1) Assumes put bonds are remarketed at the 20 year average of 3 or 4 year MMD at each mandatory tender date.
(2) Includes Refinancing cost of $250,000 for the put bonds at each mandatory tender date (every 3.5 or 4.5 years).

Costs (Fees). The estimated upfront costs or fees that we used in our analysis related to the various interim financing alternatives are outlined in the adjacent table. Put bonds provide a lower upfront cost of financing, given their shorter term and reduced fee structure, than a long term fixed rate financing. In addition, there would a refinancing cost (of approximately $250,000) for the put bonds each time they are remarketed, if at all. We note that the estimates in the table do not account for the Authority's ancillary costs, including past consultants' fees, and other ongoing fees.

Comparison of Upfront Costs

Assumes $600 Million in Par Amount, Final Maturity of 30 Years

	Fixed Rate Bonds	4.5 Year Put Bonds
Cost of Issuance	$500,000	$500,000
Underwriter's Discount(1)	$2,022,785	$1,560,925
Total	$2,522,785	$2,060,925

(1) Average takedown of $3.19/bond for fixed rate bonds; takedown of $2.50/bond for 4.5 year put bonds.

Low Cost and Low Risk Alternative. Based upon the alternative structuring features and comparisons outlined above, we have outlined in adjacent table, an interim financing structure that provides a low cost of funds and reduces the risk to the Authority and SCs in a variety of ways relative to various alternatives.

The overall results of the interim financing structure outlined above are presented in the table and graphic on the next page. For purposes of presentation, we present the debt service graph net of capitalized interest and with principal amortizing to produce relatively level debt service after 2018, though we recognize that the intent would be for the interim debt to be retired prior to that time. Similar to our other assumptions, the actual terms could be easily changed as the financing plan develops.

Proposed Interim Financing Structure

SWPCA as the Issuer	• Established JPA; participants are members and familiar with capital markets; broader mandate than using one SC as the issuer; less adverse legal risk to financing than DWR as issuer
Security via a Lien on Metropolitan and SCVWD Revenues	• Lien position to be determined (see credit discussion in Question 3.5)
Fixed Rate Put Bond Structure with Long Nominal Maturity	• Low cost, efficient funding of capitalized interest, flexible and low cost redemption provisions, allows long term amortization if necessary • For purposes of assessing estimated results below, we assume a 4.5 year soft put structure (due at the end of 2018) to minimize risk, however a shorter initial put period (e.g., 3 or 4 years), multiple tranches, hard put and/or “term out” structure could be implemented at some level of cost savings
2017 Call Date	• One year in advance of the put date (end of 2017) for additional flexibility at low cost
Capitalized Interest Through 2017	• Tax law permitting; to eliminate actual payments until interim financing is projected to be retired

While the Authority may still issue between $250 million and $300 million of interim debt initially, we show results for an issue amount of $600 million in order to illustrate funding all of the interim costs. We used 4.5 year put bonds issued in July 2014 to be relatively conservative with respect to timing. With this structure, the Authority can achieve an all-in cost of funds of 1.22% over the interim financing period and approximately 2.51% with an effective cost of funds of 2.96% over a 30 year term. This assumes that the put bonds are remarketed at the 20 year average of 4 year MMD at each mandatory tender date over 30 years. Net average annual debt service (excluding capitalized interest) is estimated at $34 million through 2044.

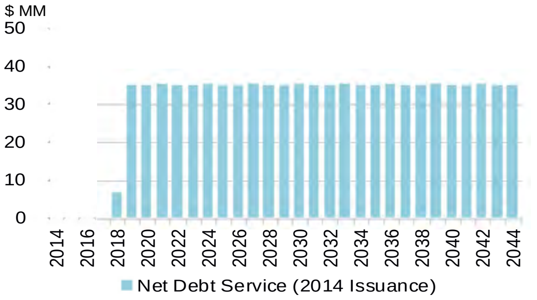
Interim Financing Structure

$600 MM of 4.5 Year Put Bond Issuance in 2014 (1)

Issue Date	7/1/2014	Uses	
Term	4.5 Years	Deposit to Project Fund	$600,000,000
Initial Put Date	12/1/2018	Capitalized Interest Fund	$22,307,640
Final Maturity	12/1/2044	Costs of Issuance Fund	2,062,360
Debt Service Structure	Level	Total Uses of Funds	$624,370,000
Sources		Average Life	19.6 Years
Par Amount	$624,370,000	All-in TIC (through Initial Put Period)	1.22%
Premium	$0	All-in TIC (with Remarketing)(1)(2)	2.51%
Bond Proceeds	$624,370,000	Value of Negative Arbitrage	0.36%
		Effective Yield	2.87%
		Average Annual Net Debt Service	$35,083,623

(1) Assumes put bonds are remarketed at the 20 year average of 4 year MMD at each mandatory tender date.
(2) Includes Refinancing cost of $250,000 for the put bonds at each mandatory tender date (every 4.5 years).

Interim Financing Debt Service Schedule



3.2 Integration of Pre-Construction and Long Term Financing

Integration of Interim Pre-Construction Financing. As described in our response to Question 3.1, we have developed a low cost interim financing structure that could be retired efficiently with a long term financing once construction on CM1 begins, which is one of the primary objectives outlined in the request. However, in structuring the interim financing, we also considered the possibilities that the project (i) does not move forward, (ii) gets delayed for a longer period of time than projected, or (iii) that the SWPCA and its participating SCs decide to make the interim financing a permanent part of the overall long term financing plan when construction begins. In the second case, the interim financing is flexible enough to roll forward through another put bond remarketing, convert to a different mode, or be refinanced into a new structure that could be better defined in the future. As noted above, we also built a one year cushion into the initial put period to be conservative, which can be made more flexible via earlier call provisions, though these decisions can be managed as the financing plan develops. In the first and third cases, the interim financing would require repayment from the Participants, but with a mechanism to reimburse these Participants for the share of the amortized pre-construction costs paid by the Contributors. In this case, we expect that the interim funding would be amortized over a long period of time, perhaps 30 or 40 years. As noted in our response to Q3.1, it is possible that the flow of funds mechanics can accommodate both Participants and Contributors making payment through DWR’s Statement of Charges, however the Participants directly securing the financing would remain responsible for any shortfalls or delays in payment. In the case where the BDCP projects are not approved or do not move to construction, it will be important to ensure that either the DWR Statement of Charge process that incorporates the interim financing can survive the project’s termination, or alternatively that the Participants have some other legal means to receive payments for the Contributors’ share of debt service.

Efficiency of DWR Long Term Financing. DWR is an active municipal market issuer with very strong Aa1/AAA (Moody's/S&P) ratings and an excellent track record of securing fixed rate funding at a low cost. It also operates a successful commercial paper program to fund its projects on an interim basis. Should the BDCP move into the construction phase, with large long-term funding needs required over an extended period of time, DWR could execute the financing program similar to how it has financed other large capital projects historically. We expect that if DWR maintains a strong credit quality, it would be able to fund construction costs efficiently over a long period of time. That said, it should be noted that the ultimate credit strength of DWR's financing structure relies on the credit strength of the underlying SCs (anchored by Metropolitan), as well as the take or pay nature of the water supply contracts, 1.25x rate covenant required under the DWR bond resolution, "step-ups" of non-defaulting SCs' to a defaulting SC's obligation and the property tax/assessment backstop provided in the water supply contracts. As a result, a JPA or other issuer could possibly replicate much of this credit strength with the same set of contractors using similar proportional shares and credit structuring elements to those that DWR enjoys today. In fact, as we describe in our response to Question 3.1, the interim debt for preconstruction costs would rely on a subset of contractors to secure strong ratings, but also the operational and payment infrastructure provided by DWR to allocate costs among the SCs appropriately. Similar provisions could extend to long term financings issued by an alternate entity such as SWPCA. Alternatively, certain elements may be able to be partially replicated in contracts between SWPCA and the SCs outside of the DWR system, though DWR would still be central to the project and process.

There are several issues that are worth considering as the long term financing plan develops, both from DWR's and from the SC's perspective, and in relation to the ultimate issuer of long term financing, as follows.

Water Supply Contracts. We understand that DWR's water supply contracts are in the process of being extended, likely to 2085, or 50 years from 2035 when most expire. Clearly, in order to finance the substantial costs associated with CM1 in the BDCP, the extension of these contracts is essential to allow for the amortization of financing payments over a long period of time. If the CM1 capital expenditures are largely exhausted as projected in 2024, then a 60+ year period from this time should be sufficient to amortize debt payments over an efficient time period. However, if the project incurs substantial delays, additional amortization could possibly be desired in the future. Should that occur and the water supply contract expirations begin to fall inside of 50 years from debt issuance, they may need to be extended further (which we realize is no easy task).

Diversity of Financing Products. To date, DWR has utilized primarily fixed rate debt and a modest size commercial paper program to manage its capital financing plan. Given the magnitude of the BDCP's projected CM1 Costs, it would be in the SC's interests to consider utilizing other financial products, including at the very least, some form of more permanent variable rate debt and put bonds. This would potentially lower the cost of the overall financing program, diversify the products used to fund the large program over time (thereby reducing the risks associated with any one product) and add flexibility to repayment and redemption. Additional products would also diversify the investor base, which could help drive costs lower as more investor segments could participate in the debt program (e.g., money market funds, short term bond funds, etc.). As the plan develops, and assuming DWR will serve as the issuer of long term debt, additional products should be implemented in the financing plan.

Statement of Charges. Related to product diversification, it should be noted that utilizing floating rate products to fund CM1 construction financing would add additional complication to DWR's Statement of Charges. Similar to power costs, such debt cost would vary over time, and as a result, following year(s) (or more frequent) true ups may be required to align with the way the Statement of Charges operates currently.

Other Financing Vehicles. As noted above, SWPCA or another JPA could be used to serve as the issuer of long-term debt for the BDCP CM1 construction costs (and interim financing takeout). In fact, such an issuer could also be considered as the overall financing program develops between both state and federal water contractors over the next several years. There could be benefits to the entire project by unifying the participants into one financing program rather than funding costs separately. Another example of a different financing program for a portion of BDCP costs could be some form of municipal securitization, at least for contractors serving large urban areas. Given the magnitude of costs projected, any segmenting of potential investors could improve borrowing costs on the entire program. To further elaborate on these types of long term financing approaches would require a separate process (or a longer page limit)! With respect to public-private partnerships, there are certain types of public projects that can benefit from private sector involvement, such as discrete building projects, toll roads and certain municipal utility projects (a new plant or joint use facility for instance). However, it should also be recognized that long-term financing of these projects will always benefit from the low cost of tax-exempt debt, as comparably rated and termed taxable debt will by definition have a higher cost and private equity contributions typically demand an even higher return metric than debt. As such, from a pure cost perspective, any private or taxable financing will add to the cost of the project, making it less efficient than a comparable tax-exempt funded program. From an operational or construction cost perspective, we are not in a position to opine on whether a public-private partnership could yield any efficiencies to the cost structure of the current BDCP project.

3.3 Pricing Indications

The tables on the next page provide indicative tax-exempt fixed rate and put bond scales for the Authority's water revenue bonds, assuming AA-category ratings and market conditions as of March 3, 2014. Morgan Stanley's scale is based on other recent California water utility financings, with comparable credit quality, including Metropolitan's 2014 water revenue bonds, DWR's 2014 water system revenue bonds, Silicon Valley Clean Water System's 2014 wastewater revenue bonds, and LADWP's 2013 water system bonds.

Term Structure. If a fixed rate structure were desired, in the current market Morgan Stanley would plan to structure the tax-exempt offering either as serial bonds through 2034 with term bonds in 2039 and 2044 (or longer if so desired). For put bonds, we show rates for put dates in 2017, 2018, 2019 and 2021. The final structure will vary with market conditions at pricing, so building flexibility into the offering documents will allow the Authority to vary the structure based on investor feedback and market conditions at pricing.

Put Bond Scale (AA)
Market Conditions as of March 3, 2014

Maturity	Late MMD	Coupon	Hard Put Spread (bps)	Yield
2017	0.56%	5.00%	8	0.64%
2018	0.87%	5.00%	10	0.97%
2019	1.17%	5.00%	12	1.29%
2021	1.89%	5.00%	23	2.12%

Maturity	Late MMD	Coupon	Soft Put Spread (bps)	Yield
2017	0.56%	5.00%	18	0.74%
2018	0.87%	5.00%	20	0.76%
2019	1.17%	5.00%	22	1.39%
2021	1.89%	5.00%	33	2.22%

Tax Exempt Scale (AA)
Market Conditions as of March 3, 2014

Maturity	Late MMD	Coupon	Spread (bps)	Yield
2015	0.20%	2.00%	(10)	0.10%
2016	0.34%	3.00%	(8)	0.26%
2017	0.56%	4.00%	(7)	0.49%
2018	0.87%	4.00%	(5)	0.82%
2019	1.17%	5.00%	(3)	1.14%
2020	1.57%	5.00%	0	1.57%
2021	1.89%	5.00%	3	1.92%
2022	2.14%	5.00%	5	2.19%
2023	2.33%	5.00%	10	2.43%
2024	2.45%	5.00%	15	2.60%
2025	2.57%	5.00%	25	2.82%
2026	2.67%	5.00%	30	2.97%
2027	2.79%	5.00%	35	3.14%
2028	2.86%	5.00%	35	3.21%
2029	2.97%	5.00%	35	3.32%
2030	3.07%	5.00%	35	3.42%
2031	3.16%	5.00%	35	3.51%
2032	3.24%	5.00%	35	3.59%
2033	3.31%	5.00%	35	3.66%
2034	3.36%	5.00%	35	3.71%
2039	3.58%	5.00%	35	3.93%
2044	3.67%	5.00%	35	4.02%

3.4 Alternatives to Public Issuance

Although alternatives to a public issue to provide interim financing can take many forms, the universe generally includes (i) private placements (to a select group of institutional investors), (ii) direct loans (e.g. bridge or bank loan), (iii) direct placements (e.g., floating rate notes purchased by a bank), and (iv) revolving lines of credit. In each of these cases, capital would be provided directly by one or a small group of lenders, with terms to be determined. However, in many of these cases, the rate on the debt is likely to float with an index. For instance, Morgan Stanley is able and would be willing to consider a bridge loan or revolving line of credit to SPWCA and the Participants or participating SCs. However, our cost of funds typically is tied to the LIBOR Index during the term of such products. As a result, it may be less efficient than a fixed rate product, as we discuss in our response to Question 3.1. With respect to direct loans, direct placements or private placements, where it may be possible to set fixed rates on the product, it seems unlikely that costs for such a financing would fall below a well-developed public financing process, as by definition the latter would involve more potential investors, and hence, more demand for the loan.

In general, the benefits of a public offering traditionally include a more attractive cost of funds, better covenants and terms, and broader distribution (including the ability to market the bonds to local retail investors, which may have the ancillary effect of generating additional public support for the project). Alternatively, one of the primary strengths of the alternative products listed above is that they would allow the SWPCA to avoid a potentially time-consuming public disclosure process (e.g. preparation of the official statement, credit ratings, etc.) as well and the need (and expense) of a broad marketing effort to sell the securities to investors through a public offering. However, in addition to their potentially higher cost, we note that these various alternatives to a public offering could include more restrictive covenants and terms. For example, a bank loan, direct placement or line of credit are often structured with escalating interest rates or a put feature in the event of a downgrade, which would increase the SWPCA's exposure to credit risk. Consequently, it would be important that the SWPCA carefully review the terms of these products to ensure they are comparable to those of a public offering from both a cost and a risk perspective. Finally, a revolving credit agreement or loan could potentially allow the Authority to draw funds over time, thereby reducing negative arbitrage in project and capitalized interest funds. This benefit would have to be weighed against the variable rate nature of these types of products.

3.5 Marketing Approach

Rating Agency Approach. Morgan Stanley has significant experience working with first-time municipal issuers to achieve high credit ratings on their inaugural issuance of debt. For example, in December 2013, Morgan Stanley served as joint bookrunner on the Utility Debt Securitization Authority's initial issuance of municipal bonds (and the first ever municipal utility securitization transaction). Among other responsibilities, Morgan Stanley crafted a rating agency presentation to explain the Authority's unique credit structure, which resulted in triple-A ratings from all three agencies for the $2.0 billion offering. Also of note, our team will include Dennis Farrell, Executive Director at Morgan Stanley and the former head of Moody's Public Finance Group. Dennis will provide assistance with all rating agency matters and offers a "behind the scenes" perspective on the ratings process. Given his experience and expertise, Dennis will be an integral member of the financing team and will help develop a credit strategy tailored specifically to the SWPCA to clearly explain the proposed financing and its credit highlights to the rating agencies. Below, we provide our thoughts on which rating agencies to approach and our preliminary review of the credit strengths and challenges of the proposed offering.

Number of Ratings to Procure. We believe that a minimum of two ratings will be sufficient to ensure a successful sale of the proposed bonds. As discussed above, at this time Metropolitan and SCVWD are the most likely Participants that will ultimately secure debt service. We assume that the credit would be a joint and several approach for each Participant's share of debt service, and therefore rated to the weakest credit link, however we could also examine minor step-ups to further blend the credit as necessary. Regardless, the two Participants' credit ratings are strong and will provide strong benchmark levels for the proposed financing. Metropolitan has a split rating, with a AAA from S&P and ratings of Aa1/AA+ from Moody's/Fitch. SCVWD's water utility system, meanwhile, is rated at the AA level by both S&P and Moody's and is not rated by Fitch. Given that S&P has the most favorable view of Metropolitan's debt, we believe SWPCA should use them for a credit rating. In terms of Moody's versus Fitch, we note that investors generally view Moody's with greater value, although they have recently been more unpredictable. In addition, we note that both Metropolitan and SCVWD have an existing relationship with Moody's and that Moody's has a solid understanding of their respective credits. As such, it may make sense to approach Moody's for a credit rating. If selected as underwriter, we would work with SWPCA throughout the initial structuring process to determine which rating agencies to ultimately approach.

We should note that while Metropolitan and SCWVD are very well positioned to secure the credit, if other members of SWPCA decide to become Participants to help secure the interim financing (as opposed to being Contributors), we would work with the Authority to craft the best credit quality possible given the ultimate Participants. Obviously, higher rated Participants can be integrated into the security structure more easily to achieve high ratings, however even if lower rated Participants choose to join, we have deep experience crafting structures that can accommodate multiple disparate credits and still capture high ratings. As such, regardless of the ultimate financing structure, we are confident that we will be able to help SWPCA position its credit in the strongest possible light in order to attract high quality investors.

Credit Challenges. In our experience with new credits, we have found that one of the most effective approaches to rating agency strategy is to identify the credit's biggest challenges and address them directly. Below, we summarize three potential challenges:

- *Relatively complicated credit story:* As detailed in our response to Q3.1, the proposed financing will likely have a relatively complicated structure. During the rating agency presentation (and the investor marketing process), it will be critical to turn this into a direct, simple story, with Metropolitan and SCVWD as the obligors of the debt service and Metropolitan (and its highly rated credit) responsible for the majority of the debt service. In addition, it will important to emphasize that Metropolitan's and SCVWD's obligation to secure the JPA debt will not be impacted by repayment by the other Contributors via DWR (through credits on their Statement of Charges). Our response to Q3.1 provides further detail on this issue.
- *Refinancing*: The proposed offering is intended to serve as interim financing until the beginning of the construction period when DWR (or another entity) will refinance the bonds with long-term debt. A natural question will be what will happen if the refinancing does not occur for any reason. Thus, it will be important to explain that the bonds will be amortized over a long period of time (likely 30 to 40 years) to minimize annual debt service and that, importantly, both Metropolitan and SCVWD stand behind the debt to offer bondholder security. In this "stranded cost" scenario, where no project moves forward, the commitment of the Participants to the debt will be paramount, recognizing that investors will face them directly (and not the Contributors). We address that scenario through our structure described in Question 3.1.
- *Determining the appropriate lien level for Metropolitan and SCVWD*: Although this is more a preliminary structuring consideration, it will be important to determine the appropriate lien level for Metropolitan and SCVWD. As discussed in more detail below, each of these agencies will want to balance their desire for the highest credit rating with the potential impact on their own debt (and credit rating) in the event that the bonds are not refinanced. While we note this issue as a structuring challenge, once decided we would anticipate turning it into a strength given the high credit quality of the Participants.

Credit Strengths. Despite the potential challenges detailed above, we believe this will be a strong credit that should achieve at least AA category ratings. Ultimately, the primary credit strength and key ratings driver is the individual credit strengths of the underlying agencies, and particularly the two largest credits, Metropolitan and SCVWD, as summarized below.

- *Metropolitan:* Metropolitan's primary credits strengths include its strong current and projected debt service coverage (which also provides debt service capacity should the proposed financing not be refinanced at the start of the construction period), its role as an essential water provider to a large and diverse service territory, and its high levels of stored water which can meet nearly two years of demand. Furthermore, Metropolitan has strong leadership with a demonstrated ability to manage a large and complex debt portfolio with multiple varieties of short and long-term debt.
- *Santa Clara Valley Water District:* Similar to Metropolitan, SCVWD has a strong financial position highlighted by a low debt burden. In addition, SCVWD is an essential service provider for a large and diverse service area which provides a stable revenue stream and has long-term take or pay contracts with eight of its fifteen largest customers through 2051. Additionally, we note SCVWD uses a strong voter approved property tax levy to repay capital and operating costs related to imported water from the State Water Project. We assume that this levy has been used for past BDCP planning costs and that it could also be used for preconstruction costs as well.

Securing the Credit. As noted above, given their size and credit strength, Metropolitan and SCVWD are excellent Participants to secure the credit of the proposed offering. In addition, both Metropolitan and SCVWD are experienced issuers of municipal debt, making them most likely to generate investor confidence and attract a wide range of high-quality investors. That said, a primary consideration will be from where in its financial structure (i.e., which "lien") each agency would secure the bonds. We detail our thoughts for Metropolitan and SCVWD below, recognizing that ultimately each agency will have different financial objectives to which to manage its security of the interim financing.

Metropolitan: Currently, Metropolitan makes payments to DWR pursuant to its Statement of Charges from both Operation and Maintenance expenses (for SWC O&M and Power Costs) and from Current Revenues after the payment of its bonds and subordinate revenue obligations (for SWC Capital Costs). As a result, depending upon the credit strength that Metropolitan wants to lend to the interim financing, it could likely secure its obligations from at least four different lien levels while still lending support to a AA rating: (1) as an Operations and Maintenance expense; (2) on parity with Revenue Bonds; (3) subordinate to Revenue Bonds; and (4) subordinate to all Obligations (parity with SWC Capital Costs). In the adjacent figure, we illustrate the potential impact on Metropolitan's debt service coverage in FY 2018 for each of these alternatives should it become obligated to pay its share of financing costs once capitalized interest expires and assuming the debt is not refinanced. Although Metropolitan has the debt service capacity to absorb this additional expense, given that it may not want to risk impacting future debt service coverage, we would expect that Metropolitan may choose to subordinate its obligation to at least its senior lien debt service. Even if Metropolitan were to subordinate the payment on SPCWA interim debt to its current subordinate lien, we still expect the rating agencies to view its obligation at a high level and no lower than AA. Additionally, given that the interim debt is expected to be retired with permanent financing before or near the time capitalized interest expires, risk of any coverage impact is reduced in the near term.

Metropolitan - Proforma Debt Service Coverage (FY 2018)

($ in millions)

		Proportionate Share of SWPCA Debt[(2)]			
	Currently Projected[(1)]	(1) O&M	(2) Senior Lien	(3) Sub Lien	(4) Parity to SWC Capital
Total Operating Revenues	$1,706	$1,706	$1,706	$1,706	$1,706
O&M					
O&M, CRA Pow er & Water Transfer Costs	(634)	(634)	(634)	(634)	(634)
Total SWC OMP&R and Pow er Costs	(440)	(440)	(440)	(440)	(440)
Proportionate Share of SWPCA Costs	N/A	(33)	N/A	N/A	N/A
Total O&M	(1,074)	(1,107)	(1,074)	(1,074)	(1,074)
Net Operating Revenues	632	599	632	632	632
Miscellaneous Revenue and Interest	61	61	61	61	61
Adjusted Net Operating Revenues	**$693**	**$660**	**$693**	**$693**	**$693**
Senior Lien Debt Service	($350)	($350)	($350)	($350)	($350)
Proportionate Share of SWPCA Costs	N/A	N/A	(33)	N/A	N/A
Total Senior Lien Debt Service	(350)	(350)	(383)	(350)	(350)
Coverage - Senior Lien	*1.98x*	*1.88x*	*1.81x*	*1.98x*	*1.98x*
Change from Currently Projected		-0.10x	-0.17x	0.00x	0.00x
Subordinate Obligations	($1)	($1)	($1)	($1)	($1)
Proportionate Share of SWPCA Costs	N/A	N/A	N/A	(33)	N/A
Total Subordinate Obligations	(1)	(1)	(1)	(34)	(1)
Coverage - All Obligations	*1.97x*	*1.88x*	*1.80x*	*1.80x*	*1.97x*
Change from Currently Projected		-0.09x	-0.17x	-0.17x	0.00x
SWC Capital Costs	($184)	($184)	($184)	($184)	($184)
Proportionate Share of SWPCA Costs	N/A	N/A	N/A	N/A	(33)
Total SWC Capital Costs	(184)	(184)	(184)	(184)	(217)
Coverage - All Fixed Charges	*1.30x*	*1.23x*	*1.22x*	*1.22x*	*1.22x*
Change from Currently Projected					

(1) Per Metropolitan's 2014 Series A and 2014 Series B Official Statement

(2) Estimated at 95% of total debt service based on Metropolitan's share of Maximum Annual SWP Table A Water Delivery Amounts for SWP Contractors relative to SCVWD

Santa Clara Valley Water District: SCVWD, as noted above, uses its voter approved property taxes to pay for its state water project costs and began accounting for those taxes and costs in a separate fund in FY2010-11. We assume that SCVWD could simply levy for additional state water contract costs in the form of amortized costs for preconstruction (as opposed to pay as you go) and that these levies would provide a very strong credit quality, perhaps in the AA category given the large base on which levies are made. However, to the extent that SCVWD's pledge requires additional support from its water utility system to reach AA category ratings, SCVWD should also have a choice of lien levels. As its revenue bond debt has ratings consistent with the AA category that SWPCA would like to achieve for the proposed financing, SCVWD could simply use a parity lien to current water utility debt service and easily achieve this level given the minor burden of amortized cost projected to SCVWD resulting from the interim financing. However, it may also be able to secure payments on the interim financing as either (i) an Operations and Maintenance expense, which would easily raise the rating though at some risk of future senior lien debt service coverage impacts or (ii) subordinate to its revenue COPs, which would protect senior lien coverage and would likely help support a rating near AA if property taxes were not sufficient on their own. In Exhibit D, we provide a table to illustrate the potential impact on SCVWD's debt service coverage for each of these alternatives should it become obligated to pay its share of financing costs once capitalized interest expires and assuming the debt is not refinanced, however we anticipate that the property tax levy for state water project costs could be sufficient to secure the desired ratings on their own.

To conclude, we believe that securing the proposed interim financing on Metropolitan and SCVWD's credit will be sufficient to achieve ratings in the AA category and attract high-quality investors. Below, we provide additional detail on specific steps that SWCPA can take to market the bonds and achieve broad distribution to a wide range of investors in order to reduce the cost of the financing

Marketing Strategy. In order to attract high quality investors and achieve broad distribution of its bonds, we believe that SWPCA should undertake a comprehensive marketing strategy. Our water and wastewater experience provides us with a wealth of knowledge that we will use to craft a marketing strategy specifically tailored to the Authority's offering. ***One key lesson is the importance of working with the Authority's financing team early in the process.*** We will market the Authority's bonds by identifying potential buyers' interests and concerns well in advance of pricing, providing relevant information in an efficient manner, allowing for the opportunity for follow-up inquiry, and soliciting input on bond structure that will translate to an attractive cost of funding for the Authority. This type of marketing will occur through a number of techniques, including investor roadshows, one-on-one calls and in–person investor meetings. In particular, one specific marketing tool that the Authority can use to market its bonds is a pre-recorded Internet Roadshow. The roadshow presentation will provide an overview of the Authority, the credit structure, and other important features of the financing. Morgan Stanley would work closely with the Authority and its team to ensure that the presentation highlights the strengths of the proposed credit structure, while addressing the questions anticipated from investors as they review the credit. Additionally, it has been our experience that Internet Roadshows can generate requests from investors for one-on-one calls with issuers, which can be an important aspect of a pre-marketing campaign. Leading up to the sale of the Authority's bonds, Morgan Stanley's Municipal Syndicate will coordinate with the sales-force to organize one-on-one calls to solicit feedback from investors and address any unresolved questions. Finally, given the complexity of the credit, the Authority should consider in-person meetings with leading investors of similar water and wastewater credits. The purpose of these meetings would be to explain the key similarities and difference between the Authority's credit structure and these other issuers to those investors.

Additionally, we anticipate that direct retail investors and retail conduits (investment advisors and bank trust department) could have substantial interest in this financing, particularly on the short end of the curve. Morgan Stanley suggests the following ideas for the Authority to consider in order to encourage retail participation in its upcoming financing: (1) retail priority or one-day retail-only order period (depending on market conditions and investor feedback); (2) compliance-approved flyer for distribution to qualified retail clients; (3) meetings with retail fixed-income sales liaisons; (4) online meeting for retail brokers; and (5) utilize the Authority's or Participant's websites to publicize the proposed transaction.

Distribution. Morgan Stanley is able to execute the above marketing plan through our world class institutional and retail distribution systems. Morgan Stanley has a premier institutional sales platform due to our long-standing and extensive relationships with institutional investors. This includes a team of 17 national institutional salespeople who are exclusively dedicated to the coverage of the 150 largest institutions that regularly buy tax-exempt securities. Additionally, The Firm's retail platform, Morgan Stanley Wealth Management ("MSWM"), has one of the largest retail sales forces in the nation, with 16,500 financial advisors covering 5.6 million accounts with assets totaling more than $1.5 trillion. This system includes 79 offices in California with 2,302 advisors who cover 936,303 accounts with total assets of $269.6 billion, including $30.3 billion of directly held municipal securities. We provide further information on our institutional and retail distribution systems in Exhibit E.

Interaction with Underwriting Desk and Sales Force. We consistently encourage our clients to interact fully with our banking team, our underwriting syndicate and our municipal sales force. The Firm believes in a transparent pricing process with open and constant communication between the underwriting syndicate, municipal sales force, bankers, the issuer and the issuer's Financial Advisor. We view the marketing and pricing process as a collaborative effort between all parties involved to achieve a fair and efficient pricing result on behalf of the Authority, and we would welcome and expect the Authority and its Financial Advisor's input throughout the entire financing process.

As senior manager, we will provide the Authority with updated structure and pricing wires throughout the process, as well as price views from any co-managers. We will also provide the Authority with a complete pre-pricing book prior to the sale that includes the proposed structure, market commentary, and recent comparable financings and pricing results. Throughout the pre-pricing process, we will regularly provide feedback on structuring options from both the underwriting syndicate and the sales force in the context of investor demand and pricing. Furthermore, Morgan Stanley routinely uses IPREO's services for negotiated sales. We would set up individuals from the Authority, Participants and its team for electronic order monitoring so that everyone can observe orders in real time as they are entered into the system, including the investor and underwriter associated with each order. We will also provide the Authority and its Financial Advisor with detailed and summary information regarding orders and allotments. Finally, after the sale, we will provide the Authority with post-pricing materials, including all of the pertinent sale information and additional information regarding comparable financings. If the Authority desires in-person contact with our underwriters or sales force, we would be happy to coordinate a trip to New York City for marketing and pricing to meet our underwriters and sales force personnel, as well as participate in investor meetings. This kind of trip will allow the Authority to receive direct feedback on structuring options and participate directly in the pricing process.

Section Four

4.1 Fees

We propose fees and estimate expenses (billed at cost) as shown in the adjacent tables, assuming a $250 million financing and AA-category ratings. Given the complexity of structuring and marketing the Authority's inaugural transaction, should the time commitment of our banking team exceed typical transaction levels, we would also reserve the right to request a reasonable management fee based upon such commitment; however, we emphasize that Morgan Stanley would like to work with the Authority, and we do not want our fees to be a limiting factor. As such, we welcome further discussion of our fee levels.

Proposed Takedowns

Fixed Rate Bonds

Years	$/Bond
1	$1.25
2 - 10	$2.50
11 - 20	$3.00
21 - 30	$3.50
Average Takedown	**$3.01**

Put Bonds

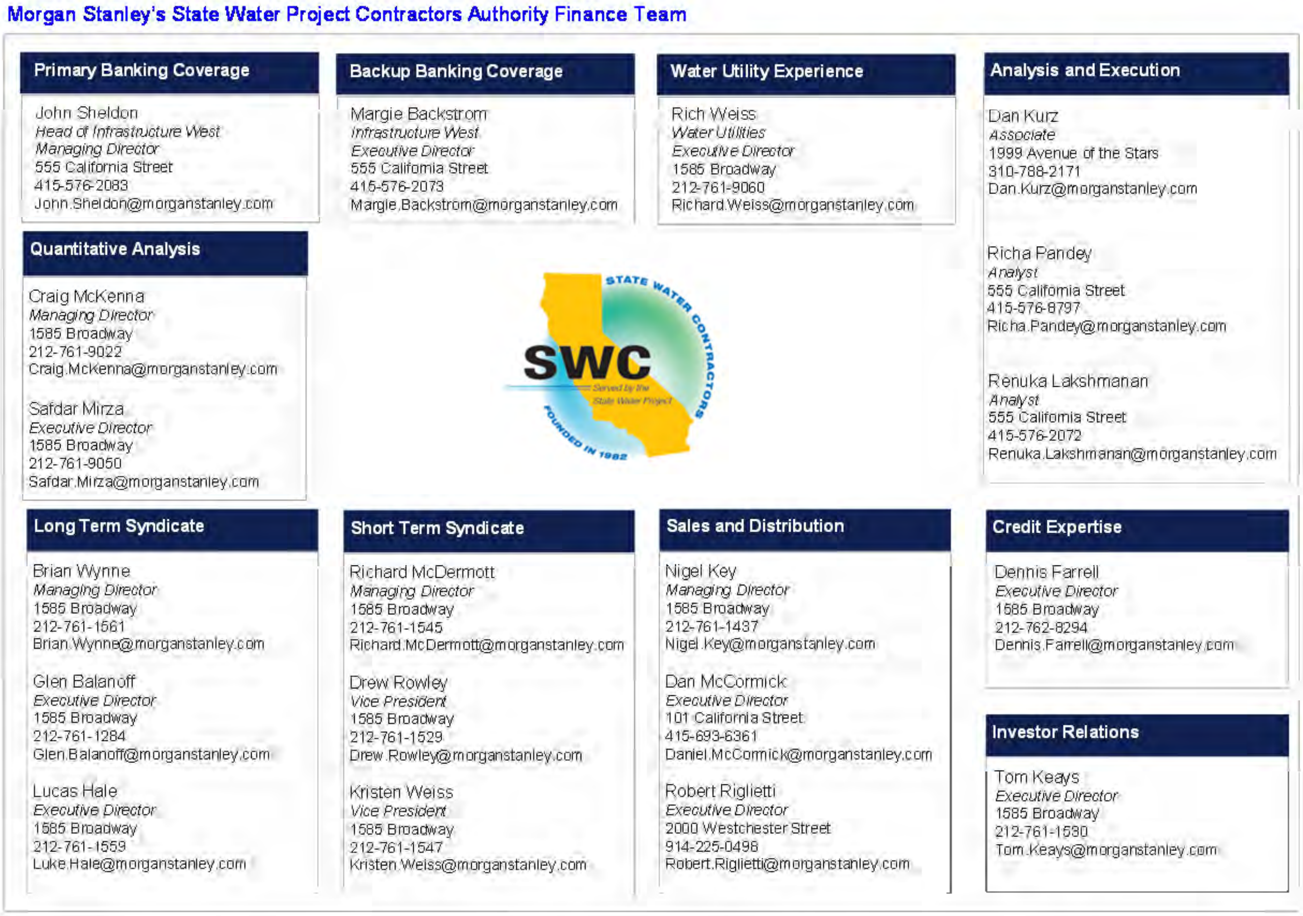
Tender Date	$/Bond
3	$2.00
4	$2.50
5	$2.50
7	$3.00

Proposed Underwriting Expenses

Assumes $250 Million in Par	$	$/Bond
Underwriters' Counsel(1)	$50,000	$0.200
Day Loan	6,944	0.028
Dalnet	16,821	0.067
Ipreo Order Monitor	1,089	0.004
Dalnet Wire Charges	131	0.001
DTC	800	0.003
CUSIP	908	0.004
Internet Roadshow	7,500	0.030
Travel	2,500	0.010
CDIAC	3,000	0.012
Total Expenses	**$89,693**	**$0.359**

(1) Estimated; to be billed at actual levels; assumes UC does not draft official statement

Exhibit A
Finance Team Resumes and Organizational Chart



Morgan Stanley's State Water Project Contractors Authority Finance Team

Primary Banking Coverage

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Primary Banking Coverage

John Sheldon, Managing Director and Head of Infrastructure West Group. John began his municipal finance career in 1989 and joined Morgan Stanley in 1997. In his 24 years in public finance, he has extensive experience serving as senior banker to issuers throughout California. His expertise covers water, wastewater and other utility revenue bonds, general obligation and revenue bonds, lease revenue securities and COPs, tax allocation bonds and assessment bonds. John has expertise with all types of variable rate and fixed rate debt, refundings and restructurings, swaps and escrow restructurings. Additionally, John has valuable experience and expertise with California utility issuers, serving as lead banker to many of the state's largest and most complex utilities, such as Metropolitan, DWR, Santa Clara Valley Water District, SMUD, SFPUC, EBMUD, City of San Diego Water Utility, Roseville Electric, City of Roseville Water System, South Placer Wastewater Authority, Irvine Ranch Water District, Contra Costa Water District, Livermore-Amador Valley Water Management Agency and Monterey County Water Resources Agency.

John also served as the senior manager for financings by new multi-obligor California water issuers, including inaugural financings by such issuers as South Placer Wastewater Authority, Monterey County Water Resources Authority, LAVWMA, and San Luis Obispo County Financing Authority. John received a MBA from the Wharton School at the University of Pennsylvania and a BA in mathematics from Occidental College.

Margie Backstrom, Executive Director. Margie joined Morgan Stanley's Public Finance department in 1994. She covers a variety of west coast municipal clients and her senior-managed transaction experience includes utility revenue financings for the California Department of Water Resources, Santa Clara Valley Water District, Marin County Municipal Water District, City of San Diego Water System, San Diego County Water Authority, and the City of Santa Barbara Water System, among others. In addition, Margie's transaction experience includes financings for the State of California, State of Alaska, Oregon Department of Transportation, County of Alameda, County of San Diego, and County of San Bernardino, among others. Margie received both an undergraduate degree in Economics and a Masters in Business Administration degree from Stanford University. Prior to her return to public finance in 2001 she ran the business development group for an Internet financial services company, structuring and negotiating deals with consumer products companies and financial institutions.

Water Utility Expertise

Richard Weiss, Executive Director and Water/Wastewater Specialist. Richard specializes in water and wastewater financings, leveraged and environmental revenue bond and project financings. His water and wastewater financing experience includes financings for issuers such as the cities of San Diego, Tampa, Norfolk, Indianapolis, El Paso, Aurora, Richmond, Corpus Christi, Baltimore, Chicago, Detroit and Philadelphia as well as the Livermore-Amador Valley Water Management Agency, the Northeast Ohio Regional Sewer District, Fairfax County Water Authority, Sarasota County, the San Antonio Water System, the Metropolitan Government of Nashville and Davidson County, the Puerto Rico Aqueduct and Sewer Authority, the Massachusetts Water Resources Authority and the New York City Municipal Water Finance Authority, among others. ***He has extensive experience working with issuers on the establishment of new water and wastewater credits*** and in restructuring or achieving rating upgrades for existing credits. Prior to joining Morgan Stanley's Public Finance Department in 1987, he worked for the City of Philadelphia Water Department as an environmental engineer involved in water and wastewater systems planning and research. Richard is a graduate of Princeton University, Drexel University's graduate environmental engineering program and the Wharton Graduate School of Business. He represents Morgan Stanley as Associate Member of the Council of Infrastructure Financing Authorities and is a member of the American Water Works Association and the Water Environment Federation.

Analysis and Execution

Daniel Kurz, Associate. Daniel joined Morgan Stanley in 2012 after completing his M.B.A. and Masters of Urban Planning at UCLA. At Morgan Stanley, Daniel provides investment banking coverage to many of the Firm's western region water and wastewater clients including the Metropolitan Water District of Southern California, San Diego County Water Authority, City of Ontario Water System, City of San Diego Water Utility, Clark County Public Utility District (Water and Power), South Placer Wastewater Authority, Los Angeles County Sanitation District, and other large issuers including the State of California. Prior to graduate school, Daniel worked for five years for a consulting firm in San Diego that provided economic valuation services to a diverse range of clients, including federal, state, and local governments.

Richa Pandey, Analyst. Richa provides analytical and execution support to infrastructure clients on the West Coast, including utility issuers such as DWR, SFPUC, Santa Clara Valley Water District, Monterey County Water Resources Agency, City of San Diego Water System, and the San Diego County Water Authority, among others. Richa joined Morgan Stanley's Public Finance Department in June 2011 after graduating from the University of California, Berkeley with a Bachelor of Arts in Economics.

Renuka Lakshmanan, Analyst. Renuka joined Morgan Stanley as a member of the Western Region Infrastructure Team in 2013, after having completed a summer analyst position with Morgan Stanley in 2012. In this capacity, she currently provides analytical and execution support to a variety of issuers across the country including SMUD, East Bay Municipal Utility District, Metropolitan Water District of Southern California, and TID, among others. Renuka is a graduate of the University of Rochester

Capital Markets

Craig McKenna, Managing Director. Craig is the Firm's lead quantitative banker with respect to complex financings, including new money and refunding issues. He has extensive experience with a wide range of financial solutions including tax-exempt and taxable cash bonds, derivative products, and reinvestment optimization. Craig has directly structured over $50 billion in senior managed transactions over the course of his career. He has worked with many different issuers covering almost every industry sector. Recent clients include Metropolitan Water District of Southern California, DWR, LADWP, West Basin Municipal Water District, Irvine Ranch Water District, Kentucky State Property and Buildings Commission, the Turnpike Authority of Kentucky, the Ohio Water Development Authority, the Michigan Department of Transportation, the Maryland Transportation Authority, the New York State Thruway Authority, the Pennsylvania Turnpike Commission, the Metropolitan Transportation Authority of New York, the Metropolitan Pier and Exposition Authority, the Ohio Building Authority, the Michigan State Building Authority, the Indiana State Office Building Commission, the Southern Minnesota Municipal Power Agency, the Battery Park City Authority and the New York State Urban Development Corporation. Craig is a graduate of Dartmouth College and has been with Morgan Stanley for 24 years and part of the public finance industry for 28 years.

Safdar Mirza, Executive Director. Safdar joined Morgan Stanley's Municipal Capital Markets Group in New York in 2002 after having worked in the Firm's San Francisco Public Finance office. Safdar is one the Public Finance Department's lead quantitative bankers with respect to complex financings such as leveraged financings, cash flow restructurings, multiple new money/refunding issues and financings involving derivative products. Prior to joining Morgan Stanley, Safdar worked at Public Financial Management, the nations' largest municipal financial advisory firm, where he served state, county and California city clients on a variety of financings. He has successfully completed financings for a wide array of clients, including LADWP, SCPPA, BWP, IID, West Basin Municipal Water District, and Irvine Ranch Water District, the cities of San Francisco, Oakland, San Diego, SFO and Sacramento Airports, University of California, among others. Safdar received his Bachelor of Arts from U.C. Berkeley in Economics.

Long-Term Syndicate

Brian Wynne, Managing Director and Head of Municipal Syndicate. Brian is responsible for underwriting a wide variety of issues for our municipal clients, as Manager of the Firm's Long-Term Municipal Syndicate. Brian has extensive experience with financings for California water and wastewater issuers such as Metropolitan Water District of Southern California, DWR, South Placer Wastewater Authority, City of San Diego, City of Roseville, Irvine Ranch Water District, and the SCVWD, among others. His national water and wastewater experience includes financings for issuers such as the cities of Tampa, Norfolk, Indianapolis, El Paso, Aurora, Richmond, Corpus Christi, Baltimore, Chicago, Detroit and Philadelphia as well as Fairfax County Water Authority, Sarasota County, the San Antonio Water System, Metropolitan Government of Nashville and Davidson County, Puerto Rico Aqueduct and Sewer Authority, Massachusetts Water Resources Authority and the New York City Municipal Water Finance Authority, among others. He has been an underwriter for Morgan Stanley since 1989, and has more than 25 years of syndicate, sales and trading experience. He also worked at Alex, Brown & Sons and Salomon Brothers. Brian received a BS from Fordham University.

Glen Balanoff, Executive Director. Glen joined Morgan Stanley in 2001 after more than 18 years of experience at another financial services firm in sales, trading, and underwriting, including experience in both the competitive and negotiated markets. Over his career, Glen has structured and priced new issues for all types of municipal issuers. Glen has also served as lead underwriter for numerous general obligation and revenue bond issuers such as public power, water and sewer, general aviation and port issuers, general transportation, housing revenue, health care, corporate, higher education bond issuers to name some specific industry sectors. Glen's recent California experience includes transactions for SCPPA, Santa Clara Valley Water District, the San Diego County Board of Education, the Sonoma County High School District, and the City of Livermore, among many others. Glen is a CPA and holds a B.S. from the University of Buffalo.

Luke Hale, Executive Director. Luke joined the Municipal Syndicate desk in 2010 after spending nearly eight years working in the Public Finance department. Most recently, Luke has underwritten bond offerings for California issuers such as DWR, Imperial Irrigation District, the City of Roseville, the City of Torrance, the City and County of San Francisco, and the County of Madera. Luke first joined Morgan Stanley's New York Public Finance department in 2000. Luke received has an undergraduate degree from Connecticut College.

Credit Expertise

Dennis Farrell, Executive Director and Head of Municipal Credit. Dennis will assist and advise the Authority on all credit-related issues. Dennis is former Head of Moody's Public Finance Group. In that capacity, Dennis managed 135 analysts and other professionals covering over 100,000 governments and not for profit issues throughout the U.S. and its territories. He was responsible for the development of the credit policies and procedures that are currently employed by Moody's analysts. In conjunction with establishing these standards, Dennis oversaw the development and use by Moody's analysts of Moody's Financial Ratio Analysis (MFRA) and Moody's Quantitative Ratings Estimator (Q-RATE), two integral tools used by the Moody's analysts in their credit assignments. Dennis received his B.S. from SUNY-Albany and M.B.A. from Baruch College.

Investor Relations

Tom Keays, Executive Director. As Morgan Stanley's Municipal Credit Research Manager, Tom works closely with the Firm's municipal sales and trading desks, as well as our public finance professionals. He provides our clients and salespeople with extensive credit analyses for both new and seasoned issues. Tom has been responsible for water and wastewater utility credit research at Morgan Stanley for 25 years and he has helped structure many of Morgan Stanley's largest and most complex financings. Tom joined Morgan Stanley in 1984 after seven years in the Municipal Research Group at Donaldson, Lufkin & Jenrette. He received his MBA from SUNY-Albany and a BA from Fordham University.

Short-Term Underwriting

J.R. McDermott, Managing Director and Head of Short-Term Syndicate. J.R. joined Morgan Stanley in 1997. He is responsible for pricing Morgan Stanley's portfolio of short-term variable rate tax-exempt securities and the distribution of short-term securities to institutional accounts, with a particular emphasis on sales to tax-exempt money market funds, corporations, bank trust departments and investment advisors. He is responsible for remarketing variable rate bonds for clients including Metropolitan District of Southern California, SFPUC, LADWP, Irvine Ranch Water District, the State of California, Port of Seattle, the State of New Jersey, the State of New York, among others. He has been in the public finance industry for 24 years.

Drew Rowley, Vice President. Drew joined Morgan Stanley's short-term trading group in August 2010. His primary responsibilities include pricing the Firm's $16 billion Variable Rate Demand Bond program. Drew has been in the municipal industry for four years and joined the Firm from another Wall Street investment bank. Drew received his B.A. from Lehigh University.

Kristen Weiss, Vice President. Kristen joined Morgan Stanley's municipal desk in March 2007 and serves in the Firm's tax-exempt short-term trading group where her responsibilities include repricing Morgan Stanley's short-term municipal portfolio, specifically commercial paper. Kristen is also responsible for coordinating institutional inquiries regarding short-term municipal products and marketing the Firm's $14 billion portfolio of CP. She received her B.A. from University of Massachusetts.

Sales and Distribution

Nigel Key, Managing Director and Municipal Product and Sales Manager. Nigel joined the Firm in 1995 and serves as the national institutional sales manager and director of credit research for the municipal finance syndicate desk. He is responsible for the coordination of new product development, marketing of portfolio strategy to clients and management of daily sales and trading inquiries. Prior to joining Morgan Stanley, Nigel worked at Bankers Trust from 1979-1983 and First Boston from 1983-1995. He has over 30 years of sales experience, and his clients include some of the largest municipal bond funds and insurers in the country. He earned a B.A. in Government at Dartmouth College.

Daniel McCormick, Executive Director. Dan is Head of Municipal Products for the Capital Markets division at Morgan Stanley Wealth Management. He is responsible for the development and distribution of Tax Exempt Fixed Income credit analysis and sales ideas. Dan and his team leverage Firm wide strategy and content to drive and deliver our highest conviction sales ideas to Financial Advisors and their clients as they create and maintain their investment portfolios. He joined Morgan Stanley in 2004 as a Financial Advisor and subsequently moved into Capital Markets Trading where he has worked in both the Purchase and San Francisco offices. Dan earned a B.S in Political Science from the University of Oregon.

Robert Riglietti, Executive Director. Rob is a member of the Wealth Management Municipal Products team and is responsible for collaborating with Municipal Trading, Sales, Credit, and Institutional Securities, to identify tactical and strategic investment opportunities within the municipal bond market. Through this process, Rob promotes the effective delivery of ideas and intellectual capital to Financial Advisors and their clients. He joined Morgan Stanley in 2001 as a Municipal Product Specialist and has worked as a Sales Manager, Trader, and most recently running Municipal Credit for Wealth Management Capital Markets. Prior to joining Morgan Stanley, Rob was a Municipal Broker's Broker at Tullett and Tokyo Securities and a Financial Advisor at Gabriel, Heuglin & Cashman (a division of Tucker Anthony). He attended Union College and earned a B.A. in Managerial Economics.

Exhibit B
Additional Case Studies

Santa Clara Valley Water District. Morgan Stanley has served as senior manager for SCVWD on three financings totaling over $310 million. In September 2007, Morgan Stanley senior managed SCVWD's $131 million of new money revenue certificates of participation. The transaction provided funds towards SCVWD's Capital Improvement Program over the next 2-3 years. Morgan Stanley developed a combined tax-exempt and taxable structure with $77.3 million in fixed-rate tax-exempt bonds and $53.8 million in floating-rate taxable bonds to fund California Water Service Company's share of the project. We led a comprehensive marketing plan, which resulted in $168 million in total orders ($48 million in retail orders) for the tax-exempt series and $54 million in total orders for the taxable series. Morgan Stanley also senior managed $78.8 million of certificates of participation in 2007, issued to refinance 2000 certificates. In addition, Morgan Stanley served as senior manager on SCVWD's $99.8 million water revenue refunding bonds in 2006.

South Placer Wastewater Authority. Morgan Stanley has a strong relationship with South Placer Wastewater Authority, having senior managed over $700 million in par since 2000. In November 2000, Morgan Stanley senior managed the Authority's inaugural $179.8 million Wastewater Revenue Bonds, Series 2000 A and B. South Placer Wastewater Authority is a JPA between the City of Roseville, South Placer Municipal Utility District and the County of Placer. Series A was structured as $109.775 million of fixed rate bonds while Series B was structured as $70 million of weekly-reset variable rate demand bonds**.** John Sheldon led the structuring efforts, with the transaction being structured with the primary repayment source being regional connection fees with a backup of service charges. A rate stabilization fund and the use of variable rate debt were used to help mitigate the risk associated with fluctuating connection fees and a unique loan agreement among participants offered partial cross-collateralization. As a new issuer, Morgan Stanley worked closely with SPWA's entire financing team to develop this complex structure and deliver superior results. The fact that SPWA has worked with Morgan Stanley on its inaugural sale and further sales (including 3 financings totaling over $400 million) is indicative of our excellent service and execution for our municipal clients.

Exhibit C
Water and Wastewater Experience

Morgan Stanley's National Water and Wastewater Financing Experience

California Financings Highlighted in Blue

Sale Date	Issuer Name	State	Issue Description	Par Amount ($MM)	Role of Morgan Stanley
03/12/14	Hartford Co Metropolitan Dt	CT	General Obligation BANs	90.459	SOLE
03/12/14	Hartford Co Metropolitan Dt	CT	General Obligation BANs	100.000	SOLE
02/25/14	Oklahoma Water Resources Bd	OK	Revolving Fund Rev Ref Bonds	55.560	CO-MGR
02/20/14	Rhode Island Clean Water Fin Agy	RI	Water PC Revolving Fund Bonds	55.925	CO-MGR
01/28/14	NYC Municipal Water Finance Auth	NY	Wtr Swr Sys 2nd Gen Res Rev Bonds	351.240	CO-MGR
01/21/14	Harris Co MUD #412	TX	Unlimited Tax Bonds	3.030	SOLE
01/15/14	Seekonk Water Dt	MA	General Obligation Water Bonds	1.900	CO-MGR
01/13/14	Northwest Harris Co MUD #19	TX	Unlimited Tax Bonds	4.420	CO-MGR
12/10/13	Danville City-Kentucky	KY	Water & Sewer Revenue BANs	13.600	LEAD
12/03/13	Texas	TX	Water Fin Assistance Ref Bonds	15.095	CO-MGR
12/03/13	Texas	TX	Water Fin Assistance Ref Bonds	20.000	CO-MGR
12/03/13	Texas	TX	Water Fin Assistance Ref Bonds	27.295	CO-MGR
12/03/13	Texas	TX	Water Fin Assistance Ref Bonds	73.465	CO-MGR
11/20/13	Jefferson Co-Alabama	AL	Sr & Sub Lien Sewer Rev Warrants	105.271	CO-MGR
11/20/13	Jefferson Co-Alabama	AL	Sr & Sub Lien Sewer Rev Warrants	474.295	CO-MGR
11/20/13	Jefferson Co-Alabama	AL	Sr & Sub Lien Sewer Rev Warrants	1,205.920	CO-MGR
11/20/13	Narragansett Bay Commission	RI	Wastewater System Revenue Bonds	34.970	CO-MGR
11/20/13	Oshkosh City-Wisconsin	WI	Water System Revenue Bonds	3.785	CO-MGR
11/20/13	Oshkosh City-Wisconsin	WI	Sewer System Revenue Bonds	4.175	CO-MGR
11/14/13	NYC Municipal Water Finance Auth	NY	Wtr & Swr Sys 2nd Gen Res Bonds	397.085	CO-MGR
11/13/13	Montgomery Co MUD #95	TX	Unlimited Tax Bonds	2.920	SOLE
11/12/13	Lakeside Wtr Ctl & Imp Dt #2-D	TX	Unlimited Tax Bonds	1.240	SOLE
11/06/13	Saginaw-Midland Muni Wtr Supp	MI	Water Supply System Revenue Bonds	4.100	CO-MGR
11/04/13	Fort Bend Co MUD #169	TX	Contract Revenue Bonds	11.310	LEAD
10/21/13	St Cloud City-Minnesota	MN	GO Sewer Revenue Bonds	5.140	LEAD
09/26/13	Johnson Co-Kansas	KS	Internal Improvement Bonds	40.685	CO-MGR
09/11/13	Trinity River Authority	TX	Reg Wstwtr Sys Rev & Ref Bonds	49.405	LEAD
09/10/13	Ontario Public Financing Auth	CA	Water Revenue Bonds	74.545	SOLE
08/28/13	Atlanta City-Georgia	GA	Water & Wastewater Rev Ref Bonds	200.140	CO-MGR
08/28/13	Connecticut	CT	General Obligation Bonds	33.000	CO-MGR
08/28/13	Ohio Water Development Authority	OH	Water PC Loan Fund Rev BANs	35.000	SOLE
08/28/13	Walsh Ranch MUD	TX	Unlimited Tax Bonds	1.675	SOLE
08/27/13	Lake Oswego City-Oregon	OR	Full Faith & Credit Obligations	75.290	SOLE
08/23/13	Dallas City-Texas	TX	Wtrwrks & Swr Sys Rev Ref Bonds	156.540	CO-MGR

Morgan Stanley's National Water and Wastewater Financing Experience

California Financings Highlighted in Blue

Sale Date	Issuer Name	State	Issue Description	Par Amount ($MM)	Role of Morgan Stanley
08/14/13	Philadelphia City-Pennsylvania	PA	Water & Wastewater Rev Bonds	170.000	LEAD
07/26/13	Jacksonville Electric Authority	FL	Water & Sewer System Rev Bonds	29.710	CO-MGR
07/26/13	Jacksonville Electric Authority	FL	Water & Sewer Sys & Sub Rev Bonds	173.925	CO-MGR
07/23/13	Sienna Plantation MUD #12	TX	Unlimited Tax Bonds	3.685	SOLE
07/19/13	Miami-Dade Co-Florida	FL	Water & Sewer Sys Rev & Ref Bonds	492.665	LEAD
07/18/13	Hamilton Co-Ohio	OH	Sewer Sys Revenue Refunding Bonds	79.935	CO-MGR
07/18/13	Hamilton Co-Ohio	OH	Sewer Sys Imp & Ref Rev Bonds	178.760	CO-MGR
07/17/13	Lee Co-Florida	FL	Wtr & Swr Rev & Rev Ref Bonds	93.195	CO-MGR
07/16/13	Harris Co MUD #410	TX	Unlimited Tax Bonds	2.550	SOLE
07/15/13	Paris City-Texas	TX	General Obligation Bonds	33.925	CO-MGR
07/11/13	Irving City-Texas	TX	Wtrwrks & Swr Sys Rev Imp Bonds	17.430	LEAD
07/10/13	NYS Environmental Facs Corp	NY	State Revolving Funds Rev Bonds	166.585	CO-MGR
06/27/13	Contra Costa Water Auth	CA	Water Revenue Refunding Bonds	91.670	LEAD
06/26/13	NYS Environmental Facs Corp	NY	Clean Wtr Drink Revolv Rev Bonds	401.090	CO-MGR
06/25/13	Mississippi Development Bank	MS	Special Obligation Bonds	89.990	LEAD
06/19/13	NYC Municipal Water Finance Auth	NY	Wtr Swr Sys 2nd Gen Res Rev Bonds	344.335	CO-MGR
06/19/13	Fort Bend Co MUD #185	TX	Unlimited Tax Bonds	4.490	SOLE
06/18/13	Arlington City-Texas	TX	Water & Wastewater Sys Rev Bonds	8.930	CO-MGR
06/18/13	Manchester Town-Connecticut	CT	Various Purp GO Temporary Notes	15.886	SOLE
06/13/13	Guadalupe-Blanco River (GBRA)	TX	Contract Revenue Refunding Bonds	6.830	LEAD
06/13/13	Guadalupe-Blanco River (GBRA)	TX	Contract Revenue Refunding Bonds	55.265	LEAD
06/06/13	Hernando Co-Florida	FL	Water and Sewer Ref Rev Bonds	36.160	CO-MGR
06/06/13	Los Angeles Co Sanit Dt Fin Auth	CA	Capital Projects Revenue Bonds	107.620	CO-MGR
05/30/13	Virginia Resources Auth (VRA)	VA	Clean Wtr St Revolving Rev Bonds	104.275	CO-MGR
05/21/13	Rhode Island Clean Water Fin Agy	RI	Wtr Poll Ctrl Revolv Fund Bonds	52.070	CO-MGR
05/08/13	Massachusetts Wtr Poll Abate Trust	MA	State Revolving Fund Bonds	16.645	SOLE
05/07/13	Garland City-Texas	TX	Wtr & Swr Sys Rev Ref & Imp Bonds	29.925	SOLE
04/25/13	Fort Bend Co MUD #5	TX	Unlimited Tax Bonds	1.645	SOLE
04/17/13	Tulare City-California	CA	Sewer Revenue Refunding Bonds	32.855	SOLE
04/11/13	Nashville-Davidson Co Metro Govt	TN	Water & Sewer Revenue Bonds	237.930	LEAD
04/09/13	Decatur City-Alabama	AL	Water Revenue Warrants	10.410	CO-MGR
04/09/13	Diablo Water Dt	CA	Water Revenue COPs	6.670	SOLE
04/03/13	Sheboygan City-Wisconsin	WI	Water Utility Revenue Bonds	3.000	LEAD
03/20/13	Sacramento City-California	CA	Water Revenue Bonds	215.195	CO-MGR
03/19/13	Rutherford Co Consol Utility Dt	TN	Waterworks Revenue Ref Bonds	33.140	CO-MGR
03/14/13	Paseo Del Este MUD #2	TX	Unlimited Tax Bonds	1.570	SOLE
03/13/13	NYC Municipal Water Finance Auth	NY	Wtr Swr Sys 2nd Gen Res Rev Bonds	543.300	CO-MGR

Morgan Stanley's National Water and Wastewater Financing Experience

California Financings Highlighted in Blue

Sale Date	Issuer Name	State	Issue Description	Par Amount ($MM)	Role of Morgan Stanley
03/06/13	Narragansett Bay Commission	RI	Wastewater System Revenue Bonds	71.480	CO-MGR
02/27/13	Massachusetts Water Resources Au	MA	General Revenue Refunding Bonds	170.635	CO-MGR
02/20/13	NYC Municipal Water Finance Auth	NY	Wtr Swr Sys 2nd Gen Res Rev Bonds	455.955	CO-MGR
02/15/13	Fairfax Co Water Authority	VA	Water Refunding Revenue Bonds	36.480	LEAD
02/15/13	Fairfax Co Water Authority	VA	Water Refunding Revenue Bonds	57.390	LEAD
02/15/13	Wisconsin	WI	Clean Water Revenue Ref Bonds	82.845	LEAD
02/13/13	San Diego Co Water Auth	CA	Water Revenue Refunding Bonds	299.105	CO-MGR
02/06/13	Connecticut	CT	Revolv Fund Gen Rev & Ref Bonds	162.170	CO-MGR
02/05/13	North Harris Co Regional Water Au	TX	Senior Lien Rev Refunding Bonds	106.320	CO-MGR
01/31/13	Bay Area Wtr Supply & Conserv Agcy	CA	Revenue Bonds	94.305	CO-MGR
01/31/13	Bay Area Wtr Supply & Conserv Agcy	CA	Revenue Bonds	241.475	CO-MGR
01/31/13	Tampa Bay Water Auth	FL	Utility System Revenue Bonds	75.295	CO-MGR
01/31/13	Monroe Twp-New Jersey	NJ	BANs	14.685	SOLE
01/09/13	Suffolk Co Water Authority	NY	BANs & Renewal BANs	100.000	LEAD
12/14/12	North Miami Beach-Florida	FL	Water Revenue Refunding Bonds	56.060	CO-MGR
12/12/12	Canadian River Muni Water Auth	TX	Sub Lien Contract Rev Ref Bonds	39.505	CO-MGR
12/05/12	NYC Municipal Water Finance Auth	NY	Wtr&Swr Sys 2nd Gen Res Rev Bonds	440.510	CO-MGR
11/27/12	Madison City-Wisconsin	WI	Water Utility Revenue Bonds	21.095	CO-MGR
11/27/12	Middletown City-Connecticut	CT	General Obligation BANs	13.050	SOLE
11/19/12	Davie Town-Florida	FL	Water & Sewer Revenue Bonds	28.190	CO-MGR
11/14/12	So California Metro Water Dt	CA	Water Revenue Refunding Bonds	111.890	LEAD
11/01/12	East Bay MUD	CA	Water Sys Rev Refunding Bonds	358.620	LEAD
10/24/12	Metropolitan St Louis Sewer Dt	MO	Wastewater Sys Ref Rev Bonds	141.730	CO-MGR
10/24/12	Philadelphia City-Pennsylvania	PA	Water & Wastewater Rev Ref Bonds	70.370	CO-MGR
10/17/12	NYS Environmental Facs Corp	NY	State Revolving Fund Rev Bonds	33.465	CO-MGR
10/17/12	NYS Environmental Facs Corp	NY	State Revolving Funds Rev Bonds	98.640	CO-MGR
10/17/12	Westchester Co-New York	NY	General Obligation Bonds	14.425	CO-MGR
09/19/12	California Dept of Wtr Resources	CA	Water System Revenue Bonds	49.525	LEAD
09/19/12	California Dept of Wtr Resources	CA	Water System Revenue Bonds	317.505	LEAD
09/11/12	Contra Costa Water Dt	CA	Extendale Municipal CP Notes	50.000	SOLE RA
09/06/12	West Palm Beach City-Florida	FL	Utility System Revenue Ref Bonds	43.040	CO-MGR
08/16/12	Mississippi Development Bank	MS	Special Obligation Bonds	19.180	CO-MGR
08/16/12	Mississippi Development Bank	MS	Special Obligation Bonds	63.045	CO-MGR
08/09/12	Indiana Finance Authority	IN	1st Lien Wstwtr Utility Rev Bonds	192.125	LEAD
08/09/12	Lee Co-Florida	FL	Water & Sewer Refunding Rev Bonds	27.480	SOLE
08/07/12	Franklin Town-Massachusetts	MA	General Obligation BANs	27.000	SOLE

Morgan Stanley's National Water and Wastewater Financing Experience

California Financings Highlighted in Blue

Sale Date	Issuer Name	State	Issue Description	Par Amount ($MM)	Role of Morgan Stanley
07/25/12	Los Angeles Dept of Wtr & Power	CA	Water System Revenue Bonds	322.000	CO-MGR
07/18/12	Jacksonville Electric Authority	FL	Water & Sewer Sys Sub & Rev Bonds	178.365	CO-MGR
07/18/12	San Francisco Public Util Comm	CA	Wastewater CP Notes	25.000	CO-MGR
07/18/12	Oakland Co-Michigan	MI	Water Supply System Bonds	6.800	LEAD
07/10/12	Las Vegas Valley Water Dt	NV	GO Water Refunding Bonds	39.310	CO-MGR
07/10/12	Las Vegas Valley Water Dt	NV	General Obligation Water Bonds	360.000	CO-MGR
07/10/12	Raynham Town-Massachusetts	MA	General Obligation Bonds	11.215	CO-MGR
06/27/12	So California Metro Water Dt	CA	Water Revenue Refunding Bonds	89.460	CO-MGR
06/26/12	NYS Environmental Facs Corp	NY	St Clean & Drink Wtr Rev Bonds	316.790	CO-MGR
06/20/12	Detroit City-Michigan	MI	Swg Disposal Sys & Sr Lien Bonds	659.780	CO-MGR
06/20/12	NYC Municipal Water Finance Auth	NY	Wtr & Swr 2nd Gen Res Rev Bonds	661.745	CO-MGR
06/20/12	So California Metro Water Dt	CA	Water Revenue Refunding Bonds	190.600	CO-MGR
06/20/12	York Co-South Carolina	SC	Water & Sewer Sys Ref Rev Bonds	12.240	CO-MGR
06/12/12	Upper Blackstone Wtr Pollution Dt	MA	General Obligation Bonds	4.000	CO-MGR
06/07/12	Cincinnati City-Ohio	OH	Water System Revenue Bonds	60.000	CO-MGR
05/31/12	Massachusetts Wtr Poll Abate Trust	MA	State Revolving Fund & Ref Bonds	254.540	CO-MGR
05/23/12	NYS Environmental Facs Corp	NY	State Revolving Funds Rev Bonds	14.440	CO-MGR
05/23/12	NYS Environmental Facs Corp	NY	State Revolving Funds Rev Bonds	88.950	CO-MGR
05/18/12	North Hudson Sewerage Authority	NJ	Gross Rev Senior Lien Lease Certs	163.410	LEAD
05/17/12	North Hudson Sewerage Authority	NJ	Gross Rev Senior Lien Lease Certs	150.555	LEAD
05/16/12	NYS Environmental Facs Corp	NY	St Clean & Drink Wtr Rev Bonds	496.145	LEAD
05/10/12	Chicago City-Illinois	IL	2nd Lien Water Revenue Bonds	399.445	CO-MGR
04/25/12	Connecticut	CT	General Obligation Bonds	60.000	CO-MGR
04/25/12	So Central Conn Reg Water Au	CT	Water System Revenue Ref Bonds	69.125	SOLE
04/03/12	San Diego Public Facs Fin Auth	CA	Subordinated Water Rev Ref Bonds	188.610	LEAD
03/27/12	Kentucky Infrastructure Auth	KY	Wstwtr & Drinking Wtr Revolv Fund	111.345	LEAD
03/22/12	Massachusetts Water Resources Au	MA	General Revenue & Ref Bonds	236.775	CO-MGR
03/22/12	Norfolk City-Virginia	VA	Water Revenue Refunding Bonds	176.925	LEAD
03/21/12	District of Columbia Wtr & Swr Au	DC	Public Utility Sub Lien Rev Bonds	52.690	CO-MGR
03/21/12	West Basin Municipal Water Dt	CA	Refunding Revenue Bonds	50.325	CO-MGR
03/21/12	District of Columbia Wtr & Swr Au	DC	Public Utility Sub Lien Rev Bonds	47.310	LEAD
03/20/12	Texas Water Development Board	TX	GO Wtr Financial Assistance Bonds	149.645	LEAD
03/14/12	District of Columbia Wtr & Swr Au	DC	Public Utility Rev & Ref Bonds	340.645	CO-MGR
03/13/12	Yarmouth Water Dt	ME	Revenue Bonds	2.255	CO-MGR
03/09/12	Broward Co-Florida	FL	Wtr & Swr Utility Rev Ref Bonds	47.655	CO-MGR
03/09/12	Broward Co-Florida	FL	Wtr & Swr Utility Rev & Ref Bonds	251.545	CO-MGR
03/07/12	NYC Municipal Water Finance Auth	NY	Wtr&Swr Sys 2nd Gen Res Rev Bonds	522.505	CO-MGR

Morgan Stanley's National Water and Wastewater Financing Experience

California Financings Highlighted in Blue

Sale Date	Issuer Name	State	Issue Description	Par Amount ($MM)	Role of Morgan Stanley
02/28/12	California Dept of Wtr Resources	CA	Central Valley Proj Water Sys Rev	36.370	CO-MGR
02/28/12	California Dept of Wtr Resources	CA	Central Valley Proj Water Sys Rev	105.875	CO-MGR
02/28/12	California Dept of Wtr Resources	CA	Central Valley Proj Water Sys Rev	183.960	CO-MGR
02/21/12	Sugar Land City-Texas	TX	Waterworks & Sewer Sys Rev Bonds	21.925	LEAD
02/15/12	Puerto Rico Aqueduct & Sewer Au	PR	Revenue Bonds	1,800.450	CO-MGR
02/15/12	Arizona Wtr Infrastruc Fin Auth	AZ	Water Quality Revenue Ref Bonds	47.600	LEAD
02/15/12	Arizona Wtr Infrastruc Fin Auth	AZ	Water Quality Revenue Ref Bonds	164.610	LEAD
02/10/12	San Francisco Public Util Comm	CA	Wastewater Commercial Paper Notes	150.000	CO-MGR
01/26/12	Jacksonville Electric Authority	FL	Water & Sewer Sys Rev & Sub Bonds	354.875	CO-MGR
01/24/12	NYC Municipal Water Finance Auth	NY	Wtr & Swr 2nd Gen Res Rev Bonds	400.000	CO-MGR
01/19/12	Nashville-Davidson Co Metro Govt	TN	Sub Lien Wtr & Swr Rev Ref Bonds	129.625	LEAD
01/10/12	Nashua City-New Hampshire	NH	General Obligation Bonds	150.570	CO-MGR
12/20/11	Detroit City-Michigan	MI	Water Supply Sys Sr Ln Rev Bonds	17.195	CO-MGR
12/20/11	Detroit City-Michigan	MI	Water Supply Sys Sn Ln Rev Bonds	483.480	CO-MGR
12/13/11	Ohio Water Development Authority	OH	Wtr Poll Ctrl Loan Fund Ref Rev	76.860	CO-MGR
12/13/11	Ohio Water Development Authority	OH	Wtr Poll Ctrl Loan Fund Ref Rev	65.575	LEAD
12/06/11	Haverhill City-Massachusetts	MA	GO Water Bonds	1.491	CO-MGR
12/01/11	Canadian River Muni Water Auth	TX	Subordinate Lien Contract Rev	81.630	CO-MGR
11/16/11	NYC Municipal Water Finance Auth	NY	Wtr Swr Sys 2nd Gen Res Rev Bonds	450.000	CO-MGR
11/09/11	Jordan Valley Water Conserv Dt	UT	Water Revenue Bonds	50.000	CO-MGR
11/09/11	Massachusetts Water Resources Au	MA	General Revenue Ref Bonds	327.160	CO-MGR
11/09/11	Cape Coral City-Florida	FL	Water & Sewer Refunding Rev Bonds	106.560	LEAD
11/04/11	Kansas City-Missouri	MO	Sanitary Swr Imp & Ref Rev Bonds	89.175	LEAD
11/03/11	Harris-Montgomery Cos MUD #386	TX	Unlimited Tax Bonds	20.400	SOLE
11/01/11	Phoenix City Civic Imp Corp	AZ	Junior Lien Wtr Sys Rev Ref Bonds	167.510	LEAD
10/27/11	Richland Co-South Carolina	SC	Sewer System GO Ref Bonds	19.300	LEAD
10/25/11	Oshkosh City-Wisconsin	WI	Water Revenue Bonds	6.510	LEAD
10/25/11	Oshkosh City-Wisconsin	WI	Sewer Revenue Bonds	8.290	LEAD
10/06/11	California Dept of Wtr Resources	CA	Water System Revenue Bond	216.930	LEAD
10/04/11	Hampton Roads Sanitation Dt	VA	Wastewater Revenue Bonds	45.705	LEAD
09/28/11	Davie Town-Florida	FL	Water & Sewer Revenue Bonds	49.930	CO-MGR
09/27/11	Novato Sanitary Dt	CA	Wastewater Revenue COPs	22.000	LEAD
09/14/11	Texas	TX	GO Water Financial Assist Bonds	92.255	CO-MGR
09/08/11	Cape Coral City-Florida	FL	Water & Sewer Ref Revenue Bonds	175.000	LEAD
08/31/11	Tampa City-Florida	FL	Wtr & Swr Sys Imp & Ref Rev Bonds	121.050	CO-MGR
08/30/11	West Basin Municipal Water Dt	CA	Refunding Revenue Bonds	34.190	LEAD
08/17/11	Indiana Finance Authority	IN	Second Lien Wtr Utility Rev Bonds	42.905	LEAD

Morgan Stanley's National Water and Wastewater Financing Experience

California Financings Highlighted in Blue

Sale Date	Issuer Name	State	Issue Description	Par Amount ($MM)	Role of Morgan Stanley
08/17/11	Indiana Finance Authority	IN	Second Lien Wstwtr Util Rev Bonds	314.005	LEAD
08/17/11	Indiana Finance Authority	IN	First Lien Wstwtr Util Rev Bonds	678.480	LEAD
07/27/11	Cincinnati City-Ohio	OH	Water System Rev & Ref Bonds	84.310	LEAD
07/19/11	Tampa Bay Water Auth	FL	Utility System Ref Rev Bonds	140.645	CO-MGR
07/19/11	Tampa Bay Water Auth	FL	Utility System Ref Rev Bonds	148.920	CO-MGR
07/13/11	So Central Conn Reg Water Au	CT	Water System Revenue Bonds	39.455	LEAD
07/12/11	San Diego Co Water Auth	CA	Sub Lien Water Revenue Ref Bonds	86.630	LEAD
07/07/11	Dallas City-Texas	TX	Wtrwks & Swr Sys Rev Ref Bonds	239.425	CO-MGR
07/07/11	Imperial Irrigation Dt	CA	Water System Refunding Rev Bonds	12.925	SOLE
06/16/11	NYC Municipal Water Finance Auth	NY	Water & Sewer Sys Revenue Bonds	662.245	CO-MGR
06/15/11	NYS Environmental Facs Corp	NY	St Revolving Funds Rev Bonds	191.735	CO-MGR
06/08/11	Baltimore Mayor & City Council	MD	Project Revenue Bonds	53.060	CO-MGR
06/08/11	Baltimore Mayor & City Council	MD	Project Revenue Bonds	103.865	CO-MGR
06/08/11	So California Metro Water Dt	CA	Water Revenue Refunding Bonds	167.855	LEAD
06/02/11	NYS Environmental Facs Corp	NY	St Clean & Drink Wtr Revolv Bonds	520.675	LEAD
06/01/11	So California Metro Water Dt	CA	Water Revenue Refunding Bonds	114.440	SOLE RA
05/24/11	Harris Co MUD #183	TX	Unlimited Tax Bonds	2.360	CO-MGR
05/24/11	Clark Co Public Utility Dt #1	WA	Water System Rev Ref Bonds	7.900	LEAD
05/18/11	Indianapolis Loc Pub Imp Bond Bk	IN	Bond Bank Bonds	58.790	LEAD
05/18/11	Soquel Creek Water Dt	CA	Certificates of Participation	16.800	LEAD
05/18/11	Ottawa Co-Michigan	MI	GO Water Supply Bonds	4.800	SOLE
05/11/11	Massachusetts Water Resources Au	MA	General Revenue Bonds	150.000	CO-MGR
05/05/11	Cinco Southwest MUD #1	TX	Contract Revenue Road Bonds	9.650	LEAD
04/14/11	Irvine Ranch Water Dt	CA	Refunding Bonds	40.370	SOLE RA
04/13/11	Bloomfield Charter Twp-Michigan	MI	GO Limited Tax Bonds	3.000	SOLE
04/06/11	South Placer Wastewater Authority	CA	Wastewater Rev Refunding Bonds	30.000	SOLE
04/06/11	South Placer Wastewater Authority	CA	Wastewater Revenue Ref Bonds	60.325	SOLE RA
04/01/11	South Placer Wastewater Authority	CA	Wastewater Rev Refunding Bonds	67.040	SOLE
03/30/11	Lee Co-Florida	FL	Water & Sewer Ref Revenue Bonds	74.855	CO-MGR
03/24/11	NYC Municipal Water Finance Auth	NY	Wtr & Swr Sys Revenue Bonds	541.810	CO-MGR
03/16/11	Connecticut	CT	State Revolv Fund Gen Rev Bonds	182.935	CO-MGR
03/16/11	Guadalupe-Blanco River (GBRA)	TX	Gen Imp & Refunding Rev Bonds	10.745	CO-MGR
03/10/11	West Park MUD	TX	Unlimited Tax Bonds	7.780	LEAD
03/01/11	Brazoria Co MUD #26	TX	Unlimited Tax Bonds	3.225	CO-MGR
02/24/11	Fort Bend Co MUD #25	TX	Unlimited Tax Bonds	5.920	CO-MGR

Morgan Stanley's National Water and Wastewater Financing Experience

California Financings Highlighted in Blue

Sale Date	Issuer Name	State	Issue Description	Par Amount ($MM)	Role of Morgan Stanley
02/23/11	Houston City-Texas	TX	First Lien Rev Refunding Bonds	273.275	CO-MGR
02/15/11	NYS Environmental Facs Corp	NY	State Revolving Funds Rev Bonds	132.745	CO-MGR
01/19/11	NYC Municipal Water Finance Auth	NY	Water and Sewer Sys Rev Bonds	450.000	CO-MGR
12/16/10	So California Metro Water Dt	CA	Water Revenue Bonds	250.000	LEAD
12/09/10	Nashville-Davidson Co Metro Govt	TN	Water & Sewer Refunding Bonds	7.610	LEAD
12/09/10	Nashville-Davidson Co Metro Govt	TN	Water & Sewer Revenue Bonds	75.000	LEAD
12/09/10	Nashville-Davidson Co Metro Govt	TN	Water and Sewer Rev Ref Bonds	104.050	LEAD
12/09/10	Nashville-Davidson Co Metro Govt	TN	Water & Sewer Revenue Bonds	135.000	LEAD
12/01/10	Kansas Development Fin Auth	KS	Revolving Funds Revenue Bonds	8.390	CO-MGR
12/01/10	Kansas Development Fin Auth	KS	Revolving Funds Revenue Bonds	60.520	CO-MGR
12/01/10	Kansas Development Fin Auth	KS	Revolving Funds Revenue Bonds	145.040	CO-MGR
11/30/10	Los Angeles Dept of Wtr & Power	CA	Water System Revenue Bonds	492.710	CO-MGR
11/15/10	Harris-Montgomery Cos MUD #386	TX	Unlimited Tax Bonds	29.775	CO-MGR
11/10/10	NYC Municipal Water Finance Auth	NY	Wtr & Swr 2nd Gen Res Rev Bonds	750.000	CO-MGR
11/08/10	Gettysburg Municipal Authority	PA	Guaranteed Sewer Revenue Bonds	6.355	SOLE
11/02/10	Travis Co MUD #4	TX	Unlimited Contract Tax Bonds	5.435	CO-MGR
10/21/10	Jacksonville Electric Authority	FL	Water & Sewer System Rev Bonds	3.480	CO-MGR
10/21/10	Jacksonville Electric Authority	FL	Water and Sewer Sys Rev Bonds	45.520	CO-MGR
10/21/10	Woodcreek MUD	TX	Wtrwrks & Swr Sys Tax & Rev Bonds	4.675	CO-MGR
10/21/10	Jacksonville Electric Authority	FL	Water & Sewer Sys Sub & Rev Bonds	73.760	LEAD
10/20/10	District of Columbia Wtr & Swr Au	DC	Public Utility Sub Lien Rev Bonds	300.000	CO-MGR
10/20/10	Fort Bend Co MUD #151	TX	Unlimited Tax Bonds	4.405	CO-MGR
10/05/10	Connecticut	CT	General Obligation Bonds	59.095	LEAD
09/30/10	Imperial Irrigation Dt	CA	Water System Refunding Rev Bonds	24.990	LEAD
09/29/10	Coweta Co Water & Sewerage Auth	GA	Revenue Bonds	40.245	CO-MGR
09/23/10	New Jersey Economic Dev Auth	NJ	Water Facilities Ref Rev Bonds	75.000	LEAD
09/22/10	NYC Municipal Water Finance Auth	NY	Wtr & Swr 2nd Gen Res Rev Bonds	210.040	CO-MGR
09/16/10	Harris Co MUD #81	TX	Unlimited Tax Bonds	5.240	CO-MGR
09/16/10	NYC Municipal Water Finance Auth	NY	Wtr & Swr 2nd Gen Res Rev Bonds	750.000	CO-MGR
09/02/10	Sunrise City-Florida	FL	Utility Sys Rev & Rev Ref Bonds	24.700	LEAD
08/31/10	Spring Meadows MUD	TX	Unlimited Tax Bonds	4.430	CO-MGR
08/25/10	NYS Environmental Facs Corp	NY	Water Facilities Revenue Bonds	35.000	LEAD
08/25/10	Cinco MUD #1	TX	Contract Revenue Refunding Bonds	5.285	SOLE
08/12/10	Ohio Water Development Authority	OH	Water PC Loan Fund Rev Bonds	30.035	LEAD
08/12/10	Ohio Water Development Authority	OH	Water PC Loan Fund Rev Bonds	429.125	LEAD
07/30/10	Davie Town-Florida	FL	Water and Sewer Revenue Bonds	46.245	CO-MGR
07/21/10	Fort Bend Co MUD #151	TX	Unlimited Tax Bonds	6.540	CO-MGR

Morgan Stanley's National Water and Wastewater Financing Experience

California Financings Highlighted in Blue

Sale Date	Issuer Name	State	Issue Description	Par Amount ($MM)	Role of Morgan Stanley
07/21/10	Jacksonville Electric Authority	FL	Water & Sewer Sys & Sub Rev Bonds	220.860	CO-MGR
07/15/10	Harris Co MUD #290	TX	Unlimited Tax Bonds	3.320	CO-MGR
07/14/10	So California Metro Water Dt	CA	Water Revenue Refunding Bonds	88.845	CO-MGR
07/13/10	Arizona Wtr Infrastruc Fin Auth	AZ	Water Quality Rev & Ref Bonds	180.990	LEAD
07/07/10	Travis Co MUD #2	TX	Unlimited Tax Bonds	2.000	CO-MGR
06/29/10	Massachusetts Wtr Poll Abate Trust	MA	State Revolving Fund & Ref Bonds	233.915	CO-MGR
06/29/10	Massachusetts Wtr Poll Abate Trust	MA	State Revolving Fund Bonds	252.595	CO-MGR
06/29/10	New Jersey Economic Dev Auth	NJ	Water Facilities Ref Rev Bonds	15.300	LEAD
06/29/10	New Jersey Economic Dev Auth	NJ	Water Facilities Ref Rev Bonds	134.700	LEAD
06/22/10	NYC Municipal Water Finance Auth	NY	Wtr&Swr Gen Resolution Rev Bonds	554.045	CO-MGR
06/16/10	Dallas City-Texas	TX	Wtrwrks & Swr Sys Rev Ref Bonds	295.850	CO-MGR
06/16/10	Franklin Twp-New Jersey	NJ	General Imp & Water Utility Bonds	14.990	CO-MGR
06/16/10	San Diego Public Facs Fin Auth	CA	Water Revenue Refunding Bonds	123.075	LEAD
06/15/10	Trenton City-New Jersey	NJ	Gen Imp & Wtr & Swr & Pkg Util	58.813	SOLE
05/28/10	NYS Environmental Facs Corp	NY	State Revolving Funds Rev Bonds	140.850	CO-MGR
05/11/10	Indian Wells Redev Agency	CA	Consol Whitewater Tax Allocation	10.890	CO-MGR
04/28/10	Massachusetts Water Resources Au	MA	General Revenue & Rev Ref Bonds	283.570	CO-MGR
04/22/10	Fort Bend Co MUD # 142	TX	Unlimited Tax Bonds	6.745	LEAD
04/21/10	Texas	TX	GO Water Financial Assist Bonds	185.505	CO-MGR
04/21/10	Rhode Island Clean Water Fin Agy	RI	Water PC Subord Ref Rev Bonds	77.140	LEAD
04/20/10	Harris Co MUD #281	TX	Unlimited Tax Bonds	2.510	CO-MGR
04/09/10	Philadelphia City-Pennsylvania	PA	Water & Wstwtr Rev Ref Bonds	396.460	LEAD
03/26/10	Virginia Resources Auth (VRA)	VA	Clean Wtr St Revolv Rev Ref Bonds	94.410	LEAD
03/23/10	Kentucky Infrastructure Auth	KY	Wstwtr & Drink Wtr Revolv Fund	208.430	LEAD
03/18/10	So Central Conn Reg Water Au	CT	Water System Revenue Bonds	11.455	LEAD
03/18/10	So Central Conn Reg Water Au	CT	Water System Revenue Bonds	31.385	LEAD
03/17/10	NYC Municipal Water Finance Auth	NY	Wtr & Swr 2nd Gen Res Rev Bonds	359.110	CO-MGR
03/09/10	NYC Municipal Water Finance Auth	NY	Wtr & Swr Sys Gen Res Rev Bonds	500.000	CO-MGR
03/02/10	Harris Co Water Ctl Imp Dt #96	TX	Unlimited Tax Park Bonds	5.315	LEAD
02/16/10	Pecan Grove MUD	TX	Unlimited Tax Bonds	32.000	LEAD
02/11/10	East Bay MUD	CA	Water System Sub Revenue Bonds	400.000	LEAD
02/10/10	San Antonio City-Texas	TX	Water Sys Jr Lien Rev Ref Bonds	59.145	LEAD
02/03/10	NYS Environmental Facs Corp	NY	St Clean & Drinking Wtr Rev Bonds	132.660	CO-MGR
02/03/10	NYS Environmental Facs Corp	NY	St Clean & Drinking Wtr Rev Bonds	196.460	CO-MGR
02/02/10	Wisconsin	WI	Clean Water Revenue Bonds	49.690	LEAD
02/02/10	Wisconsin	WI	Clean Water Rev & Rev Ref Bonds	81.485	LEAD
01/26/10	NYC Municipal Water Finance Auth	NY	Water & Sewer System Rev Bonds	400.000	CO-MGR

Morgan Stanley's National Water and Wastewater Financing Experience

California Financings Highlighted in Blue

Sale Date	Issuer Name	State	Issue Description	Par Amount ($MM)	Role of Morgan Stanley
01/14/10	Jacksonville Electric Authority	FL	Water and Sewer System Rev Bonds	24.220	CO-MGR
01/14/10	Jacksonville Electric Authority	FL	Water and Sewer System Rev Bonds	45.780	CO-MGR
01/14/10	Jacksonville Electric Authority	FL	Water and Sewer System Rev Bonds	83.115	CO-MGR
01/14/10	NW Harris Co MUD #32	TX	Unlimited Tax Bonds	4.020	CO-MGR
01/14/10	Atwater Public Finance Authority	CA	Wastewater Revenue Bonds	54.345	LEAD
01/12/10	Ohio Water Development Authority	OH	Water PC Loan Fund Rev Bonds	366.290	LEAD
01/12/10	Tulsa Metro Utility Auth	OK	Utility Revenue Bonds	14.510	LEAD
Total Senior Managed California Experience				***$3,003.805***	
Total California Experience				***$5,707.540***	
Total Senior Managed National Experience				***$12,188.508***	
Total National Experience				***$41,312.920***	

Exhibit D
SCVWD Proforma Debt Service Coverage

SCVWD - Proforma Debt Service Coverage(1)

($ in thousands)

		Proportionate Share of SWPCA Debt(3)		
	FY 2012-13(2)	O&M	Senior Lien	Subordinate Lien
Total Revenues	$171,066	$171,066	$171,066	$171,066
O&M				
Operating Expenses	(111,120)	(111,120)	(111,120)	(111,120)
Proportionate Share of SWPCA Costs	N/A	(1,744)	N/A	N/A
Total O&M	(111,120)	(112,864)	(111,120)	(111,120)
Net Water Utility System Revenues	**$59,946**	**$58,202**	**$59,946**	**$59,946**
Parity Debt Service	($14,569)	($14,569)	($14,569)	($14,569)
Proportionate Share of SWPCA Costs	N/A	N/A	(1,744)	N/A
Total Debt Service	(14,569)	(14,569)	(16,313)	(14,569)
Coverage - Parity Lien	*4.11x*	*3.99x*	*3.67x*	*4.11x*
Change from Currently Projected		-0.12x	-0.44x	0.00x
Subordinate Lien	$0	$0	$0	$0
Proportionate Share of SWPCA Costs	N/A	N/A	N/A	(1,744)
Total Debt Service	$0	$0	$0	(1,744)
Coverage - All Obligations	*4.11x*	*3.99x*	*3.67x*	*3.67x*
Change from Currently Projected		-0.12x	-0.44x	-0.44x

(1) Assumes that SCVWD elects to pledge Net Water Utility System Revenues to secure the SWPCA financing

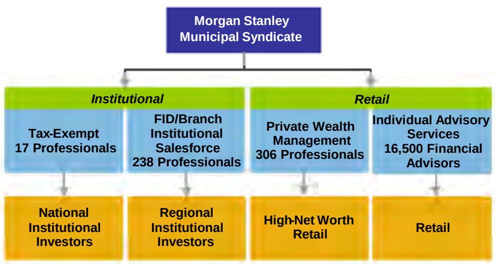
(2) Projections not available; Per SCVWD's Continuing Disclosure Annual Report for FY 2013

(3) Estimated at 5% of total debt service based on SVCWD's share of Maximum Annual SWP Table A Water Delivery Amounts

Exhibit E
Morgan Stanley's Distribution System

Distribution System. Morgan Stanley is one of only a few firms in the municipal industry that offers the Authority a complete distribution system, including a dedicated institutional municipal sales force, middle markets and high-net-worth coverage, and the largest retail distribution system in the country.

Morgan Stanley's Municipal Securities Distribution Network


Morgan Stanley Municipal Syndicate
Institutional
Retail
Tax-Exempt 17 Professionals
FID/Branch Institutional Salesforce 238 Professionals
Private Wealth Management 306 Professionals
Individual Advisory Services 16,500 Financial Advisors
National Institutional Investors
Regional Institutional Investors
High-Net Worth Retail
Retail

Institutional Investor Coverage. Morgan Stanley is widely recognized as a premier institutional firm because of our long-standing and extensive relationships with institutional investors and our active participation in the secondary market for municipal bonds. Our firm has a team of 17 institutional salespeople with an average of over 20 years of experience in the industry who are dedicated to the coverage of the 150 largest institutions that regularly buy municipal securities. The Firm also maintains a 238-person institutional sales force in 35 of our brokerage offices nationwide. These individuals cover a second tier of institutional investors that include regional banks, investment advisors, and corporations throughout the country, including in California.

Participation in the Secondary Market. The Firm's trading activities play an important role in the Firm's ability to achieve the lowest possible borrowing cost for our municipal issuing clients. The Firm understands that active secondary market support fosters investor participation in the primary market. ***The depth of this secondary market trading provides Morgan Stanley with insights into which institutions are large holders of similar California utility-related bonds generally and how their positions are changing over time.*** Investors active in the secondary market have proven to be important investors in revenue-secured offerings, and Morgan Stanley provides assurance to investors of its willingness to provide liquidity in the secondary market. ***This is especially important for new credits.***

High-Net-Worth Retail. The Firm's Private Wealth Management Group ("PWM") caters to high-net-worth individuals across the globe, further enhancing our sales and marketing efforts. The individuals covered by PWM purchase securities directly rather than through intermediaries (e.g. bond funds) and these individuals represent an important class of investors in municipal obligations. PWM has 306 professionals in select cities globally, including San Francisco, Menlo Park, and Los Angeles who actively market municipal securities to their clients.

State of California Retail Coverage. Morgan Stanley, through Morgan Stanley Wealth Management ("MSWM"), maintains the largest brokerage network in the nation. MSWM has over 16,500 financial advisors who cover 5.6 million individual accounts with assets totaling more than $1.5 trillion and municipal assets totaling $161.6 billion. In California, MSWM's 2,302 Financial Advisors in 79 offices across the State manage 936,303 million client accounts with $269.6 billion of assets under management, including $30 billion of directly held municipal assets**.** Morgan Stanley is committed to having an industry-leading brokerage presence throughout California and in the service area of SWPCA's contractors. Morgan Stanley will leverage its superior retail sales network to ensure successful distribution of the Authority's bonds.

Significant National and California Retail Presence

	National	California	Bay Area	LA Area
Number of Offices	604	79	20	33
Number of FAs	16,500	2,302	777	980
Accounts	5,611,713	936,303	408,811	325,176
Assets	$1.54 TR	$269.58 BN	$110.18 BN	$100.16 BN
Directly Held Municipals	$161.62 BN	$30.29 BN	$10.47 BN	$14.44 BN
Municipals as % of Total	10.5%	11.2%	9.5%	14.4%

Exhibit F
MSRB G-17 Disclosure Letter

March 19, 2014

State Water Project Contractors Authority
1121 L Street, Suite 1050
Sacramento, CA 95814
Attn: Mary Lou Cotton

Re: Disclosures by Morgan Stanley Pursuant to MSRB Rule G-17
Related to the Proposed Issuance of Bonds

Dear Ms. Cotton,

We are writing to provide you, as the State Water Project Contractors Authority (the "Authority") General Manager, with certain disclosures relating to the captioned bond issues (the "Bonds"), as required by the Municipal Securities Rulemaking Board (MSRB) Rule G-17 as set forth in MSRB Notice 2012-25 (May 7, 2012)[1].

Morgan Stanley & Co. LLC proposes to serve as an underwriter, and not as a financial advisor or municipal advisor, in connection with the issuance of the Bonds.

As part of our services as underwriter, Morgan Stanley & Co. LLC may provide advice concerning the structure, timing, terms, and other similar matters concerning the issuance of the Bonds.

I. Disclosures Concerning Morgan Stanley & Co. LLC's Role as Underwriter:

(i) MSRB Rule G-17 requires an underwriter to deal fairly at all times with both municipal issuers and investors.

(ii) Morgan Stanley & Co. LLC's primary role as underwriter is to purchase the Bonds with a view to distribution in an arm's-length commercial transaction with the Authority. Morgan Stanley & Co. LLC has financial and other interests that differ from those of the Authority.

(iii) Unlike a municipal advisor, Morgan Stanley & Co. LLC does not have a fiduciary duty to the Authority under the federal securities laws and are, therefore, not required by federal law to act in the best interests of the Authority without regard to their own financial or other interests.

(iv) Morgan Stanley & Co. LLC has a duty to purchase the Bonds from the Authority at a fair and reasonable price, but must balance that duty with their duty to sell the Bonds to investors at prices that are fair and reasonable.

(v) Morgan Stanley & Co. LLC will review the official statement for the Bonds in accordance with, and as part of, its responsibilities to investors under the federal securities laws, as applied to the facts and circumstances of this transaction[2].

I. Disclosures Concerning the Morgan Stanley & Co. LLC's Compensation:

Morgan Stanley & Co. LLC will be compensated by a fee and/or an underwriting discount that will be set forth in the bond purchase agreement to be negotiated and entered into in connection with the issuance of the Bonds. Payment or receipt of the underwriting fee or discount will be contingent on the closing of the transaction and the amount of the fee or discount may be based, in whole or in part, on a percentage of the principal amount of the Bonds. While this form of compensation is customary in the municipal securities market, it presents a conflict of interest since Morgan Stanley & Co. LLC may have an incentive to recommend to the Authority a transaction that is unnecessary or to recommend that the size of the transaction be larger than is necessary.

---

[1] Interpretive Notice Concerning the Application of MSRB Rule G-17 to Underwriters of Municipal Securities (effective August 2, 2012).

[2] Under federal securities law, an issuer of securities has the primary responsibility for disclosure to investors. The review of the official statement by the underwriters is solely for purposes of satisfying the underwriters' obligations under the federal securities laws and such review should not be construed by an issuer as a guarantee of the accuracy or completeness of the information in the official statement.

III. Additional Conflicts Disclosures:
If Morgan Stanley & Co. LLC identifies any additional potential or actual material conflicts (within the meaning of MSRB Rule G-17) specific to Morgan Stanley & Co. LLC's participation in the underwriting of the Bonds, we will notify you under separate cover at the appropriate time.

IV. Disclosures Concerning Complex Municipal Securities Financing:
In accordance with the requirements of MSRB Rule G-17, if Morgan Stanley & Co. LLC recommends a "complex municipal securities financing" to the Authority, this letter will be supplemented to provide disclosure of the material financial characteristics of that financing structure as well as the material financial risks of the financing that are known to us and reasonably foreseeable at that time.

If you or any other Authority officials have any questions or concerns about these disclosures, please make those questions or concerns known immediately to the undersigned. In addition, you should consult with the Authority's own financial and/or municipal, legal, accounting, tax and other advisors, as applicable, to the extent you deem appropriate.
It is our understanding that you have the authority to bind the Authority by contract with us, and that you are not a party to any conflict of interest relating to the subject transaction. If our understanding is incorrect, please notify the undersigned immediately.

We are required to seek your acknowledgement that you have received this letter. Accordingly, please send me an email to that effect, or sign and return the enclosed copy of this letter to me at the address set forth above. We look forward to working with you and the Authority in connection with the issuance of the Bonds. Thank you.

Sincerely,

John L. Sheldon

John Sheldon
MORGAN STANLEY & CO. LLC

Acknowledgement:

____
Mary Lou Cotton, General Manager
State Water Project Contractors Authority

Date: _______________

Exhibit G
Disclaimer

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Exhibit E

State Water Project Contractors Authority

STATE WATER PROJECT CONTRACTORS AUTHORITY

STATE WATER CONTRACTORS
SWC
Served by the State Water Project
FOUNDED IN 1982

RESPONSE TO REQUEST FOR QUALIFICATIONS AND PROPOSALS FOR UNDERWRITING SERVICES

MARCH 19, 2014

RAYMOND JAMES®

Raymond James & Associates, Inc.
One Embarcadero Center, 6th Floor
San Francisco, California 94111
(415) 616-8939

RAYMOND JAMES®

March 19, 2014

Ms. Mary Lou Cotton
General Manager
State Water Contractors
1121 L Street, Suite 1050
Sacramento, CA 95814

Dear Ms. Cotton:

On behalf of Raymond James & Associates, Inc. ("RJA" or "Raymond James"), we are pleased to submit our proposal to provide underwriting services for the State Water Project Contractors Authority ("SWPCA"). Raymond James proposes to provide SWPCA with the public finance expertise, distribution capabilities and capital strength of a national firm and the market knowledge and agility of a regional firm.

- ✓ **Value Adding Distribution Capabilities**: In addition to excellent coverage of the Tier 1 institutional accounts, Raymond James provides unsurpassed coverage of Tier 2 and Tier 3 institutional buyers with the ***largest middle market sales force in the US fixed income business***. This coverage will bring a broader investor base relative to firms that focus solely on Tier 1 accounts, resulting in lower cost borrowing. Our distribution coverage also includes significant California presence as reflected below:
    - 2,600 office locations across all 50 states with approximately 7,100 financial advisors
    - 400 California institutional accounts exceeding $1.6 trillion in assets under management
    - 340 California retail brokers with $12.7 billion in assets under management
- ✓ **Commitment to the Future of California Municipal Finance:** Raymond James is building its public finance practice the right way in California. In addition to our more than 180 professionals in 27 locations nationwide, our firm is fully committing to the future of California as demonstrated through recent hires of Tom Innis to lead the utility practice and Parker Colvin to lead California underwriting out of our San Francisco desk. Parker brings ***more California underwriting experience than anyone in the industry*** and will help Tom build a ***top level utility practice at Raymond James*** as they did together at their previous firm. This combination will provide significant additional value to any team that SWPCA selects.
- ✓ **Financial Stability:** Unlike many firms that have suffered financial instability and are questioning their presence in the municipal market, Raymond James, because of our conservative nature, has continued to prosper. In fact, we have enjoyed more than 100 consecutive quarters of profitability. Raymond James currently has more than $3.6 billion in equity capital, including $393 million in excess net capital. Our strong capital position gives us ***maximum flexibility to aggressively price and support SWPCA's bonds in difficult markets***. This capital strength and commitment will help ensure that SWPCA achieves the lowest cost of funds over the life of the transaction.

Raymond James has all the resources, skill and capabilities to successfully execute SWPCA's financings and be a vital part of any financing team. We very much look forward to working with you and your financial management team, and we thank you for the opportunity to provide our investment banking qualifications. If you have any questions about our proposal or credentials, please do not hesitate to contact Tom Innis, who will serve as your primary point of contact.

Sincerely,

Tom Innis
Raymond James & Associates, Inc.
Managing Director, Head of California Utility Practice
(415) 616-8939
Tom.Innis@raymondjames.com

Parker Colvin
Raymond James & Associates, Inc.
Managing Director, Head of California Underwriting
(415) 616-8020
Parker.Colvin@raymondjames.com

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Section 2

1. Contacts: Provide the name of the proposing firm with the name, address, telephone and facsimile numbers, and email addresses of the proposed lead and backup banker(s).

Raymond James considers addressing the capital financing needs of SWPCA a matter of the highest priority within the Firm and an important part of the Firm's commitment to public finance and California. We believe the proposed Raymond James team will be a key addition to SWPCA's finance team and includes members with extensive experience within the utility sector. This Raymond James team is comprised of public finance bankers, quantitative and analytical specialists, research staff and a veteran underwriting, sales and trading team. Each team member brings with them an in-depth knowledge and understanding of the municipal marketplace and the market for SWPCA's proposed financing.

Tom Innis, a Managing Director based in San Francisco and head of our Western Region Utility Practice, will serve as the lead banker to ensure that SWPCA receives the highest priority of resources from our firm. Tom will provide overall team direction, senior banking and utility sector experience. **John Nguyen**, Vice President, will serve as backup banker and lead financing execution with **Robert Yi**, Vice President, who will provide focus on the quantitative analysis of financing alternatives. **Catherine Lee,** Associate, will provide transaction support throughout the deal process.

Parker Colvin, Managing Director, will serve as the lead underwriter and will have overall responsibility for the development of the marketing plan, leading the marketing effort for SWPCA from our California trading desk. Parker has underwritten more bond financings than any other underwriter in California over the last five years and has unmatched knowledge of the California market, making him not only the best representative of our firm but also one of the most astute underwriter representatives in the market. Below we provide the name, address, telephone and facsimile numbers, and email address of each member assigned to SWPCA.

Principal Contact	Backup Banker/Financing Execution	Quantitative Analysis
Tom Innis, Managing Director **One Embarcadero, Suite 650** **San Francisco, CA 94111** **T: (415) 616-8939 F: (415) 616-8070** **Tom.Innis@RaymondJames.com**	**John Nguyen, Vice President** **One Embarcadero, Suite 650** **San Francisco, CA 94111** **T: (415) 616-8026 F: (415) 616-8070** **John.Nguyen@RaymondJames.com**	**Robert Yi, Vice President** **50 N. Front Street, 16th Floor** **Memphis, TN 38103** **T: (901) 531-3340 F: (901) 579-4532** **Robert.Yi@RaymondJames.com**

Underwriting	Project Support
Parker Colvin, Managing Director **One Embarcadero, Suite 650** **San Francisco, CA 94111** **T: (415) 616-8020 F: 415.616.8070** **Parker.Colvin@RaymondJames.com**	**Catherine Lee, Associate** **One Embarcadero, Suite 650** **San Francisco, CA 94111** **T: (415) 616-8940 F: 415.616.8070** **Cathy.Lee@RaymondJames.com**

In addition to having experienced banking and underwriting professionals dedicated to SWPCA, we will utilize all our available resources such as our investment strategies group and credit analysis group to provide added value to SWPCA outside of pricing. **Robert Larkins** is the head of the Raymond James Western Region financing team and will ensure that every resource of the firm will be available to meet the needs of SWPCA. Rounding out our team coverage is **Chris Crosby,** who spends his time working with our institutional clients on various credits. And lastly, **David Sutton** heads our firm's Investment Strategies Group. Mr. Sutton has extensive experience with the procurement of investment vehicles for project, capitalized interest, debt service reserve, and escrow funds.

2. Resume and References: Provide three client references to the lead and backup banker(s). Enclose resumes of each of the assigned team members as Exhibit A to your proposal.

We believe our ability to serve as a senior managing underwriter for SWPCA can be best represented by references from past clients. Below please find three client references for the lead and backup banker. We note that we are in the process of structuring and pricing a refunding for Contra Costa Water District where we will be working on the same team with SWPCA's financial advisor, serving as senior manager with Citi and Goldman Sachs as co-managers.

Brice Bledsoe, Director of Finance, Contra Costa Water District
bbledsoe@ccwater.com, (925) 688-8300
1331 Concord Avenue
Concord, CA 94520
Services Provided (Tom Innis and John Nguyen):
Co-managed 2013 Water Revenue Refunding Bonds, Series B
Senior-managed 2011 Water Revenue Refunding Bonds, Series P
Senior-managed 2011 Water Revenue Notes, Series B
Senior-managed 2010 Water Revenue Notes, Series A

Keith Norris, Debt Manager, Metropolitan Water District of Southern California
knorris@mwdh2o.com, (213) 217-7121
700 North Alameda Street
Los Angeles, CA 90012
Services Provided (Tom Innis):
Co-managed 2012 Senior G Water Revenue Refunding Bonds
Co-managed Water Revenue Refunding Bonds, 2012 Series F
Senior-managed Water Revenue Refunding Bonds, 2011 Series C
Co-managed Water Revenue Refunding Bonds, 2011 Series B
Co-managed Water Revenue Bonds 2010 Authorization Series A
Co-managed Waterworks General Obligation Refunding Bonds 2010 Series A
Co-managed Water Revenue Refunding Bonds 2010 Series B
Sole-managed and Remarketed Water Revenue Refunding Bonds 2009 Series A-2 (SIFMA Index Mode)
Senior-managed Water Revenue Bonds, 2008 Authorization, Series A

Margie Armstrong, CFO, Elsinore Valley Municipal Water District
margie@evmwd.net, (951) 674-3146 ext. 8306
31315 Chaney Street
Lake Elsinore, CA 92530
Services Provided (Tom Innis):
Sole-managed 2011 Series A, Refunding COPs
Sole-managed 2008 Series A, Refunding COPs
Sole-managed 2007 Series A, COPs

Resumes of each of the assigned team members can be found in *Appendix A* of the proposal.

3. Case Study: Provide two case studies that highlight the firm's ability to provide underwriting services on similar transactions as contemplated in this RFP. Case studies should be for transactions where the proposed team members were actively involved.

On the following pages we provide two case studies to highlight both our California distribution capabilities for the City of Fresno, as well as our firm's aggressiveness in pricing bonds for the New York Municipal Water Authority. Members of our proposed team were involved in both financings.

City of Fresno
$33,600,000
Airport Revenue Bonds
Series 2013A (Non-AMT) and 2013B (AMT)
Senior Manager

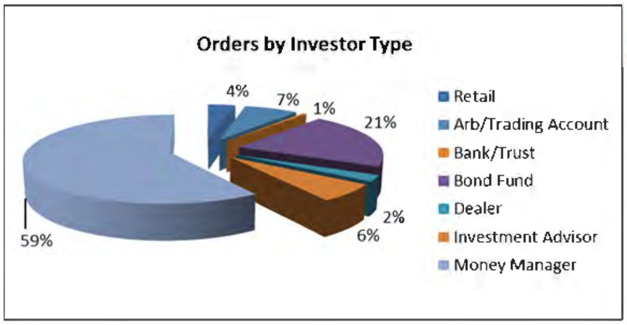
BACKGROUND.

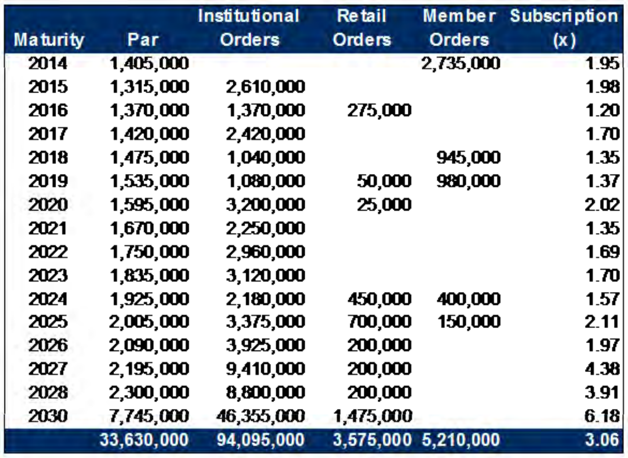
- On July 17, 2013, RJ senior managed a $33.6 million refunding of Airport Revenue Bonds for the City of Fresno (Baa1/BBB/BBB underlying ratings)
- The transaction was split into a $10.8 million Non-AMT series and a $22.8 million AMT series
- RJ worked with the team in preparing a rating presentation emphasizing the significant improvement in Airport finances and positive trends

RESULTS.

- One week of comprehensive pre-marketing to nationwide institutional and retail distribution system, including live investor presentation
- RJ negotiated with BAM to provide bond insurance for 47% portion the issue, resulting in estimated savings of more than $70,000
- Excluding stock orders, **126 orders totaling $97.7 million were placed** for the transaction
  - **98 institutional orders from 29 separate accounts**
  - **28 retail orders totaling $3.6 million**
  - **Order size** ranged from **$20,000 to $5.3 million** with an **average order size of $775,000**
- All-in TIC was 4.79% and PV refunding savings was 7.2%

ORDER SUMMARY AND INVESTOR BREAKDOWN. The charts below detail the order book, over-subscription rate by maturity and the types of investors that submitted orders.





Maturity	Par	Institutional Orders	Retail Orders	Member Orders	Subscription (x)
2014	1,405,000			2,735,000	1.95
2015	1,315,000	2,610,000			1.98
2016	1,370,000	1,370,000	275,000		1.20
2017	1,420,000	2,420,000			1.70
2018	1,475,000	1,040,000		945,000	1.35
2019	1,535,000	1,080,000	50,000	980,000	1.37
2020	1,595,000	3,200,000	25,000		2.02
2021	1,670,000	2,250,000			1.35
2022	1,750,000	2,960,000			1.69
2023	1,835,000	3,120,000			1.70
2024	1,925,000	2,180,000	450,000	400,000	1.57
2025	2,005,000	3,375,000	700,000	150,000	2.11
2026	2,090,000	3,925,000	200,000		1.97
2027	2,195,000	9,410,000	200,000		4.38
2028	2,300,000	8,800,000	200,000		3.91
2030	7,745,000	46,355,000	1,475,000		6.18
	33,630,000	94,095,000	3,575,000	5,210,000	3.06

New York City Municipal Water Finance Authority
$351,240,000
Water and Sewer System Second General Resolution Revenue Bonds, Fiscal 2014 Series CC
Senior Manager

MARKET CONTEXT. The bonds were sold during a retail order period on Monday January 27, and an institutional order period on Tuesday January 28, 2014. At the end of the week prior to this pricing, the fixed income market was showing strength due to global economies and equity market weakness. On the Friday before the sale, the DJIA closed down 318 points. The economic calendar for the week of pricing featured the Federal Reserve's two-day meeting on Tuesday and

Wednesday, Treasury auctions and economic data featuring durable goods orders and GDP. Market participants were closely watching for the potential of a Fed tapering announcement that Wednesday for hints of the Fed's outlook on rates going forward. Bottom line: this volatility and uncertainty caused investors to be extremely cautious.

UNIQUE STRUCTURE: REFUNDABLE PRINCIPAL INSTALLMENTS. NYW typically sells bonds with 30+ year maturities. This was a rare opportunity for investors to buy short NYW bonds. The Fiscal 2014 Subseries CC-2 bonds were designated as Refundable Principal Installments. They were issued in two maturities, 6/15/18 and 6/15/19 with first call dates at par of 12/15/16 and 12/15/17, respectively. For the retail order period, $25 million of each maturity was offered. After receiving price views form the syndicate and speaking with investors, our underwriters decided to take an aggressive pricing approach, setting levels which were 15 basis points more aggressive than syndicate consensus. This was clearly a bet on the momentum developed during the premarketing effort. The bonds were offered at yields of 0.64% and 0.89%. At the end of the retail order period, both maturities were oversubscribed and the bonds were re-priced for the institutional order period at 0.61% and 0.87% yields. In addition, the RPIs were upsized from $50 million to $100 million. After the institutional order period, with demand still strong for the bonds, yields were reduced a second time to 0.59% and 0.85% and upsized again to $110 million.

NYW plans to refinance the RPIs into longer term debt on or near their first call dates of 12/15/16 and 12/15/17. The yields to call of 59 and 85 basis points respectively provide NYW with very low cost, fixed rate funding for close to three and four year periods. This pricing is very attractive compared to variable rate demand bonds which would carry a comparable all-in cost including line of credit and remarketing fees and would expose NYW to both interest rate and bank rating risks.

STRATEGICALLY RISKING CAPITAL FOR THE BENEFIT OF THE ISSUER. Withy NYW bonds typically issued with maturities of 30+ years, many major investors were facing saturation on this credit in their portfolios. A strategy was developed to offer during the retail order period $25 million of 6/15/44 bonds with a coupon of 4.25% and a yield of 4.39%. The balance of the transaction, maturing 6/15/47 was offered to institutions only with 5% coupons yielding 4.38%. Due to the weak market conditions, at the end of the institutional order periods, we had orders for $177 million of the $242 million in the 2047 maturity. Market conditions were such that two orders totaling $15 million were pulled after the investors realized they simply did not have the cash, leaving us with $162 million in orders. As we explored price adjustment, it was clear investors were totally indecisive. The market and investors needed leadership on price and Raymond James provided it. We made a bid to backstop the price for this maturity by increasing the yield 5 basis points and committed to purchase the now $80 million unsold balance if necessary. Raymond James transferred the price risk from NYW to ourselves. We bought the deal, went back to investors at the new prices, and solicited orders, while informing investors we would inventory unsold balances. At the end of the day, $5.1 million of the bonds remained unsold. After the bonds were "free-to-trade", Raymond James continued to make a market in this maturity, holding spreads stable relative to the benchmark.

4. Firm Experience – California Water and Wastewater Bonds: As a separate Exhibit B in tabular form, provide a list of Water and Wastewater Agency Bond experience from January 2010 to the present with a grand total of the number of financings and par amount. Include the date, issuer name, par amount and series name/description.

Our proposed team has extensive experience working with various water sector clients, including but not limited to the Contra Costa Water District, Metropolitan Water District of Southern California, Eastern Municipal Water District, Elsinore Valley Municipal Water District, Sacramento Regional County Sanitation District, and the New York City Municipal Water Finance Authority, among many others. In total, over the last four years, members of the Raymond James team senior managed 80 California Water and Wastewater Bonds and Bonds for Water Utility issuers for nearly $1.9 billion. As requested, we provide a table in Exhibit B listing specific transactions the we have senior-managed from January 2010.

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5. Firm Status: Provide your firm's level of Tier 1 Capital and provide your firm's Tier 1 common capital ratio for the most recent reported period along with the date as of which those numbers were current.

CAPITAL POSITION

Fiscal Year	Total Capital*	Equity Capital*	Net Capital*	Excess Net Capital*
9/30/2009	$11,545	$2,032	$278	$250
9/30/2010	$9,458	$2,302	$253	$224
9/30/2011	$10,426	$2,587	$409	$379
9/30/2012	$11,950	$3,268	$264	$233
9/30/2013	$13,021	$3,662	$431	$393

** in millions*

Raymond James believes that in the current market environment, the capital position and overall financial health of any underwriter of SWPCA debt is essential to a successful underwriting. Raymond James is unique in terms of its financial stability, willingness to underwrite bonds for our clients and its ability to provide liquidity for our clients' bonds in the secondary market. At a time when many of the largest financial institutions are not underwriting bonds in primary markets or supporting bonds in the secondary market, Raymond James is able to make these types of capital commitments.

As of September 30, 2013, Raymond James's equity capital base was approximately $3.6 billion. **The Firm's excess net capital was approximately $393 million which, based on S.E.C. guidelines, is sufficient to solely underwrite issues of approximately $5.6 billion.** Our unleveraged capital position, relative to our competitors, allows us to utilize our financial strength to complete deals in volatile markets and optimize the pricing of deals in stable markets.

Section 3

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1. As noted above, this financing will fund the participating funding State Water Project Contractors' share of the pre-construction costs. Assuming that the total pre-construction costs are equal to $1.2 billion, and that the split between the State Water Project Contractors and the Central Valley Project Contractors will be 50/50, outline your recommendations as to the most efficient way to finance the "pre-construction" costs. Be sure to include timing, size of issue or issues, term of borrowing, structure, and costs (fees). Please include your rational as to why your recommendation would result in the lowest cost of capital for the project and the contractors.

Due to the timing and complexity of the pre-construction activities, a flexible financing program would best serve the State Water Project ("SWP") contractors and the Central Valley Project ("CVP") contractors. As indicated in the RFP, financing is needed for $1.2 billion of pre-construction activities over the next two to three years. While the short-term rates and flexibility of a commercial paper program would serve as an efficient financing vehicle for the pre-construction activities, the market does not currently have capacity for this level of new paper. Additionally, fixed interest rates remain very low and the various risks of variable rate funding – interest rate, liquidity pricing and availability, remarketing, rollover, product, liquidity (with term outs) – are very real. We believe that it is possible to replicate the structure of a commercial paper program in the fixed and index rate market through a combination of issuance timing, incorporating short call options, utilizing put bonds or index rate bonds, capitalizing interest, and remaining short on the yield curve.

Timing. With yields at historic lows, it is important to time the various issuances with the expected expenditure plan to mitigate negative arbitrage in the construction fund. However, this strategy requires that bonds not be issued until funds are needed which presents the risk of interest rates rising during that time. A solution to hedging this interest rate would be a tax-exempt forward-delivery program, an innovative structure designed to eliminate negative arbitrage. This structure eliminates negative arbitrage through the issuance of bonds on a forward-delivery basis to a point when funds are needed. Due to a small pool of willing buyers relative to the $1.2 billion in funding needs, we recommend only using this strategy for a portion of the financing and for maturities near the front end of the yield curve to minimize the forward penalty.

Call Options. Significant flexibility can be added to both short and long term fixed rate bonds by incorporating much shorter par call features instead of the standard 10-year par call. The flexibility of a short call can be utilized to either roll the debt into DWR bonds at the end of pre-construction or into another financing vehicle. This only provides an efficient alternative for SWPCA if the short call is priced with minimal premium in yield. We believe SWPCA, with its high anticipated credit ratings and well-known name member agencies with liquid secondary market activity, could sell bonds with optional redemptions at par prior to 10 years. However, without many comparable transactions in today's market investors will look to "penalize" and gain yield with an abnormal call structure. The yield penalty becomes heavier as the call protection is decreased from 10 years. Similarly, a maturity inside 10 years will be penalized even more as the call protection moves away from the maturity date. The calls can be structured to occur at the end of pre-construction or at various intervals when take-out financings are expected to occur.

Put Bonds and SIFMA Index Bonds. SWPCA can take advantage of several short-term financing alternatives as a means of maintaining flexibility on its pre-construction debt. Given the market conditions at issuance, we recommend that the SPCWA consider (1) Put Bonds or (2) SIFMA Indexed Bonds.

1. *Put Bonds.* Multi-annual interest rate term bonds with a mandatory put ("Put Bonds") currently allow issuers to take advantage of very low rates at the front end of the yield curve while eliminating the need for a liquidity facility normally associated with commercial paper or variable rate demand bonds. Put Bonds lock in a fixed rate for typically a two to ten year period. At the end of the interest rate period, the Put Bonds are either remarketed into another interest rate period or refunded with fixed rate bonds, potentially the DWR bonds. If neither occurs, the Put Bonds' interest rate increases to a pre-determined stepped coupon rate. This structure is very similar to Index Bonds, but eliminates the interest rate risk associated with a SIFMA or LIBOR benchmark. Similar remarketing risks remain at the mandatory tender date. Based on the anticipated AA credit ratings, we believe there would be demand for soft put bonds through 5 years. We recommends exploring maturities up to 10 years with call options during the pre-marketing period to determine where investor demand is optimally located. Additionally, we would anticipate that a stepped coupon rate of 10% would be necessary to compensate buyers for carry risk. This is a figure that can be adjusted during the pre-marketing period.
2. *SIFMA Index Bonds.* There continues to be strong demand among short term funds for SIFMA floater products through five years. Similar to put bonds, demand wanes beyond 10 years but several issuer have achieved efficient pricing in mid-term maturities, including the State of California's GO SIFMA Index bonds.

Given the current extraordinary low levels of the SIFMA index, SIFMA-based floaters could sell initially at a lower yield than put bonds. Despite that, we believe that SWPCA should consider the use of soft put bonds to diversify its debt products and lock in today's low rates. We note that the Raymond James team has significant experience in structuring and executing these products with issuers such as the Metropolitan Water District of Southern California, the East Bay Municipal Utility District, Eastern Municipal Water District and the Regents of the University of California.

Capitalized Interest. The water deliveries generated from the BDCP are projected to lag the start of pre-construction activities by approximately 10 years. Thus, SWPCA will need a mechanism to lessen the impact of the debt service on project revenues. This would typically be achieved by capitalizing interest through the completion of the project. However, federal tax laws restricts capitalized interest fund from going beyond five years when funded with tax-exempt proceeds. This presents a challenge given the estimated three years of pre-construction activities followed by an estimated six years of construction for CM1. SWPCA has several options to address this issue. Assuming this level of funding is achieved over multiple financings as indicated in the RFP, the final term of the capitalized interest funds can be staggered to roll in debt service to project revenues over time. The terms could also be scheduled to align with the timing of the anticipated DWR financings. If SWPCA anticipates that the debt service burden during the construction period will hinder the successful and timely completion of the project, then taxable bonds can be issued and interest capitalized for as long as needed.

Portfolio Structure. While taking into account timing considerations to maximize the use of capitalized interest, we believe SWPCA should issue its 50/50 share of the $1.2 billion utilizing the three different structures addressed previously in this section. The first issuance, assuming $250 million according to the RFP, should be structured as fixed rate debt with the potential use of shorter call options. Representative fees for this structure are provided in our response to Section 4. This initial financing will receive the widest investor audience and set SWPCA up well for subsequent issues. The next two issues could be broken up into $150 million of forward delivery bonds and $200 million of either Put Bonds or SIFMA Indexed notes. While fees for the forward delivery structure would be higher than those represented for the traditional fixed rate financing, the fees associated with a Put Bond or SIFMA Indexed structure would be significantly lower. This portfolio approach will serve to diversify the outstanding debt to achieve lowest cost borrowing on an aggregate basis, provide greatest flexibility for the future and optimize the timing nuances of this project and the market. It also enables SWPCA and its financial advisor to work with multiple underwriters, creating a healthy competitive environment to further ensure lowest cost borrowing.

2. *Please describe how the interim "pre-construction" financing is best integrated into the long-term financing described above. As noted, it is anticipated the California Department of Water Resources would be issuing providing the long-term financing. Please provide your firm's perspective on the efficiency of using traditional financing through the California Department of Water Resources versus other financing vehicles (e.g., SWPCA, public-private partnership, etc.)*

For the purposes of our analysis, we have assumed that the water facilities of CM1 will be owned by the State and the costs of constructing, operating, and maintaining the facility will be shared by the State Water Project ("SWP") contractors and the Central Valley Project ("CVP") contractors on an equal basis. The financing, regardless of the issuing entity, will be repaid with revenues from the participating SWP contractors.

Revenue and Coverage. Since DWR anticipates issuing long-term bonds to refund the planning and construction expenditures made by the SWP and CVP contractors, structuring the initial financing in accordance with their covenants will initiate a more fluid transition at that time. DWR's General Bond Resolution pledges that the revenues received by DWR, after deduction of maintenance and operation, must be at least equal to 1.25 times debt service. The resolution also requires that the debt service reserve account be funded at 50% of maximum annual debt service. A debt service reserve fund is currently not required for efficient market access and there is a clear economic benefit to issuing SWPCA pre-construction bonds without a reserve.

For many SWP contractors, annual payments for operation and management of the SWP are the largest single component of their budgets. Annual debt service payments are estimated to reach $1.0 billion by 2055. Additionally, O&M costs are estimated at $36 million per year. According to the BDCP EIR/EIS, water exports will increase from 1.3 million to 1.7 million AF per year on average. Assuming 1.25 times debt service coverage, SWP and CVP contractors will need to generate $1.295 billion in annual revenues. This produces a range of $762 to $996 price per AF, a significant increase over current prices. Depending on the timing of the anticipated DWR financing, these price levels must be realized near the completion of construction to ensure coverage levels are sufficient to issue bonds under the General Bond Resolution. Taking into consideration these factors will create the greatest efficiency of using traditional financing through DWR relative to other financing vehicles going forward.

3. Please provide a preliminary pricing scale as of March 3, 2014 assuming an "AA" underlying rating. Please provide coupons, yields and spreads to MMD AAA GO by maturity.

Provided below is our proposed interest rate scale assuming market conditions as of March 10, 2014 assuming underlying ratings of "AA".

Maturity	MMD	Coupon	Spread	Yield
2015	0.15	2	0	0.15
2016	0.25	2	0	0.25
2017	0.41	4	0.02	0.43
2018	0.66	4	0.05	0.71
2019	0.96	4	0.08	1.04
2020	1.37	4	0.10	1.47
2021	1.71	5	0.12	1.83
2022	2.01	5	0.15	2.16
2023	2.22	5	0.17	2.39
2024	2.35	5	0.20	2.55
2025	2.49	5	0.23	2.72
2026	2.62	5	0.25	2.87
2027	2.75	5	0.28	3.03
2028	2.86	5	0.30	3.16
2029	2.97	5	0.30	3.27
2030	3.07	5	0.30	3.37
2031	3.16	5	0.30	3.46
2032	3.24	5	0.30	3.54
2033	3.31	5	0.30	3.61
2034	3.36	5	0.30	3.66
2035	3.41	5	0.30	3.71
2040	3.61	5	0.30	3.91
2044	3.67	5	0.28	3.95

4. Please describe any alternatives to a public issue to finance the "pre-construction" costs (e.g., private placement, line of credit, etc.) that you believe would be a more effective financing vehicle. Be sure to include the strengths and weaknesses of such financing alternatives relative to a public offering.

Given the nature and size of the initial borrowings, Raymond James does not believe a private placement, line of credit or any other alternatives, not previously addressed in our response to Section 3, Question 1, would serve SWPCA as a more effective financing vehicle. Because SWPCA's initial financings represent a signal to the market for future borrowings that will ultimately have to access the public market in a significant way, it is important to prove definitive success with a public borrowing. SWPCA is fortunate to be potentially issuing these structures in an extremely low rate environment where it can both position itself and DWR well for future financings as well as achieve extremely low cost borrowing rates.

5. Please describe your recommended marketing approach for the bonds. At a minimum, include the following:
a.) A description of the rating agency approach (e.g., which rating agencies, what credit strengths, credit challenges, and other relevant information would be needed to achieve at least a "AA" rating.)
b.) A discussion of the credit – which agencies would best serve to secure the credit? How would you recommend positioning SWPCA to attract quality investors?
c.) Describe the marketing leading up to the sale of the bonds, including need for investor meetings, net roadshow, etc.
d.) How would you envision SWPCA interacting with the underwriting desk and the sales force (if at all)?

CREDIT APPROACH

Highly rated water bonds are among the most sought after bonds in the municipal market today. The revenues are generated by a natural monopoly of essential services and are largely insulated from the stresses of general governmental budget making. The two main areas of concern for rating agencies with established water credits, such as DWR, are the size of the capital plan and collecting revenues sufficient to cover expenses. The majority of the cost increase to the SWP and CVP contractors will be debt service, an item that will not vary with the amount of water delivered or sold. A major challenge will be the ability of the agencies reliant on the SWP and CVP contractors to raise rates in advance of debt service requirements and not look to alternative water sources to mitigate the increased costs. The current SWP water supply contracts include provisions which provide protection future SWP contractor defaults, and require contractors to make payments, regardless of water deliveries. If a contractor is unable to raise sufficient funds by other means, the water supply contracts require each contractor to levy on all property in the contractor's territory not exempt from taxation a tax or assessment sufficient to cover costs under the water supply contracts. The ability to trigger a taxation provides an extra layer of security, but the rating agencies will be weary of a process that is not streamlined or requires voter approval.

Political Risk. SWPCA will need to clearly convey the contingency plan for funding the BDCP if voters do not approve the Water Bonds on the ballot in November and the risk of Legislative appropriation. This risk includes both the ability to issue DWR bonds but also the state funding component. The state funding represents 17% of the overall financing plan and 91% of that funding is anticipated from future statewide bond issues. While it is generally accepted that the SWP and CVP contractors will back-stop these funds, the challenge of willingness and ability to pay come into effect.

Bifurcated Revenue Pledge. The current contracts between DWR and the water contractors contain terms that ensure that contractors pay the full cost of SWP. However, the contracts for water supply will have to be renegotiated in order to fund the tunnels and there is no guarantee that these terms will be continued. Investors will be concerned about the extension of those terms through the life of the bonds. This credit weakness could be mitigated by creating subsets of contractors to isolate the water supply contracts at risk for renegotiation and the revenue generated from those contracts. A bifurcated revenue structure would preserve the high credit quality of the contracts without term risk. Individual water contractors in the weaker credit subset may issue their own revenue bonds or issue collectively through SWPCA. As these contracts are renegotiated, they can be rolled into the DWR financing without impacting the credit quality.

Rating Agencies. With regard to which ratings agencies to approach, we believe SWPCA would be best served with ratings from Fitch and S&P. Both agencies released recent reports in December 2013 and February 2014 respectively that indicate a solid understanding of the issues at hand both for the water sector in general as well as specific to financings related to the BDCP. Given both agencies' grasp on the subject, we are confident that SWPCA can attain ratings in the AA category.

MARKETING APPROACH

Our marketing plan will focus on promoting the wealthy tax base and essential service fundamentals of the SWP and CVP contractors while striving to reach as many investors as possible. We highlight seven key steps in our marketing plan to achieve the lowest cost/greatest savings.

1) **Target Top Bondholders of Similar Credits.** Our first step would be to approach the top holders of municipal water bonds and begin to engage in conversations with them about the credit, garnering as much attention towards the transaction as possible. An indicative list of institutional holders of DWR and MWD bonds is provided on the right.

California Department of Water Resources	Metropolitan Water District of Southern CA
Vanguard	Vanguard
Franklin Templeton	PIMCO
MFS Investment Mgmt	Liberty Mutual Ins
Fidelity Mgmt	Fidelity Mgmt
American Century Inv Mgmt	GSAM
Metropolitan Life Ins	Lord Abbett
Deutsche Asset Mgmt	Penn Mutual Life Ins
BlackRock Financial	BlackRock Financial Mgmt
Wells Capital Mgmt	State Compensation Ins
Tennessee Farmers Mutual Ins	Northern Trust Global Advisors

2) **Aggressively Reach Out to Tier 2 and Tier 3 Investors**. We would utilize all of our distribution capabilities discussed in detail on the following page to further broaden the investor universe for SWPCA.

3) **Run Pre-sale Advertisements to Stimulate Local Demand and Allow California Ratepayers to become Investors**. Local retail investors have a common sense attraction to utility credits, as water is an “essential service.” Running pre-sale ads the weekend prior to the sale date will help us build a base of orders and presents the BDCP project a good ratepayer relations opportunity by allowing the residents who pay for the service to invest in their water supply.

4) **Bifurcate Coupons**. SWPCA should be prepared to bifurcate maturities to reach as many investors as possible. Tailoring various coupons in a maturity will encourage more small investors to put in orders. The greater investor participation will help achieve as low of a cost as possible and enhance savings.

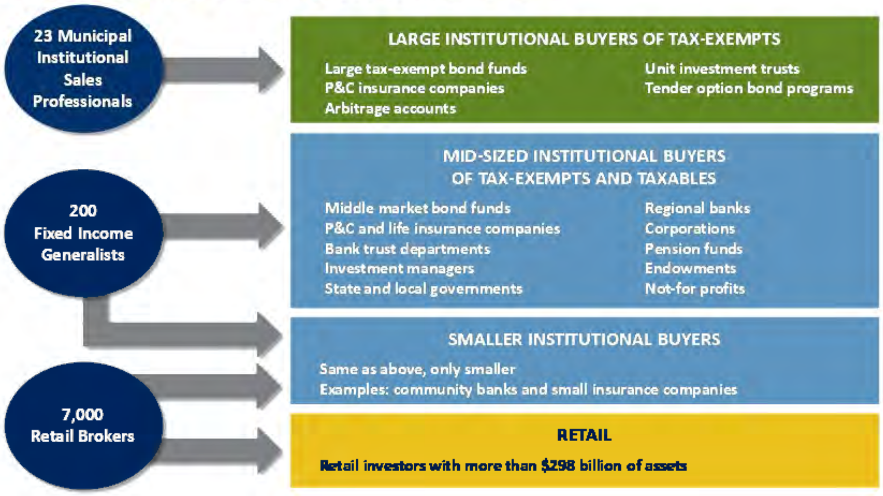
5) **Post a Clear and Accurate Preliminary Official Statement 5-7 Business Days Prior to Pricing.** We recommend posting the POS at least a week (and ideally 7 business days) prior to pricing, then allowing 3-4 business days for our sales forces to talk the deal up with investors, prior to moving into the price discovery phase.

6) **Allow Time for Rating Agencies to Publish Their Reports**. Despite investors “looking through” ratings and wanting time to do their own credit analysis, we have seen a strong desire by investors to have the *rating reports* in hand—not just the ratings—2-3 days prior to pricing.

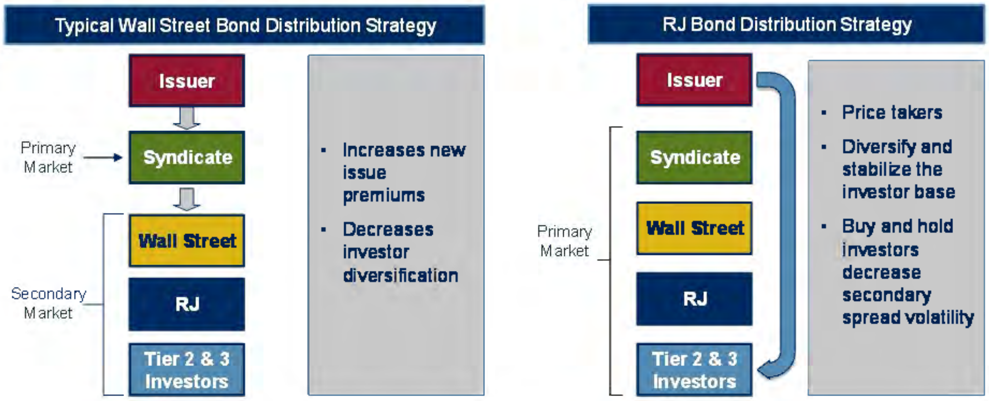
7) **Investor Calls/Meetings and Internet Road Show.** We suggest you consider an internet roadshow to update investors on the status of the regional economy, highlight the contractors’ strong financial profile, provide updates on the status of the BDCP, and discuss future additional debt plans.

RAYMOND JAMES INVESTOR COVERAGE. Raymond James’ value-added is our ability to tap the thousands of Tier 2 and 3 institutions who rarely get primary market access to SWPCA bonds. **One of the unique strengths that we bring to the SPWCA is our middle market Sales force.** “Middle markets”

RAYMOND JAMES DISTRIBUTION CAPABILITIES


23 Municipal Institutional Sales Professionals
200 Fixed Income Generalists
7,000 Retail Brokers
LARGE INSTITUTIONAL BUYERS OF TAX-EXEMPTS
Large tax-exempt bond funds
P&C insurance companies
Arbitrage accounts
Unit investment trusts
Tender option bond programs
MID-SIZED INSTITUTIONAL BUYERS OF TAX-EXEMPTS AND TAXABLES
Middle market bond funds
P&C and life insurance companies
Bank trust departments
Investment managers
State and local governments
Regional banks
Corporations
Pension funds
Endowments
Not-for profits
SMALLER INSTITUTIONAL BUYERS
Same as above, only smaller
Examples: community banks and small insurance companies
RETAIL
Retail investors with more than $298 billion of assets

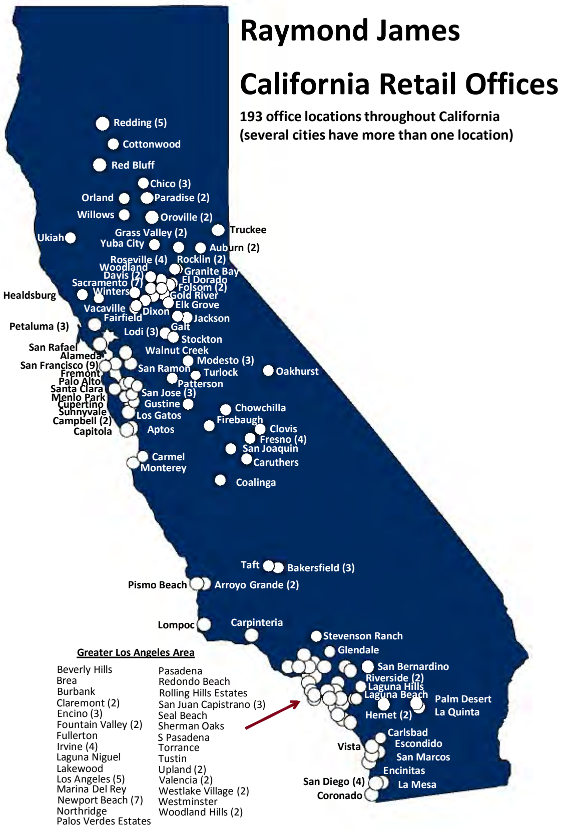
refers to smaller institutional buyers including regional insurance companies, smaller banks, money managers, and others – virtually any fixed income portfolio in the country of material size. This is the core of our fixed income franchise and our unique strength. With 200 fixed income institutional generalists, **Raymond James is the dominant fixed income middle markets firm.** Every firm has a call into the largest funds when they have bonds to sell. Raymond James makes calls into thousands of Tier 2 and Tier 3 institutional investors, most of whom you have never heard of. ***As bankers from major firms have joined Raymond James, each has remarked something similar to, "I've never seen an order from a buyer like this come in at my old shop; it was always the Allstate, Nuveen and Vanguards of this world."*** This middle market sales group sells tax-exempt and taxable municipals, Treasuries, Agencies, corporates, and ABS – any and all fixed income products – and they do it well. With Raymond James as your senior manager, you significantly broaden the distribution of SWPCA's bonds by providing direct and focused access to thousands of institutions across the country.


Typical Wall Street Bond Distribution Strategy
Issuer
Primary Market
Syndicate
Wall Street
Secondary Market
RJ
Tier 2 & 3 Investors
Increases new issue premiums
Decreases investor diversification
RJ Bond Distribution Strategy
Issuer
Syndicate
Primary Market
Wall Street
RJ
Tier 2 & 3 Investors
Price takers
Diversify and stabilize the investor base
Buy and hold investors decrease secondary spread volatility

As demonstrated in the accompanying chart, **by bringing Tier 2 and Tier 3 investors into the primary market, we help issuers achieve lower funding costs.** Generally, these are smaller regional banks, insurance companies, credit unions, etc., whose buying is not big enough to merit coverage by the Wall Street firms. For years, Raymond James has known and developed mid-sized and smaller institutional investors, particularly regional and community banks, which are quite active in the municipal securities market. It is this group of investors, which is typically under-served by other broker/dealers, that Raymond James calls upon to consistently and effectively support its municipal bond activity.

Middle market accounts operate with retail-investor type characteristics; they tend to utilize our credit analysts and require longer lead time before placing an order. **These orders are typically less price sensitive than the larger institutional buyers because the middle market investors typically only deal with one or two regional dealers and do not have access to the new issue market.** They are accustomed to buying bonds that have been marked up several times, so when they get access to new issues, they can be very aggressive. For example, if the new issue clearing rate is 4.50%, these accounts may only see bonds that have passed through multiple dealer hands before being shown to them at, say, 4.20%. Raymond James can bring these accounts into the primary at, say 4.35% and everybody wins: SWPCA gets a lower cost of funds and the investors get some of the yield that would have been clipped by dealers on the way down the price ladder. This dynamic gives us the ability to achieve tighter spreads for our clients.

CALIFORNIA RETAIL INVESTORS. Raymond James' sizable financial advisory system can assist SWPCA in leveraging retail demand. With 2,600 office locations and approximately 7,100 financial advisors, we have one of the largest retail distribution networks in the country. These advisors manage $298 billion in 1.9 million client accounts. Raymond James is a major part of the California retail market with 298 Registered Representatives in 193 offices covering nearly 74,000 retail brokerage accounts with assets under management over $11.8 billion. Please see our coverage map below.



Additionally, the dominant buying base for California municipals continues to be "professional retail," which are institutions investing on behalf of retail investors. We bring to SWPCA extremely effective penetration of this class, including bank trust departments, investment advisors and money managers.

INTERACTION WITH DESK AND SALESFORCE

As SWPCA's Financial Advisor can attest to, one of the biggest distinguishing factors the Raymond James team brings to any financing is our underwriter's experience and accessibility. Unlike most firms SWPCA is considering, our lead underwriter, Parker Colvin, is San Francisco based and available for all meetings and calls to provide market updates and commentary. This direct line of communication throughout the financing process culminates with unmatched transparency through pricing. Having underwritten more California financings over the past five years than any other underwriter in the market, Mr. Colvin is a valuable asset to have on any team SWPCA puts together. More importantly he will be readily available for all questions throughout the process while directly linked to his salesforce to provide real time investor feedback.

Section 4

PROPOSED FEE STRUCTURE. Below we provide our proposed not-to-exceed underwriter's discount assuming "AA" ratings, a traditional fixed rate structure and a $250 million par amount. The average takedown assumes a sole-managed financing; however we would try to keep the associated maturity by maturity takedowns if selected senior manager and agreed upon by SWPCA and co-manager(s). We expect these takedowns to adequately compensate our sales professionals for marketing the bonds as aggressively as possible. The table below details our proposed fee structure.

	$ per bond	Total $ Amount
Takedown*	$1.25	$312,500.00
Expenses (excluding counsel)	$0.12	$30,000.00
Estimated Underwriter's Counsel Fee**	$0.06	$15,000.00
Total	**$1.43**	**$357,500.00**

*Average Takedown

**Subject to negotiation and approval by SWPCA

DISCLAIMER

The information contained herein is solely intended to facilitate discussion of potentially applicable financing applications and is not intended to be a specific buy/sell recommendation, nor is it an official confirmation of terms. Any terms discussed herein are preliminary until confirmed in a definitive written agreement. While we believe that the outlined financial structure or marketing strategy is the best approach under the current market conditions, the market conditions at the time any proposed transaction is structured or sold may be different, which may require a different approach.

The analysis or information presented herein is based upon hypothetical projections and/or past performance that have certain limitations. No representation is made that it is accurate or complete or that any results indicated will be achieved. In no way is past performance indicative of future results. Changes to any prices, levels, or assumptions contained herein may have a material impact on results. Any estimates or assumptions contained herein represent our best judgment as of the date indicated and are subject to change without notice. Examples are merely representative and are not meant to be all-inclusive.

Raymond James shall have no liability, contingent or otherwise, to the recipient hereof or to any third party, or any responsibility whatsoever, for the accuracy, correctness, timeliness, reliability or completeness of the data or formulae provided herein or for the performance of or any other aspect of the materials, structures and strategies presented herein. Raymond James is neither acting as your financial advisor nor Municipal Advisor (as defined in Section 15B of the Exchange Act of 1934, as amended), and expressly disclaims any fiduciary duty to you in connection with the subject matter of this Proposal.

Municipal Securities Rulemaking Board ("MSRB") Rule G-17 requires that we make the following disclosure to you at the earliest stages of our relationship, as underwriter, with respect to an issue of municipal securities: the underwriter's primary role is to purchase securities with a view to distribution in an arm's-length commercial transaction with the issuer and it has financial and other interests that differ from those of the issuer.

Raymond James does not provide accounting, tax or legal advice; however, you should be aware that any proposed transaction could have accounting, tax, legal or other implications that should be discussed with your advisors and/or legal counsel.

Raymond James and affiliates, and officers, directors and employees thereof, including individuals who may be involved in the preparation or presentation of this material, may from time to time have positions in, and buy or sell, the securities, derivatives (including options) or other financial products of entities mentioned herein. In addition, Raymond James or affiliates thereof may have served as an underwriter or placement agent with respect to a public or private offering of securities by one or more of the entities referenced herein.

This Proposal is not a binding commitment, obligation, or undertaking of Raymond James. No obligation or liability with respect to any issuance or purchase of any Bonds or other securities described herein shall exist, nor shall any representations be deemed made, nor any reliance on any communications regarding the subject matter hereof be reasonable or justified unless and until (1) all necessary Raymond James, rating agency or other third party approvals, as applicable, shall have been obtained, including, without limitation, any required Raymond James senior management and credit committee approvals, (2) all of the terms and conditions of the documents pertaining to the subject transaction are agreed to by the parties thereto as evidenced by the execution and delivery of all such documents by all such parties, and (3) all conditions hereafter established by Raymond James for closing of the transaction have been satisfied in our sole discretion. Until execution and delivery of all such definitive agreements, all parties shall have the absolute right to amend this Proposal and/or terminate all negotiations for any reason without liability therefor.

EXHIBIT A

Tom Innis, *Managing Director.* Tom Innis joined Raymond James in July 2013 from Stifel Financial (Stone and Youngberg), after leading its utility practice for the past five years. Tom manages Raymond James' utility practice for the Western Region. He recently joined the firm after leading Stifel / Stone & Youngberg's utility practice for the past five years. Prior to that, Tom worked at UBS for over 10 years, developing its utility practice in the West. His experience, particularly in water utility financings, helped establish and maintain both firm's positions as leading underwriters in the utility sector. Tom's senior-managed water utility experience includes work for the Metropolitan Water District of Southern California (MWD), Eastern Municipal Water District, Elsinore Valley Municipal Water District, Sacramento Regional County Sanitation District, Sacramento County Water Agency, Central Basin Municipal Water District, Moulton Niguel Water District, and Santa Margarita Water District. Prior to his work in municipal finance, Tom served as an officer in the United States Army. Mr. Innis received his M.B.A. in Finance from the Wharton School at the University of Pennsylvania and his B.S. in Engineering from the United States Military Academy at West Point**.** He holds Series 7 and 63 licenses.

John Nguyen, *Vice President.* John Nguyen joined Raymond James in 2012 as a Vice President in the San Francisco office. John has ten years of municipal finance experience and has worked on more than 150 transactions totaling approximately $3 billion in senior-managed debt financings. Prior to joining Raymond James, John was with Wedbush Securities and George K. Baum & Company, where he worked on numerous financings that included GO bonds, revenue bonds, certificates of participation, bond anticipation notes and TRANs. John earned a B.A. in Economics from the University of California, Berkeley. He holds Series 7 and 63 licenses.

Robert Yi, *Vice President.* Mr. Yi joined Raymond James in April 2010 after spending 5 years in Citigroup's public finance department, where he provided analytical support on utility, general obligation, healthcare, and tobacco financings. As a member of Raymond James's National Quantitative Group, Mr. Yi specializes in transaction structuring and model development. Issuers he covers include the University of California, City of Los Angeles, City of Atlanta, City of New York, and Cook County, Illinois. Mr. Yi holds a Bachelor's degree in Economics from Yale University and a Master's degree in Economics from Cambridge University.

Parker Colvin, *Managing Director.* Parker Colvin joined our California team as an underwriter in November 2013. Most recently Parker managed the California/Arizona underwriting desk for Stifel. Prior to that, he served as head of trading and underwriting for Stone & Youngberg. Over the past several years, Parker has underwritten more than 1,200 California transactions with a par value exceeding $30 billion. He is considered to be the most experienced underwriter for K-12 financings in California as well as one of the most experienced underwriters and traders of land secured credits in the nation. Born and raised on the Iron Range of Minnesota, Parker earned a degree in mathematics and played ice hockey at Wheaton College (IL).

Catherine Lee, *Associate*. Catherine Lee recently joined Raymond James in February 2014 from Siebert Brandford Shank & Co., L.L.C. where she worked with various issuers for both east coast and west coast clients, including but not limited to the City of Oakland, the State Public Works Board of California, City of Philadelphia, and the Hartsfield-Jackson Atlanta International Airport. Ms. Lee has almost 3 years of municipal finance experience and holds her Series 7 FINRA license. Ms. Lee received her BA and MBA from Fordham University in 2007 and 2011, respectively.

EXHIBIT B

Raymond James Underwriting Team Senior-Managed California Water/Wastewater Underwriting Experience since January 1, 2010*

Sale Date	Par ($ mils)	Issuer	Issue Description
Pending	100.000	Contra Costa Water Dt	Water Revenue Refunding Bonds
07/25/13	2.695	Eastern Municipal Water Dt	Special Tax Bonds
07/18/13	57.420	Santa Margarita Water Dt	Special Tax Bonds
07/16/13	19.490	Oceanside Pub Financing Auth	Water Revenue Refunding Bonds
07/02/13	12.500	Clovis City-California	Wastewater Revenue Ref Bonds
07/02/13	31.810	Clovis City-California	Water Revenue Refunding Bonds
06/07/13	24.750	Western Riverside Wtr Wstwtr Au	Local Agency Rev Ref Bonds
06/06/13	54.175	Western Riverside Wtr Wstwtr Au	Local Agency Revenue Ref Bonds
06/04/13	20.890	Corona Utility Authority	Wastewater Revenue Bonds
05/29/13	2.715	Eastern Municipal Water Dt	Imp Area Special Tax Bonds
05/29/13	2.825	Eastern Municipal Water Dt	Special Tax Bonds
05/23/13	.810	Eastern Municipal Water Dt	Special Tax Bonds
05/23/13	3.675	Eastern Municipal Water Dt	Special Tax Bonds
05/14/13	17.165	West Basin Municipal Water Dt	Refunding Revenue Bonds
05/08/13	6.890	Santa Fe Springs Water Utility Auth	Water Revenue Bonds
04/18/13	15.135	Oceanside Pub Financing Auth	Sewer Revenue Refunding Bonds
02/27/13	6.995	South Pasadena Pub Fin Auth	Water Revenue Refunding Bonds
01/31/13	4.810	Fairfield City-California	Water Revenue Refunding Bonds
01/29/13	6.500	Malibu City-California	Special Tax Bonds
11/29/12	19.975	Chino Hills Financing Auth	Water Revenue Bonds
11/28/12	26.735	Hesperia Jt Pub Finance Auth	Lease Revenue Bonds
11/20/12	9.820	Santa Cruz Co (Felton) CFD #1	Special Tax Refunding Bonds
11/08/12	10.085	Whittier Utilities Authority	Water Revenue Bonds
11/01/12	68.940	California Infrstr & Eco Dev Bank	Clean Wtr St Revolv Fd Ref Bonds
09/18/12	10.080	Concord City-California	Wastewater Revenue Ref Bonds
08/16/12	17.105	Lodi Public Finance Auth	Ref Wastewater Revenue Bonds
07/25/12	35.880	Corona Utility Authority	Water Revenue Bonds
07/18/12	50.000	Eastern Municipal Water Dt	Ref Water & Sewer Rev Bonds
06/05/12	2.055	Santa Maria City-California	Water & Wastewater Rev Ref Bonds
06/05/12	48.064	Santa Maria City-California	Water & Wastewater Rev Ref Bonds
05/23/12	53.240	Santa Rosa City-California	Wastewater Revenue Ref Bonds
05/16/12	9.055	Eastern Municipal Water Dt	Special Tax Bonds
04/12/12	6.355	El Paso De Robles City-California	Wastewater Revenue Ref Bonds
04/04/12	9.345	Oxnard Financing Authority	Water Revenue Refunding Bonds
03/27/12	8.910	Tustin Public Financing Auth	Refunding Water Revenue Bonds
03/21/12	31.660	Escondido Jt Powers Fin Auth	Revenue Bonds
03/20/12	27.390	Escondido Jt Powers Fin Auth	Revenue Bonds
02/08/12	17.995	Salinas City-California	Sanitary Sewer System Rev Bonds
01/18/12	4.960	San Luis Obispo-California	Water Revenue Refunding Bonds
09/15/11	2.220	Western Municipal Water Dt	Special Tax Refunding Bonds
09/15/11	6.220	Western Municipal Water Dt	Special Tax and Refunding Bonds
09/14/11	157.100	So California Metro Water Dt	Water Revenue Refunding Bonds
08/16/11	109.475	Cucamonga Valley Water Dt	Water Revenue Refunding Bonds
08/16/11	4.500	Lake Co Public Finance Authority	Wastewater Revenue Bonds
08/02/11	77.180	Sacramento Regional County Sanitation District	Refunding Revenue Bonds
07/21/11	38.710	Santa Margarita Water Dt	Special Tax & Refunding Bonds
06/23/11	8.565	San Bernardino Vlly Muni Wtr Dt	Rev Certificates of Participation
06/21/11	46.705	Contra Costa Water Dt	Water Revenue Refunding Bonds
06/21/11	59.820	Contra Costa Water Dt	Water Revenue Notes
05/25/11	25.485	Elsinore Valley Muni Water Dt	Var Rte Ref Cert Of Participation
05/24/11	10.000	Mountain House Public Fin Auth	Utility System Revenue Bonds
05/12/11	22.750	San Luis Obispo Co Fin Auth	Lopez Dam Imp Ref Rev Bonds
03/22/11	3.345	Watereuse Finance Authority	Refunding Revenue Bonds
01/06/11	35.620	Dublin San Ramon Services Dt	Water Revenue Refunding Bonds
11/10/10	8.965	Moulton Niguel Water Dt	Certificates of Participation
10/19/10	9.015	Lodi Public Finance Auth	Water Revenue Bonds
10/19/10	29.650	Lodi Public Finance Auth	Water Revenue Bonds
10/14/10	9.965	Monte Vista Co Water Dt	Rev Certificates of Participation
09/23/10	.787	Coachella Valley Water Dt	Limited Obligation Imp Bonds
06/17/10	127.630	Contra Costa Water Dt	Water Revenue Notes
06/08/10	70.595	Castaic Lake Water Agency	Refunding Revenue COPs
05/26/10	47.050	San Francisco Public Util Comm	Wastewater Revenue Bonds
04/27/10	4.200	Diablo Water Dt	Water Revenue COPs

Sale Date	Par ($ mils)	Issuer	Issue Description
04/16/10	2.410	Brea Public Fin Authority	Water Revenue Bonds
04/16/10	9.885	Brea Public Fin Authority	Water Revenue Bonds
04/07/10	1.690	Eastern Municipal Water Dt	Special Tax Bonds
03/05/10	12.980	Fairfield-Suisun Sewer Dt	Sewer Revenue Refunding Bonds
03/04/10	28.550	Carmichael Water Dt	Water Revenue Refunding COPs
02/25/10	37.935	Central Basin Municipal Water Dt	Revenue Refunding COPs
01/05/10	11.690	Thousand Oaks-California	Wastewater Revenue Ref Bonds
Total	**1,879.591**	**70 Total Transactions**	

**Includes team experience at prior firms (Tom Innis, Parker Colvin, and John Nguyen)*

Exhibit F

Management Briefing:
DHCCP SWP Cost Allocation Alternatives

State Water Contractors
DHCCP SWP Cost Allocation Work Group
November 8, 2013

Current Agreement with DWR

Supplemental DHCCP Funding Agreement

- Define Principles in Agreement:

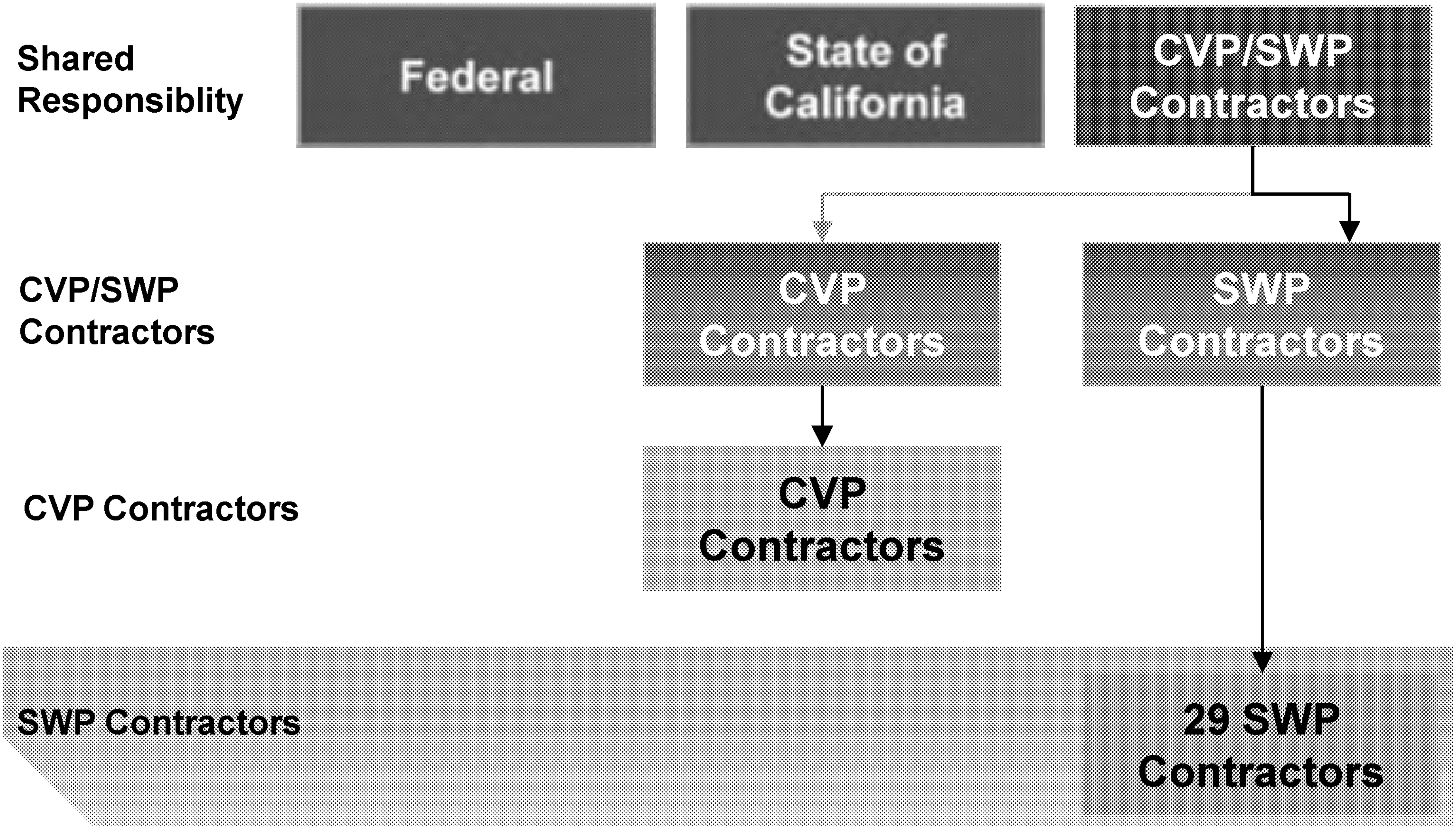
1. Benefits and Costs for SWP Contractors
2. Participation of SWP Contractors
3. Implementation Approach
4. SWC-DWR Organization and Process

Benefits

BDCP's Delta Conveyance Water Management Benefits:

1. Improved Water Supply Conditions
2. Improved Water Quality
3. Protection From Seismic Events
4. Improved Ability to Use So. of Delta Storage
5. Improved Capability for Water Transfers

Allocation Work Groups



Shared Responsiblity

Federal

State of California

CVP/SWP Contractors

CVP/SWP Contractors

CVP Contractors

SWP Contractors

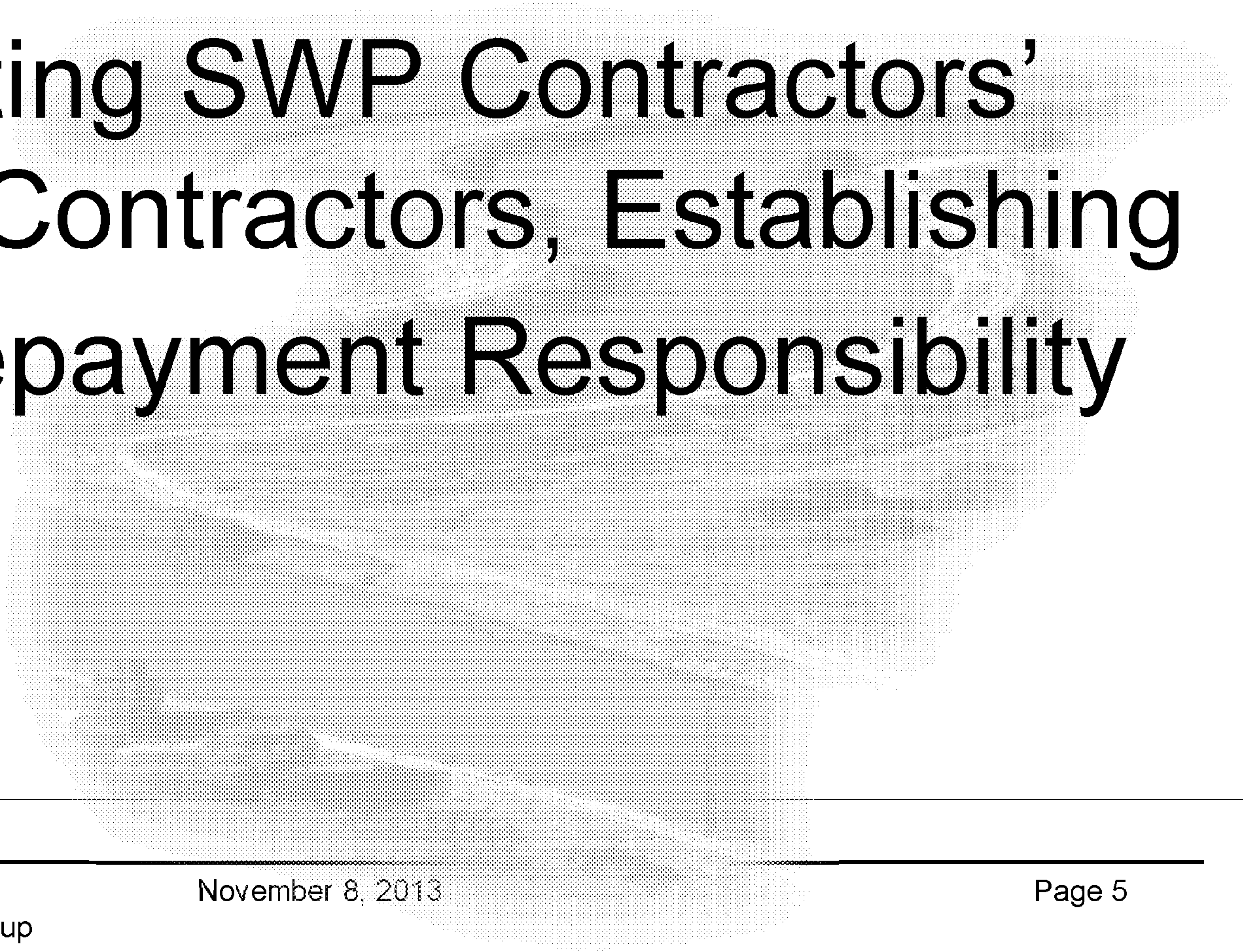
CVP Contractors

CVP Contractors

SWP Contractors

29 SWP Contractors

Objective



Develop Alternatives for Allocating SWP Contractors' Share to Contractors, Establishing SWP Repayment Responsibility

Goal

Criteria for Alternatives:

1. Get All Contractors to say “Yes”
2. Simple to Implement
3. Equitable to All Contractors

SWP Cost Allocation Alternatives

Order for Considering Alternatives

1
Table A Allocations

1A
Conservation Charge

1B
Conservation Charge without NOD Contractors

1C ①
Conservation Charge with Management Provisions

2
Level of Participation with "Fair Share"

2A
Fixed Table A Amount for Level of Participation

2B
Variable Table A Amount for Level of Participation

2C ②
Variable Capacity Amount for Level of Participation

3
Costs Follow Water

Excluded

4
Hybrid Approach

4A ③
Water Supply Sliding Scale

SWP Cost Allocation Alternatives

1

Table A Allocations

Order for Considering Alternatives

1C

Conservation Charge with Management Provisions

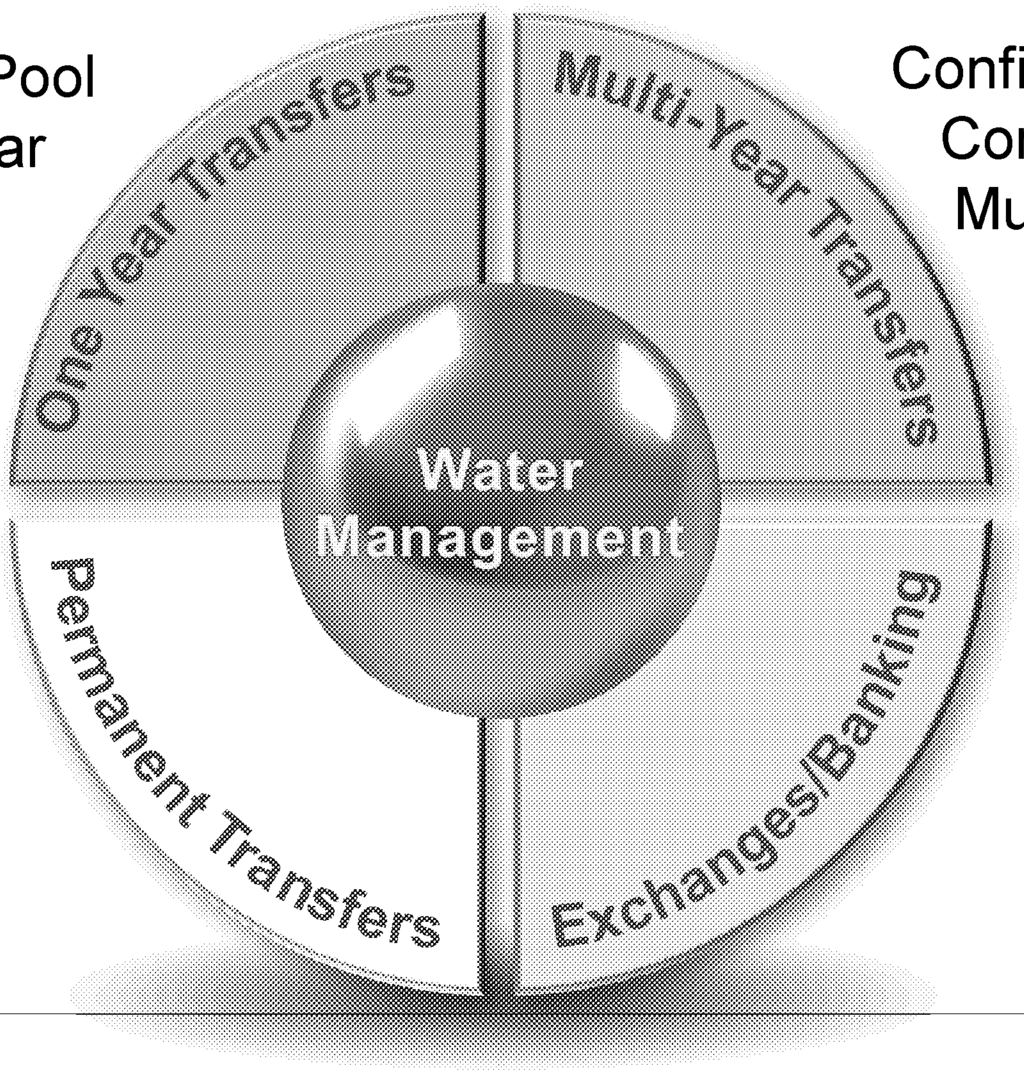
Alternative 1C:

Conservation Charge with Management Provisions

Cost Allocation (Basis)	Table A Amounts Except for North of Delta Contractors
Water Supply Allocation (Basis)	Table A Amounts
Description	Provides for Non-Participation or Reduced Participation Rates for North of Delta. Includes Contractual Provisions for Annual Water Sales and Contractor to Contractor Agreements for Exchange Programs
Implementation	Contract Amendment Likely Needed to Reflect Different Cost Allocations and Different Water Supply Deliveries, and Allowance for Annual Sales
Example	Provided in Following Slides

Potential Management Provisions

Alternative 1C



Replace Turnback Pool with New One-Year Sale Article (Like MYTP)

Confirm Ability for SWP Contractors to initiate Multi-Year Transfers

Modify Existing Contract for Clarity (if Necessary)

Make Consistent and Address Issue of Disguised Sale

Improved Management Options

Agencies Able to Develop Short & Long-Term Agreements:

Short-Term Agreements

Annual Agreements

- Maintain Flexibility
- Respond Annually to Needs

Long-Term Agreements

Option Agreements

- Give Up Supply When Needs Not Critical

Long-Term Purchase Agreements

- Meet Water Management Goals
- e.g. Could Sell Additional DHCCP Supply to Other SWP Contractors

SWP Cost Allocation Alternatives

2

Level of Participation with “Fair Share”

Order for Considering Alternatives

2C

Variable Capacity Amount for Level of Participation

Alternative 2C:

Variable Capacity Amount for Level of Participation	
Cost Allocation (Basis)	Contractors Subscription to Facility Capacity
Water Supply Allocation (Basis)	Incremental Allocation Proportional to Capacity Subscription
Description	SWP Contractors subscribe for facility capacity based on their water supply needs. Capacity is allocated based on Table A if there are more requests than capacity. There may be provision for multiple layers of capacity subscription, with cost and supply differences.
Implementation	SWP Contract Amendment Needed
Example	Provided in Following Slides

Alternative 2C: Level of Participation

Approach

1. **INCREMENT**
   - Project Supply Increase and Costs Identified, Possibly by Capacity Increment
2. **REQUEST**
   - Individual Contractors Request Capacity Increment Based on Resulting Supply and Ability to Pay
3. **ALLOCATION**
   - Water Supply Allocated either Incrementally or as Adjustment to Table A Amounts
4. **SHARED COSTS**
   - All SWP Contractors Pay for Share of Common Delta Habitat Projects

Alternative 2C: Water Supply Allocation

Access to New Delta Conveyance

Reduced for Contractors with Lower Levels of Participation during Delta Failure

Approaches for Managing Different Water Supplies:

Indexed Approach

- Would Reduce Supply by Fixed Percentage for Agencies with Lower Participation
- Simpler
- Less Exact

Incremental Approach

- Would Allocation DHCCP Supply Increment Separately to Participants:
- More Complicated
- More Exact

SWP Cost Allocation Alternatives

4

Hybrid Approach

4A ④

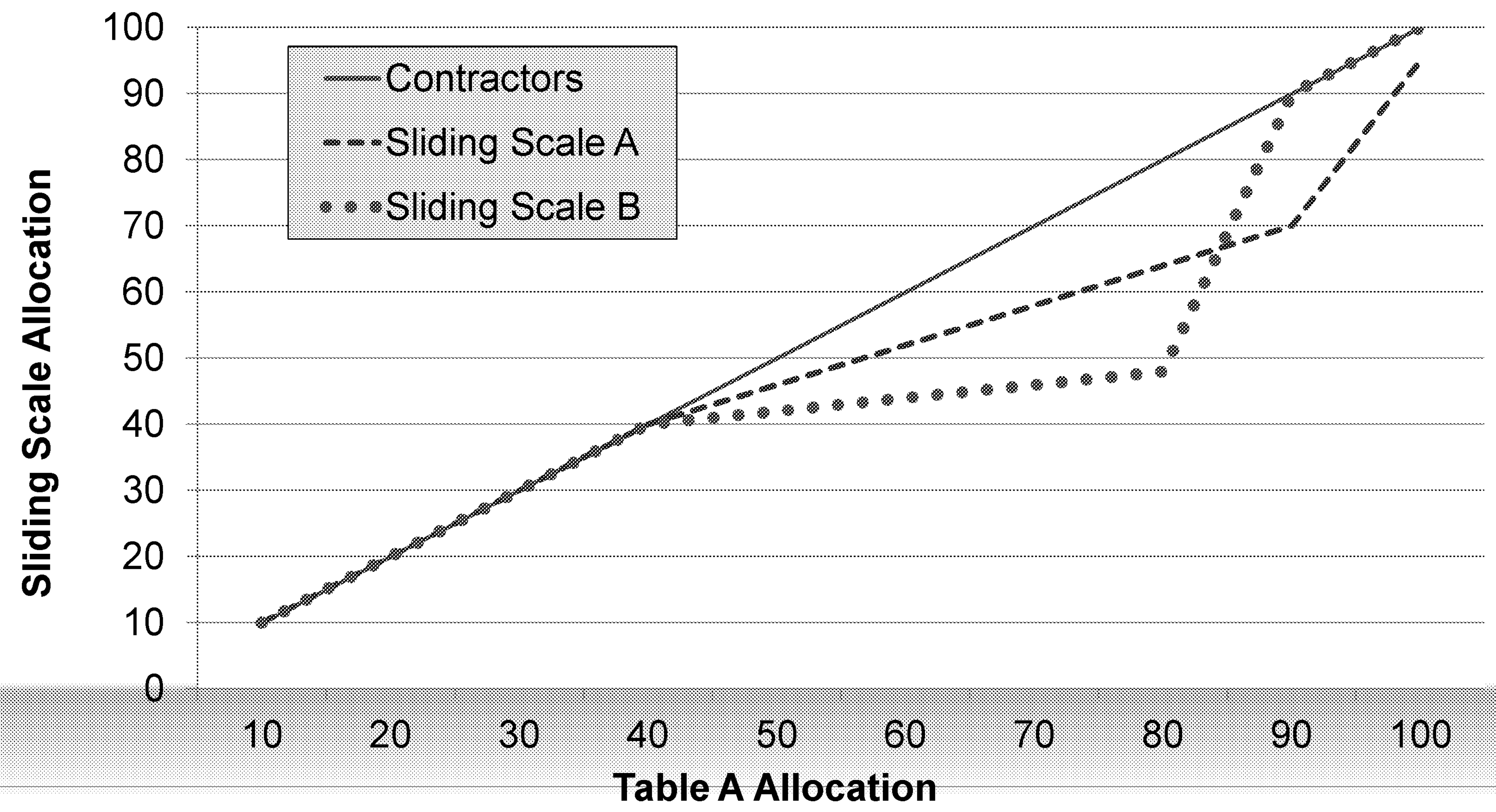
Water Supply Sliding Scale

Order for Considering Alternatives

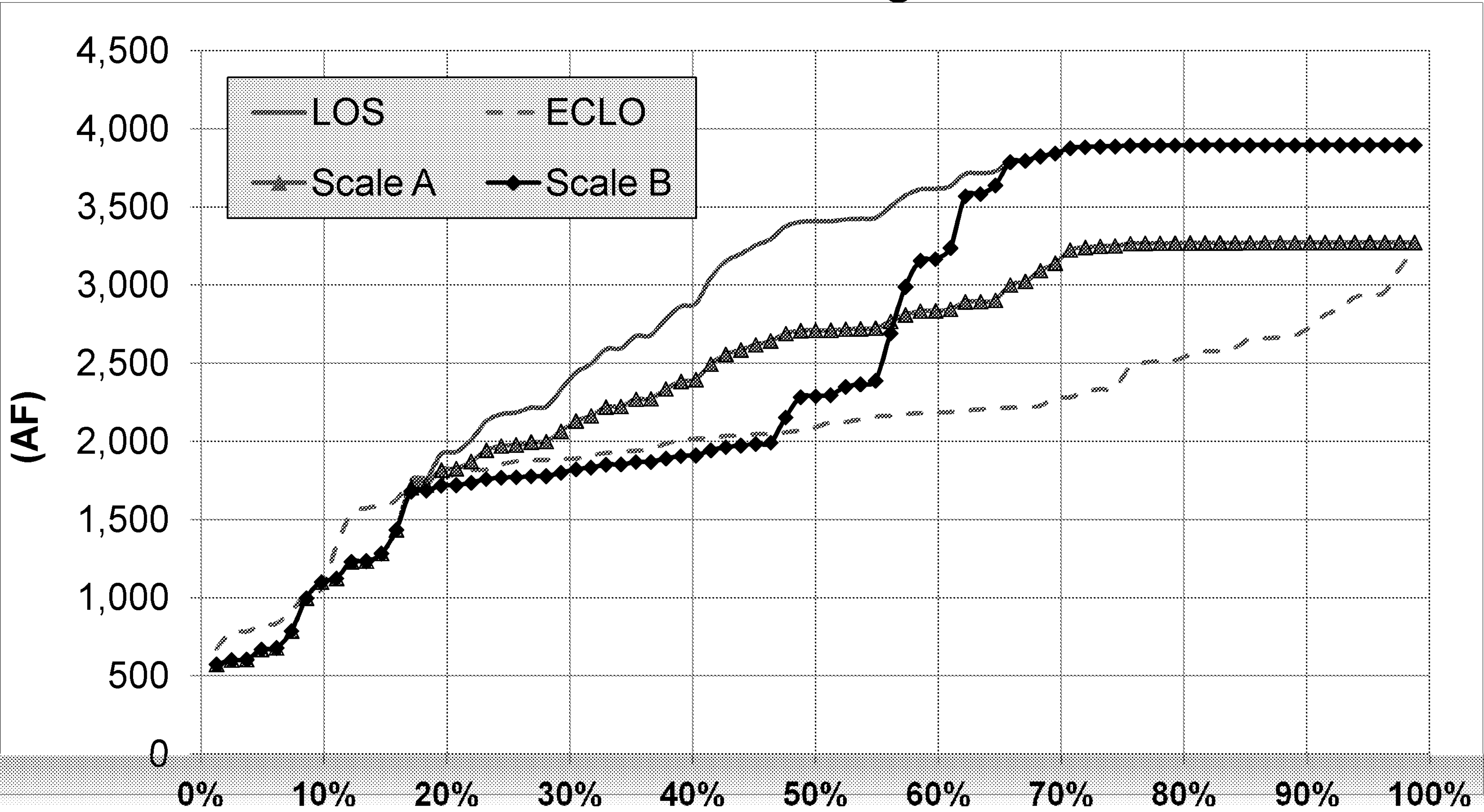
Alternative 4A:

Water Supply Sliding Scale	
Cost Allocation (Basis)	Reduced Cost Allocation
Water Supply Allocation (Basis)	Reduced Water Supply (Could be Sliding Scale)
Description	Could be seen as a type of “Exchange” from one group of SWP Contractors to another Sliding Scale and Cost Allocation based generally on water supply studies, with negotiated price and sliding scale
Implementation	Would Require Contract Amendment
Example	Provided in Following Slides

Alternative 4A
Provide Limited Number of Sliding Scales



Alternative 4A
Exceedence Curve for Sliding Scales



Alternative 4A
Other Sliding Scale Considerations

NEGOTIATIONS ☑

Break Points, Adjusted Percentages and Payment Percentage to be Negotiated Among SWP Contractors

FUTURE CONDITIONS ☑

Possibly Provide Buy-Back Provision for Change in Future Conditions

WATER MANAGEMENT ☑

Price Adjusted, so Likely Not Compatible with More Relaxed Management Options

Alternatives Considered

	Met Criteria?	
Basis for Allocation	Yes	No
1. Table A Allocations	✓	
2. Level of Participation with "Fair Share"		✓
3. Costs Follow Water		✓
4. Hybrid Approach		✓

Recommended Alternatives

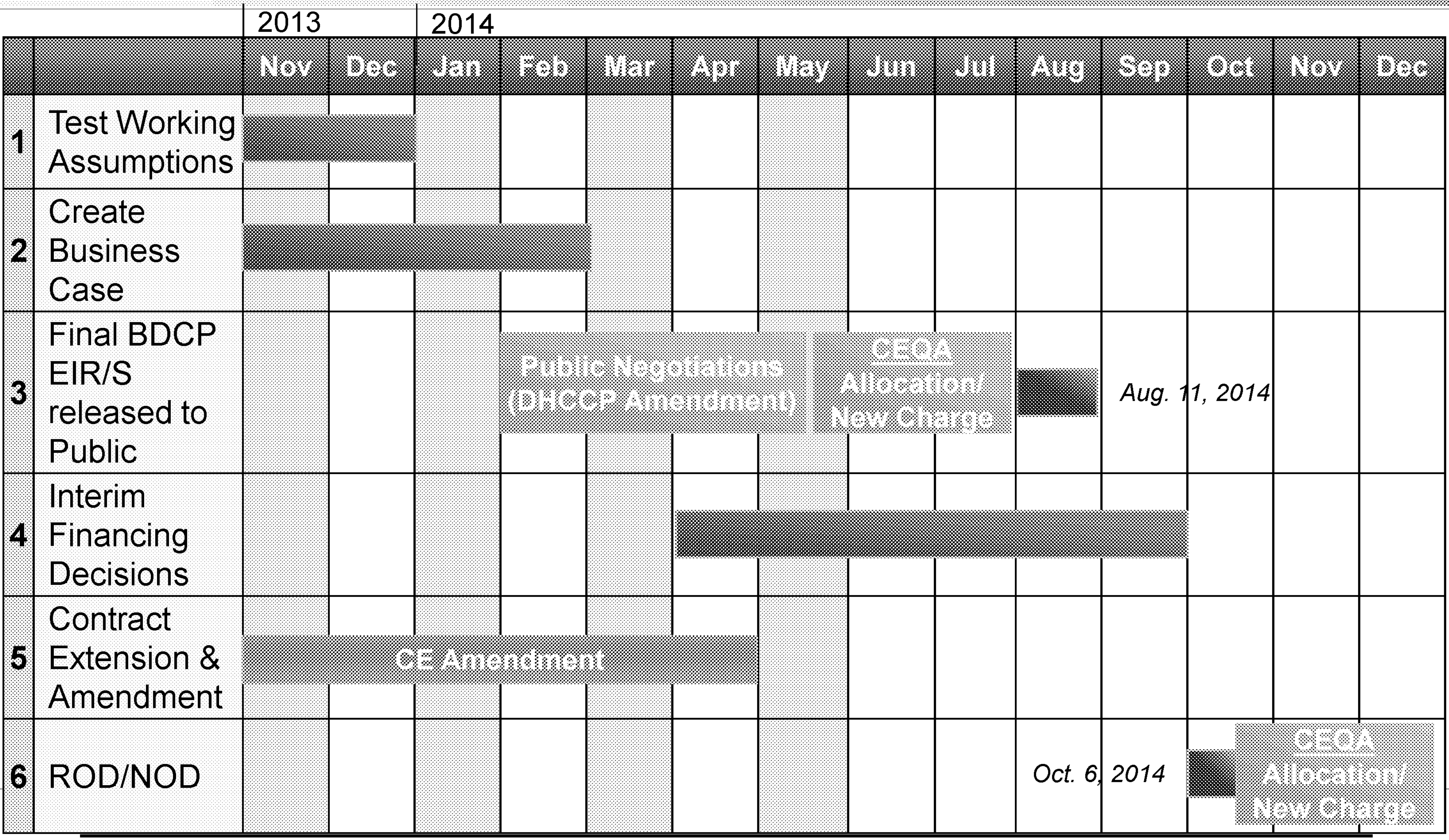
Alternatives	Strengths	Weaknesses
1C- Conservation Charge with Management Provisions	Consistent with Existing Terms All SWP Contractors will Participate in DHCCP Project Ultimate Cost Match Water Supply Needs	North of Delta Agreement Contractors not wanting to Participate in DHCCP Project Contractors with Limited Ability to Participate in Water Management Options
2C – Level of Participation	Select Level of Participation Ultimate Cost Match Water Supply Needs	Contractors not wanting to Participate in DHCCP Project Requires Method to Ensure Zero Benefits for Non-Participants Could Lead to Smaller-sized Facilities, Reducing Benefits Increasing Challenges for Permitting
4A – Water Supply Sliding Scale	Select Level of Participation All SWP Contractors will Participate in DHCCP Project Ultimate Cost Match Water Supply Needs	Contractors not wanting to Participate in DHCCP Project Requires Method to Ensure Zero Benefits for Non-Participants Determination of Sliding Scales

Recommendation

Working Assumption Approach

- Test Alternative within Individual Agencies
- Preferred Approach:
  - ✓ 1C- Conservation Charge with Management Provisions

Next Steps



		2013 Nov	Dec	2014 Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Test Working Assumptions	▨	▨												
2	Create Business Case	▨	▨	▨	▨										
3	Final BDCP EIR/S released to Public				Public Negotiations (DHCCP Amendment)	▨	▨	▨ CEQA Allocation/ New Charge	▨	▨	▨	Aug. 11, 2014			
4	Interim Financing Decisions						▨	▨	▨	▨	▨	▨			
5	Contract Extension & Amendment	CE Amendment	▨	▨	▨	▨	▨								
6	ROD/NOD										Oct. 6, 2014		▨ CEQA Allocation/ New Charge	▨	▨

Questions

Terry Erlewine, General Manager

State Water Contractor

terlewine@swc.org

(916) 447-7357 ex: 203

Exhibit G

DHCCP Finance Workshop

SWP Cost Allocation Workgroup
State Water Contractors
1 April 2014

SWP Cost Allocation Alternatives

Order for Considering Alternatives

1
Table A Allocations

1A

Conservation Charge

1B ①

Conservation Charge without NOD Contractors

1C ②

Conservation Charge with Management Provisions

2
Level of Participation with "Fair Share"

2A

Fixed Table A Amount for Level of Participation

2B

Variable Table A Amount for Level of Participation

2C ③

Variable Capacity Amount for Level of Participation

3
Costs Follow Water

Excluded

4
Hybrid Approach

4A ④

Water Supply Sliding Scale

Alternative 1C:

Conservation Charge with Management Provisions

Cost Allocation (Basis)	Table A Amounts Except for North of Delta Contractors
Water Supply Allocation (Basis)	Table A Amounts
Description	Provides for Non-Participation or Reduced Participation Rates for North of Delta. Includes Contractual Provisions for Annual Water Sales and Contractor to Contractor Agreements for Exchange Programs
Implementation	Contract Amendment Likely Needed to Reflect Different Cost Allocations and Different Water Supply Deliveries, and Allowance for Annual Sales

SWP Cost Allocation Workgroup KCWA Proposal – Alternative 1K

- Identify 3,000 cfs Increments
  - 0-3,000 cfs – $296M/Year
  - 3-6,000 cfs – $90M/Year
  - 6-9,000 cfs – $47M/Year
- Provide for Agricultural Contractors to Purchase Capacity in 6-9,000 cfs
- Allocate Total Project Yield Proportional to Table A Amounts

Alternative 1K:

Variable Capacity Amount for Level of Participation with Management Provisions

Cost Allocation (Basis)	Incremental Capacity, 3,000 cfs Increments Except for North of Delta Contractors
Water Supply Allocation (Basis)	Table A Amounts
Description	Provides for Non-Participation or Reduced Participation Rates for North of Delta. Includes Contractual Provisions for Annual Water Sales and Contractor to Contractor Agreements for Exchange Programs
Implementation	Contract Amendment Likely Needed to Reflect Different Cost Allocations and Different Water Supply Deliveries, and Allowance for Annual Sales

Alternative 2C:

Variable Capacity Amount for Level of Participation	
Cost Allocation (Basis)	Contractors Subscription to Facility Capacity
Water Supply Allocation (Basis)	Incremental Allocation Proportional to Capacity Subscription
Description	SWP Contractors subscribe for facility capacity based on their water supply needs. Capacity is allocated based on Table A if there are more requests than capacity. There may be provision for multiple layers of capacity subscription, with cost and supply differences.
Implementation	SWP Contract Amendment Needed

Alternative 4A:

Water Supply Sliding Scale	
Cost Allocation (Basis)	Reduced Cost Allocation
Water Supply Allocation (Basis)	Reduced Water Supply (Could be Sliding Scale)
Description	Could be seen as a type of “Exchange” from one group of SWP Contractors to another Sliding Scale and Cost Allocation based generally on water supply studies, with negotiated price and sliding scale
Implementation	Would Require Contract Amendment

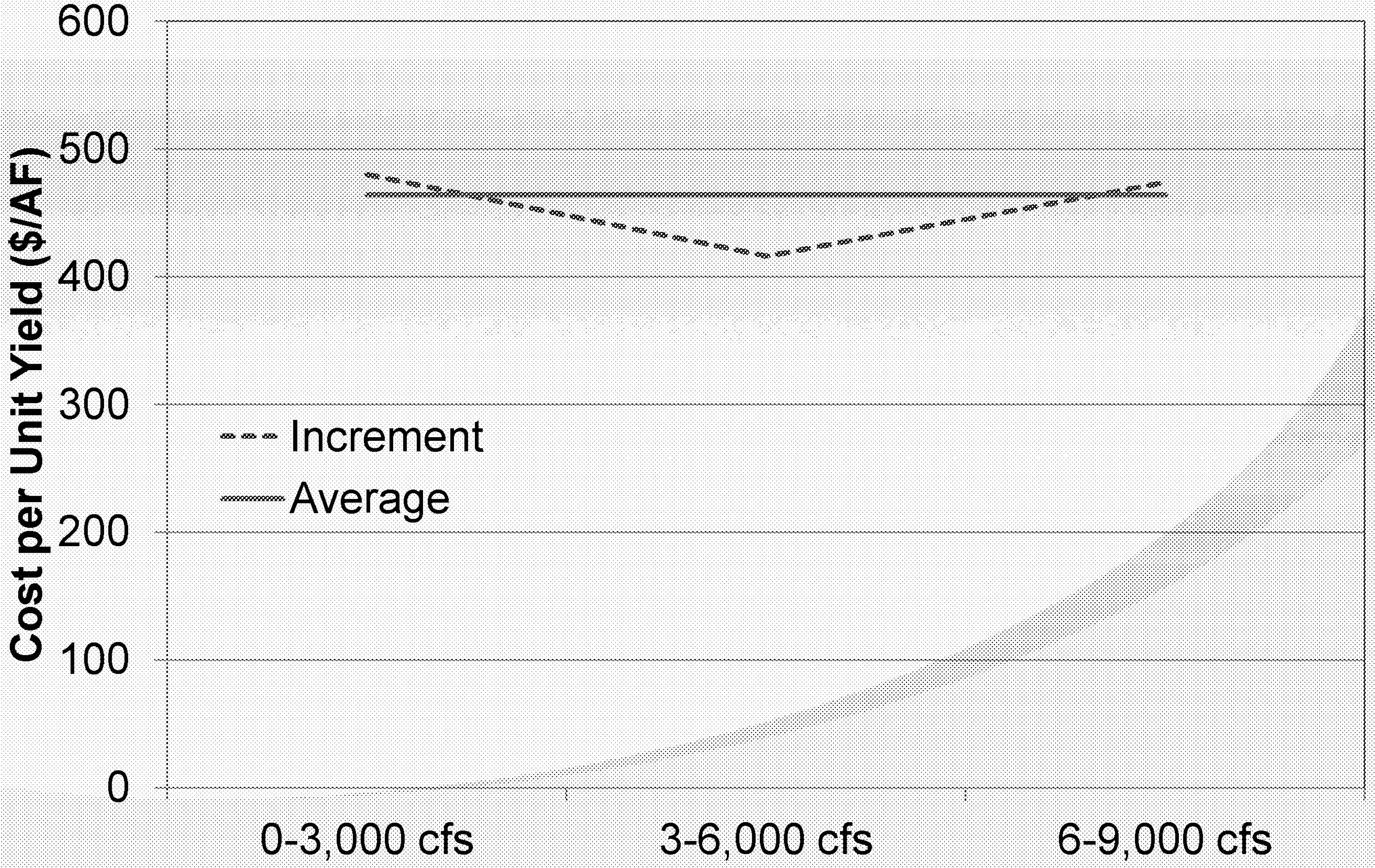
SWP Cost Allocation Work Group 2014 Activity

- Review KCWA Cost Allocation Proposal
- Review Cost Allocation for Smaller Sizes
- Potential Followup Negotiations for Alternative 1C
- SWC Staff Meeting with KCWA Member Agencies
- Formulate Potential Additional Alternative

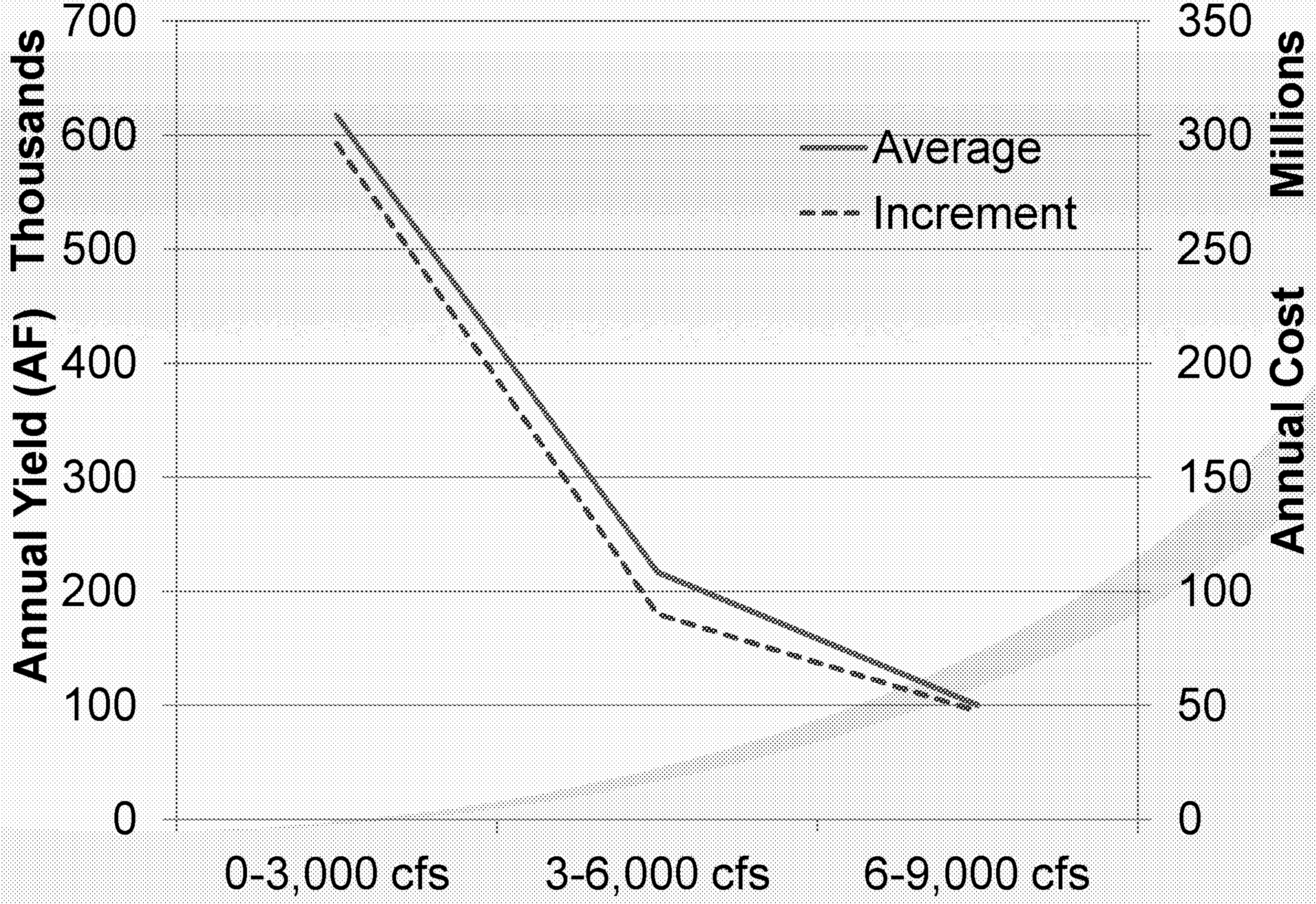
Considerations for New Alternative

- Considerable Support for Water Management Measures in Alternantive 1C
- Different Water Management Goals and Financial Capability Among SWC Contractors
- Limited Variation in Unit Costs for Different Sizes

Low Outflow Scenario Unit Yield



Why Does Unit Yield Remain Relatively Constant Over Incremental Sizes



Alternative Based on Incremental Cost

- Cost for Low Outflow Scenario Generally Insensitive to Size
- Intuitively Makes Sense
  - Incremental Costs For Facility Smaller
  - Incremental Benefits for Facility Smaller
- Implication for Cost Allocation:
  - Incremental Benefits (In Terms of Water Supply) Proportional to Incremental Costs
  - Project Size Could be Modified Without Affecting Unit Cost for Water Supply Benefits

New Alternative 2D:

Variable Capacity Amount for Level of Participation with Management Provisions

Cost Allocation (Basis)	Contractors Subscription to Facility Capacity Except for North of Delta Contractors
Water Supply Allocation (Basis)	Incremental Allocation Proportional to Capacity Subscription
Description	SWP Contractors subscribe for facility capacity based on their water supply needs. Capacity is allocated based on Table A if there are more requests than capacity. Includes Contractual Provisions for Annual Water Sales and Contractor to Contractor Agreements for Exchange Programs
Implementation	Contract Amendment Likely Needed to Reflect Different Cost Allocations and Different Water Supply Deliveries, and Allowance for Annual Sales

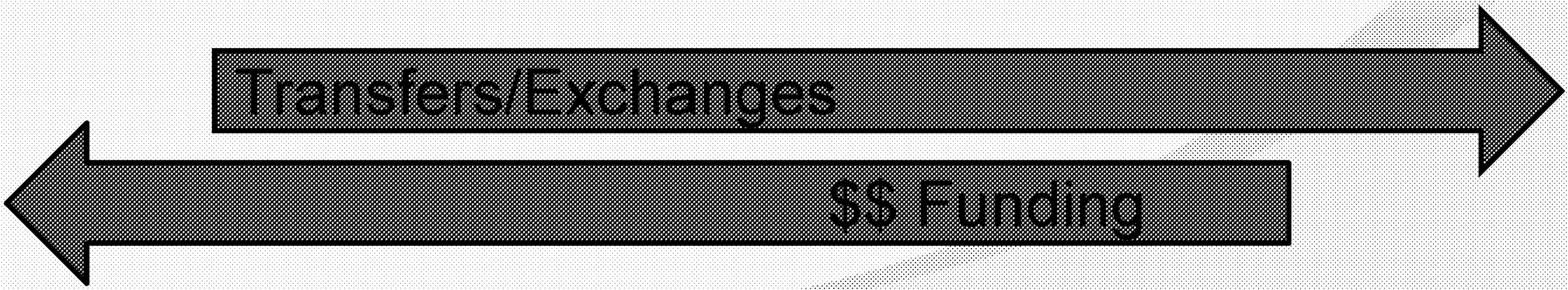
Alternative 1C

"Ag" Agencies

- Cost: Allocated based on Table A Amounts
- Supply: Allocated based on Table A Amounts

"M&I" Agencies

- Cost: Allocated based on Table A Amounts
- Supply: Allocated based on Table A Amounts



Transfers/Exchanges

$$ Funding

Financial Risk of Transfers Not Materializing

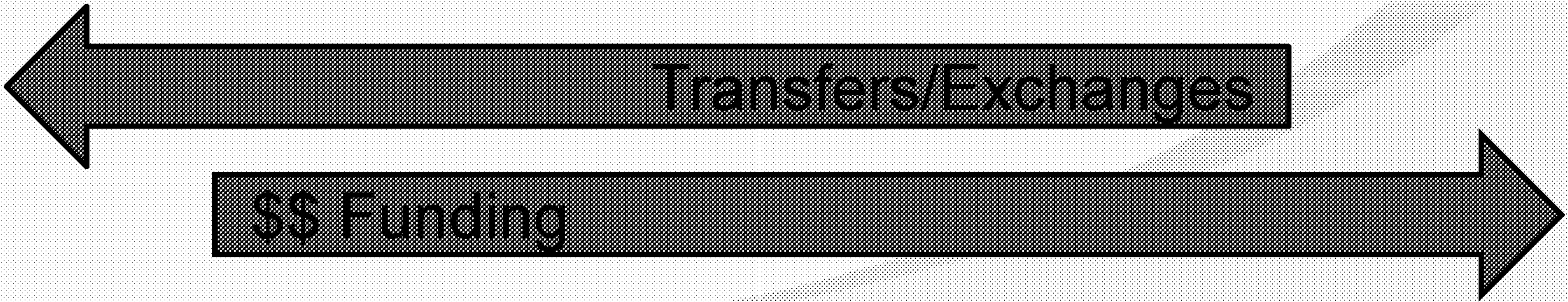
Alternative 2D

“Ag” Agencies

- Cost: Incremental Above 6,000 cfs Tunnel
- Supply: Incremental Above 6,000 cfs Tunnel

“M&I” Agencies

- Cost: Incremental Below 6,000 cfs Tunnel
- Supply: Incremental Below 6,000 cfs Tunnel



Financial Risk of Transfers Not Materializing

Other Considerations for Alternative 2D

- Essentially a Type of Opt-Out Alternative
- In Theory Could Provide for Lower Total Level of Participation and Smaller Facility Size Without Affecting Unit Water Supply Benefits For Individual SWP Contractors
- Would Result in Different Cost and Water Supply Allocations to Different
  - Increased Billing and Allocation Challenges
  - Moves SWP Towards CVP Model With Different Allocations for Different Groups

Cost Allocation For Alternative 2D:

- Identify Incremental Unit Cost for Project
- Individual SWP Contractors Select Their Preferred Level of Participation
- Levels of Participation Adjusted:
  - Reduced Proportionate to Table A if More Capacity Requested than Available
  - Increased if Less Capacity Requested than Available
  - Project Could be Reduced in Size if Level of Participation Lower than Facility Size

Why Would Some Contractors Increase their Level of Participation?

- SWP Contractor water supply needs not all Proportional to Table A Amounts
- Higher Level of Participation Provides Greater Protection Against Potential Future Changed Circumstance such as Climate Change
- Higher Level of Participation Provides Additional Water Supplies that Can be Sold to Other SWP Contractors

Why Would Some Contractors Increase their Level of Participation?

- SWP Contractor water supply needs not all Proportional to Table A Amounts
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Water Supply Operations

- Identify Incremental Water Supply
  - Annual With and Without Calculation
  - Fixed Percentage Allocation
  - Fixed Formula
- Access To Delta Conveyance Capacity Limited to Level of Participation
- Need to Define Access to Article 21 Water
- Water Supply Operations Procedures Defined in Contract Amendment

Delta Conveyance Contract Amendment Potential Approach

- Three Alternatives for Individual SWP Contractors:
  - Default, No Contract Amendment – Delta Conveyance Paid for Through Delta Water Charge
  - Participants' Contract Amendment:
    - ☐ Defines New Charge and Water Supply Benefits
  - Non-Participants' Contract Amendment:
    - ☐ Confirms Reduced Payment for Delta Conveyance and Defines Limits on Water Supply

Questions?

Terry Erlewine, General Manager

State Water Contractor

terlewine@swc.org

(916) 447-7357 ex: 203

Exhibit H

From: Arakawa,Stephen N
Sent: Thursday, January 30, 2014 12:05 PM
To: Patterson,Roger K; Kightlinger,Jeffrey; Upadhyay,Devendra N
Cc: Donhoff,Kevin A; Safely,Jack S; Arakawa,Stephen N; Goshi,Brandon J
Subject: Kern County Proposal on BDCO Cost Allocation

Importance: High

Last week, Jim Beck provided this presentation and an associated spreadsheet as an alternative SWP contractor cost allocation strategy for BDCP.

Kern has been moving away from Table A based approach since December when we first heard that their members were not supportive.

Jim is asking whether this can be a viable approach, or whether we have comments or changes to it.

In summary, the premise he put forward is that 6000 cfs capacity would get done as urban only, given their needs. That is his assumption.

Kern cannot afford paying their proportionate share of a 9000 cfs facility based on Table A.

Therefore their share should be within the last 3000 cfs increment of a 9000 cfs facility; last and least costly increment.

He states that they would receive less benefits, but it's not clear to me how that would work.

With proportionate share of 9000 cfs facility, they would pay roughly 25 percent of the total cost share attributed to SWP contractors.

With his new last increment approach, they would pay about 8 percent.

There will be another meeting/call to discuss this amongst contractors tomorrow at 2 pm.

I recommend that we indicate that the basic concept is not workable for us. Also we do not agree with the logic, and have no suggestions on how to make it work. Key messages are:

1. Need to build the first increment for anyone to get any water supply.
2. The proper approach should be reflective of where the water is going, ie Jeff's follow the water principal.
3. Getting full supply capability but paying only in last increment is not equitable.
4. This approach would be very challenging to negotiate and is not a simple approach (ie who gets what water and when).
5. This approach deviates significantly from the existing SWP contract.

I would like to put forth these types of responses. Let me know if you disagree with either the content of the messages here or the strategy of communicating our concerns on this call. I know that the other contractors have similar concerns, but will likely be looking to MWD to express concern.

Cost Allocation
Presentation.p...

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Letter 9 Center for Food Safety

CENTER FOR
FOOD SAFETY

October 17, 2016

VIA ELECTRONIC MAIL

California Department of Water Resources
Attn: Ted Alvarez
State Water Project Analysis Officer
SWP Support Branch
1416 9th Street, Room 1620
Sacramento, CA 95814
ted.alvarez@water.ca.gov

Comments on the Department of Water Resources Draft Environmental Impact Report for the Water Supply Contract Extension Project

To Department of Water Resources ("DWR"):

The Center for Food Safety ("CFS") appreciates the opportunity to comment on the Draft Environmental Impact Report ("DEIR") for the Water Supply Contract Extension Project ("Project"). CFS and its members depend on the sustainable and equitable operation of the State Water Project ("SWP") and take great interest in the Project for the opportunity—and obligation—that the Project presents to mitigate the SWP's environmental impacts. These comments are submitted on behalf of CFS, as well as its members, volunteers, and employees.

CFS is a nonprofit, public interest advocacy organization dedicated to protecting human health and the environment by curbing the proliferation of harmful food production technologies and promoting sustainable agriculture, including impacts to water resources. In furtherance of this mission, CFS uses legal actions, groundbreaking scientific and policy reports, books and other educational materials, and grassroots campaigns on behalf of its 750,000 farmer and consumer members across the country.

I. INTRODUCTION

The Project seeks to finance capital expenditures to the SWP beyond the 2035 expiration date set in the current contracts by signing long-term extensions for each contract. (DEIR at ES-1.) The SWP is the largest state-owned, multi-purpose, user-financed water storage and delivery system in the United States. (*Id.* at 2-2.) DWR constructed and currently operates and maintains the SWP, which conveys water to twenty-nine water contractors. (*Id*. at ES-1.) The contractors receive water service from the SWP in exchange for paying the costs that are associated with constructing, operating, and maintaining the SWP facilities. (*Ibid*.) DWR finances capital expenditures on the SWP by selling revenue bonds with terms of up to thirty years or more. However, according to DWR, it has become more challenging to finance expenditures because it is getting difficult to sell long-term revenue bonds beyond 2035, the date the contracts begin to expire. (*Ibid*.) Thus, the Project seeks to amend the financial sections of the contracts to ensure that DWR can finance SWP expenditures beyond 2035. (*Id*. at ES-3.)

Notwithstanding the importance of conveying water to a large portion of California's population, the SWP has contributed to a substantial decline in the Sacramento-San Joaquin Delta watershed ("Bay-Delta") ecosystem for the past fifty years. Water delivery is estimated in each of the contracts and included in a schedule for each contractor that sets forth the maximum annual amount of water that may be requested, which is known as the annual Table A amounts. (*Id*. at 2-12.) The contracts require DWR to make all reasonable efforts to deliver the full Table A amounts; however, the Table A amounts are much higher than those the SWP is capable of providing. This is one of the leading causes of the precipitous decline in the health of the Bay-Delta.

Realizing the crisis facing the Bay-Delta, the California State Legislature passed the Sacramento-San Joaquin Delta Reform Act of 2009 ("Delta Reform Act") to ensure that all projects involving the Bay-Delta will meet the coequal goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Bay-Delta ecosystem. Despite the fact that the SWP unequivocally is subject to these requirements, the Project fails to align the contract extensions with the Delta Reform Act.

The DEIR is also deficient in its description of the future expenditures that will be enabled by the Project, failing to mention a single expenditure for which the money will be used. Most significantly, the DEIR fails to include an analysis of California WaterFix, which is an enormous expenditure that will likely be funded, at least in part, by the funds generated as a result of the Project. Without an analysis of proposed future expenditures to the SWP—and in particular California WaterFix—it is impossible to evaluate the environmental impacts of the Project, and the DEIR fails in its role as an informational document.

II. THE CALIFORNIA ENVIRONMENTAL QUALITY ACT ("CEQA")

Under CEQA, a public agency must prepare an environmental impact report ("EIR") on any project the agency proposes to "carry out or approve" if the project may have significant environmental effects. (*Save Tara v. City of Hollywood* (2008) 45 Cal.4th 116, 121 [citing Pub. Resources Code, §§ 21100, subd. (a), 21151, subd. (a)].) An EIR is a "detailed statement … describing and analyzing the significant effects of a project and discussing ways to mitigate or avoid the effects." (Cal. Code Regs., tit. 14, § 15362 ("CEQA Guidelines").) The EIR is intended "to demonstrate to an apprehensive citizenry that the agency has, in fact, analyzed and considered the ecological implications of its action. (*County of Amador v. El Dorado Water Agency* (1999) 76 Cal.App.4th 931, 944.) Because the EIR must be certified or rejected by public officials, it is a document of accountability. (*Ibid*.)

A crucial component of the EIR "is to ensure that all reasonable alternatives to Projects are thoroughly assessed by the responsible official." (*Laurel Heights Improvement Assn. v. Regents of University of California* (1988) 47 Cal.3d 376, 400 [citing *Wildlife v. Chickering* (1976) 18 Cal.3d 190, 197].) An EIR must describe a reasonable range of alternatives to the project, or to the location of the project, that could feasibly attain most of the basic objectives of the project while avoiding or substantially lessening any of the significant effects of the project. (CEQA Guidelines, § 15126.6, subds. (a), (f).)

Another chief purpose of an EIR is the cumulative impact analysis. (*San Franciscans for Reasonable Growth v. City and County of San Francisco* (1984) 151 Cal.App.3d 61, 72-73.) The cumulative impacts from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. (*Id*. at 73 [citing CEQA Guidelines, § 15355, subd. (b) (formerly § 15023.5, subd. (b).)].) Lead agencies therefore must prepare a list of projects producing related or cumulative impacts. (*Ibid*.)

III. THE SACRAMENTO-SAN JOAQUIN DELTA REFORM ACT OF 2009 ("DELTA REFORM ACT")

In 2009, the California State Legislature determined that the Bay-Delta and California's water infrastructure were "in crisis and the existing Delta policies were not sustainable." (California Water Code, § 85001, subd. (a).) Accordingly, the State found that resolving the crisis required fundamental reorganization of the State's management of Bay-Delta watershed resources. (*Ibid*.) In an effort to resolve the crisis, a new policy was enacted to guide management decisions of the Bay-Delta, known as the Delta Policy.

Under the Delta Policy, the California Legislature declared that the basic goals for the Bay-Delta are the following:

> (a) Achieve the two coequal goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Bay-Delta ecosystem. The coequal goals shall be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Bay-Delta as an evolving place;
>
> (b) Protect, maintain, and, where possible, enhance and restore the overall quality of the Bay-Delta environment, including, but not limited to, agriculture, wildlife habitat, and recreational activities;
>
> (c) Ensure orderly, balanced conservation and development of Bay-Delta land resources; and
>
> (d) Improve flood protection by structural and nonstructural means to ensure an increased level of public health and safety.

(Pub. Resources Code, § 29702.) The California Water Code further elaborates that the State of California must reduce reliance on the Bay-Delta in meeting California's future water supply needs through a statewide strategy of investing in improved regional supplies, conservation, and water use efficiency. (California Water Code, § 85021.)

Under the Delta Reform Act, a state or local public agency that proposes to undertake a covered action shall prepare a written certification of consistency with detailed findings as to whether the covered action is consistent with the Delta Policy and shall submit that certification to the Delta Stewardship Council. (California Water Code, § 85225.) An action is covered if it is a plan, program, or project that occurs within the boundaries of the Bay-Delta, funded by a state or local public agency, is covered by at least one provision of the Delta Plan, and will have a significant impact on the coequal goals of the Delta Policy. (California Water Code, § 85057.5, subd. (a).) Regarding the SWP, an action is not covered only if it involves routine maintenance. (*Id*., subd. (b)(2).)

Since a proposal to implement the Water Supply Contract Extension Project is likely a covered action, and is more than just routine maintenance, DWR must draft a written certification of consistency with detailed findings indicating that it is consistent with the Delta Plan and will meet the coequal goals of the Delta Policy.

a. DWR Must Align the SWP Long-Term Contracts with the Delta Policy.

In proposing to implement the Water Supply Contract Extension Project, DWR has an opportunity and requirement to ensure that the SWP long-term contracts meet the coequal policy requirements of the Delta Reform Act. That is, in extending the SWP long-term contracts, DWR must provide a more reliable water supply for California as well as protect, restore, and enhance the Bay-Delta ecosystem. By amending only the financial terms of the contracts, yet extending the terms of the contracts to 2085, DWR is failing to meet the coequal goals of the Delta Policy, and failing to meet its obligations under the Delta Reform Act.

The SWP was enacted into law in the Burns-Porter Act (California Water Code, § 12930 et seq.), which was passed by the California Legislature in 1959 and approved by the voters in 1960. (DEIR at 2-1.) The SWP delivers water pursuant to contracts between DWR and twenty-nine contractors, including water agencies, throughout California. (*Ibid*.) The Burns-Porter Act authorized the State of California to issue bonds for construction of the SWP and enter into contracts for the sale, delivery, or use of water or power made available by the SWP. (*Id*. at 2-1 to 2-2.) In return for state financing, public water agencies contractually agreed to repay all SWP capital and operating costs allocable to water supply. (*Id*. at 2-2.)

The SWP diverts large volumes of water from the Bay-Delta, which flows down the California Aqueduct and is eventually delivered to the contractors. (*Id*. at 2-16.) Each year, by the first of October, the contractors submit monthly water requests to DWR for the subsequent calendar year to receive the water diverted from the Bay-Delta. (*Ibid*.) The amounts requested are the Table A amounts, which set the maximum annual amount of water that may be requested to be delivered. (*Id*. at 2-12.) The contracts require DWR to make all reasonable efforts to complete the water supply facilities necessary to deliver the full Table A amounts in the contracts, but when the supply of Table A water is less than the total of all contractors' requests, the available supply of Table A water is allocated among all contractors in proportions to each contractors' annual Table A amount. (*Ibid*.) Thus, the current contracts focus on supplying the maximum amount of water for human consumption, including agriculture and industry, with little to no regards to the ecology of the region.

Due to the long-term contracts' focus on DWR supplying the maximum amount of water to the contractors, and the SWP's reliance on the Bay-Delta, the SWP has played a large role in devastating the Bay-Delta ecosystem. According to DWR's 2011 SWP Delivery Reliability Report, SWP pumping is "not sustainable over the long term under current management practices and regulatory requirements." (Cal. Dept. of Water Resources, Final Delivery Reliability Report (2011) ("2011 DRR") p. 32 (Attached as Exhibit A).) That is partially why, in 2009, the California Legislature determined that the Bay-Delta was in crisis and passed the Delta Reform Act to restore the ecosystem and reduce the State's reliance on the Bay-Delta as a water supply. Thus, in extending the contracts that supply Bay-Delta water through the SWP for an additional fifty years, DWR cannot and should not maintain the same wasteful practices that led to the deterioration of the Bay-Delta's ecosystem in the first place.

b. Alternatives that Align the SWP Long-Term Contracts with the Delta Policy.

There are multiple ways DWR can align the Project with the Delta Policy, which DWR included but rejected in its alternatives analysis. As mentioned above, one of an EIR's major functions "is to ensure that all reasonable alternatives to proposed projects are thoroughly assessed by the responsible agency." (*Laurel Heights Improvement Assn. v. Regents of University of California*, *supra*, 47 Cal.3d at p. 400.) Public agencies "should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures available which would substantially lessen the significant environmental effects of such projects." (*Id*. [citing Pub. Resources Code, § 21002].) When an alternative is found to be infeasible on the ground that it is inconsistent with the project objectives, the finding must be supported by substantial evidence in the record. (*California Native Plant Soc. v. City of Santa Cruz* (2009) 177 Cal.App.4th 957, 604.)

DWR need only evaluate alternatives that meet the project objectives. DWR and the contractors agreed to the following project objectives:

(1) Ensure DWR can finance SWP expenditures beyond 2035 for a sufficiently extended period to provide for a reliable stream of revenue from the contractors and to facilitate ongoing financial planning for the SWP;

(2) Maintain an appropriate level of reserves and funds to meet ongoing financial SWP needs and purposes;

(3) Simplify the SWP billing process; and

(4) Increase coordination of financial matters between DWR and the contractors.

(DEIR at ES-3.) The alternatives that DWR considered meet the project objectives, but DWR erroneously rejected them.

i. Reduce Table A Deliveries.

During the scoping process, comments recommended that the DEIR should include an alternative with a reduction of the maximum Table A deliveries to contractors based on DWR reliability reports, climate change reports, and the Delta Reform Act, as well as associated reports on future water supplies. (DEIR at 7-3.) As the DEIR mentions, annual Table A amounts set forth the maximum annual amount of water that may be requested by contractors, and under the terms of the contracts DWR must make all reasonable efforts to perfect and protect those water rights. (*Ibid.*) A history of Table A deliveries indicates that DWR frequently attempts to give the maximum amount of Table A deliveries, which is not sustainable and degrades the Bay-Delta ecosystem. (DEIR at 2-14.) Thus, if Table A amounts were to be reduced to amounts that aligned with the amount of water the SWP can reliably and sustainably deliver each year, DWR would not be pressured to pump more water than the Bay-Delta is capable of providing.

In fact, there is no justification for including the original full Table A amounts in the new contracts. DWR cannot deliver these allocations because they simply do not exist. According to the 2011 DRR, there is a zero percent chance of delivering more than 3,365 acre feet in a given year, even though the maximum Table A amount is 4,133 acre feet. (2011 DRR at 46-49.) The Bay-Delta faces numerous challenges to its long-term sustainability, including continued subsidence of Bay-Delta Islands, many of which are below sea level, climate change, the threat of increased variability in floods and droughts, and potential levee failure. (*Id.* at S-1.) The Table A amounts must be changed in the new contracts to reflect these challenges. DWR should conduct a full analysis of actual water supply availability, taking into account climate change, impacts to threatened and endangered species, public trust doctrine issues, and other environmental regulations and statutes, to determine realistic Table A amounts that can actually be delivered.

Despite this information, DWR excuses the use of the inflated Table A amounts as merely representing the maximum annual water delivery a contractor can request, and thus not guaranteed amounts. (DEIR at 7-3.) DWR therefore concludes that reducing Table A amounts proportionately for all the contractors by amendment would not change the amount of water being delivered to the contractors. (*Ibid.*) However, that conclusion is logically inaccurate and not supported by substantial evidence: reducing the Table A amounts would lower the maximum amount of water contractors could request each year, which in turn would lower the total amount of water DWR was contractually obligated to attempt to deliver. Setting Table A amounts at sustainable levels would also reduce the political and economic pressure on DWR to continually deliver water in excess of what the SWP system and the Bay-Delta ecosystem can handle.

The DEIR reasons that reducing Table A amounts would not change the financial health of the SWP because it would not affect any of the contract financial provisions that address SWP billing provisions and reimbursements. (*Id.* at 7-3 to 7-4.) DWR then rejected a reduction in Table A deliveries because it does not address the Project's financial objectives. (*Id.* at 7-4.) However, as the DEIR admits, proportionally reducing the Table A amounts can be accomplished without reducing the annual amounts paid by each contractor, or the total amount paid by all the contractors together (these figures are calculated proportionally, as a percentage of the total, not as fixed amounts per contractor). Thus, a reduction in Table A amounts is a clearly feasible and environmentally superior alternative. Not only can DWR meet all the objectives set forth above, it can also align the Project with the Delta Reform Act by ensuring a reliable and sustainable water supply to contractors and protecting, restoring, and enhancing the Bay-Delta ecosystem.

ii. Implement New Water Conservation Provisions in the Contracts.

Comments during the scoping also recommended that the EIR include an alternative that requires new agriculture and urban water conservation measures in the contract amendments, but DWR again rejected the alternative. (DEIR at 7-4.)

DWR reasoned that it does not have to evaluate the alternative because existing regulatory and legal requirements independent from the Project require agriculture and urban water efficiency, conservation, and management measures. (DEIR at 7-4.) According to the DEIR, federal, state, and local regulatory requirements are in place, and the contractors' water uses are governed by the Reasonable and Beneficial Use Doctrine. (*Ibid*.) The DEIR also states that Governor Brown issued Executive Order B-29-15, which requires stated mandatory water reductions from urban use. (*Ibid*.) Taking this into account, DWR concluded that additional water conservation measures would not address the financial challenges, nor would they make needed improvement to the current contract financial provisions, and therefore contract amendments with agriculture and urban water conservations measures were rejected for not meeting the basic project objectives. (*Ibid*.)

However, DWR fails to understand that the current federal, state, and local regulatory requirements are insufficient to protect and restore the Bay-Delta, which is exactly why the State Legislature determined that the Bay-Delta was in crisis and passed the Delta Reform Act. In fact, the Delta Plan promulgated pursuant to the Delta Reform Act specifically recommends DWR to include provisions "in all State Water Project contracts, contract amendments, contract renewals, and water transfer agreements that requires the implementation of all State water efficiency and water management laws, goals, and regulations, including compliance with Water Code § 85021," which requires California to reduce reliance on the Bay-Delta as a water supply. (Delta Stewardship Council, The Delta Plan (2013) ("Delta Plan") pp. ES-19, 103 (Attached as Exhibit B).) The impacts of water diversion and exports have environmental consequences beyond the Delta, impacting other hydrologically connected waters including the San Francisco Bay watershed. (See The Bay Institute, San Francisco Bay: the Freshwater-Starved Estuary (September 2016) p. 7 (Attached as Exhibit C).) The SWP's Banks Pumping Plant is one of the single largest extractors of the San Francisco Bay watershed's freshwater. (*Id*. at 9.) As a result of intensive water diversion and exports, on top of permanent drought conditions, the estuary and its unique and valuable fish and wildlife species have experienced extremely dry conditions throughout the past four decades. (*Id*. at 12.) The massive transformation of the Bay's watershed, including SWP pumping, has changed the patterns of flow resulting in a sharp decline of native fish. (*Id*. at 37.) Six native fish species—Delta smelt, longfin smelt, steelhead, green sturgeon, and the winter and spring runs of chinook salmon—used to be among the most common in the estuary but are now listed as in danger of extinction. (*Ibid*.)

By failing to include urban and agriculture conservation measures into the contracts, DWR is failing to comply with the Delta Plan and maintaining the same wasteful practices that caused the deterioration of the Bay-Delta. The conservation measures would not impact the financial provisions of the contract, meaning that DWR can meet all the projective objectives while also complying with the Delta Plan.

IV. CUMULATIVE IMPACTS

a. Failure to Disclose Reasonably Foreseeable Probable Future Projects.

A chief purpose of CEQA is providing public agencies and the general public with detailed information about the effects of a project on the environment. (*Bakersfield Citizens for Local Control v. City of Bakersfield* (2004) 124 Cal.App.4th 1184, 227.) Part of this vital informational function is performed by a cumulative impact analysis, which refers to when two or more individual effects which, when considered together, are considerable. (*Ibid*.) The cumulative impact is “the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects.” (*Ibid*.) An EIR must analyze all probable future projects, which includes any projects that are undergoing environmental review. (*Gray v. County of Madera* (2008) 167 Cal.App.4th 1099, 1127.) Moreover, agencies have a duty to “use its best efforts to find out and disclose all that it reasonably can.” (S*an Franciscans for Reasonable Growth v. City of County of San Francisco, supra*, 151 Cal.App.3d at p. 74 [citing CEQA Guidelines, § 15140, subd. (g).].)

The DEIR concludes that the Water Supply Contract Extension Project will not result in physical environmental impacts, and therefore would not contribute to any cumulative effect, but DWR failed to analyze any reasonably foreseeable probable future projects. (DEIR at 6-4.) DWR proposed the Water Supply Contract Extension Project to affordably finance capital expenditures for the SWP because it is apparently difficult for DWR to sell revenue bonds used to finance the expenditures with maturity dates that extend beyond the year 2035. (DEIR at 4-1.) However, DWR has not described a single expenditure on the SWP that requires funding. Because DWR believes it needs more reliable funds to finance capital expenditures to the SWP, DWR must be aware of probable future expenditures, but has not disclosed what those expenditures are. DWR has a duty to disclose all that it reasonably can, and it is impossible to properly evaluate the environmental impacts of the Project without information regarding probable future projects that will use the funding enabled by this Project. DWR has therefore failed to conduct a proper cumulative impact analysis.

b. California WaterFix is a Reasonably Foreseeable Probable Future Project.

Despite its likely-insurmountable political and economic obstacles, and its dubious legality, California WaterFix qualifies as a reasonably foreseeable probable future project that will use SWP funding, and thus must be included in the DEIR’s cumulative impacts analysis. (*Gray v. County of Madera*, *supra*, 167 Cal.App.4th at pp. 1127-1128 [“[A]ny future project where the applicant has devoted significant time and resources to prepare for any regulatory review should be considered a probable future project for the purposes of the cumulative impact].) DWR has prepared a Recirculated Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement ("RDEIR/SDEIS") that purports to address the impacts of California WaterFix, making it a probable future project, yet information about this project is not sufficiently included in the DEIR. (DEIR at 7-5.) The DEIR concludes that since California WaterFix is separate and independent, and the contract extension would need to occur regardless of California WaterFix, it need not be included in the EIR. (*Ibid.*) Yet CEQA requires that the DEIR analyze all future probable projects.

Moreover, since the purpose of the Project is to enable DWR to finance SWP expenditures beyond 2035, and California WaterFix is an SWP expenditure, the funds will likely be used to pay for California WaterFix. (DEIR at 7-5.) Even in the unlikely event that California WaterFix obtains final approval, the Water Supply Contract Extension Project appears to exist for the purpose of funding California Waterfix, and DWR must therefore include California WaterFix in its cumulative impact analysis. In fact, California WaterFix, due to its extremely large capital cost, likely could not move forward without the completion of this contract extension. This is even more apparent when considering the removal of Article hh, which required that SWP revenue bonds be used to finance repairs to facilities that existed prior to January 1, 1987 and only be used to repair listed capital projects. (DEIR at 4-5.) The Water Supply Contract Extension Project proposes to delete the only clause that limits the extent of Delta Transfer Facilities that DWR could pursue after 1987. By removing Article hh, DWR would pave the way to finance California WaterFix with revenue bonds, which is prohibited in the current contracts.

V. CONCLUSION

DWR should not certify the DEIR or approve the Water Supply Contract Extension Project without conforming the Project to the Delta Policy, properly analyzing environmentally superior alternatives, and evaluating reasonably foreseeable probable future projects, including California WaterFix.

Thank you for the opportunity to comment on this matter. We look forward to your consideration and response to these comments.

Sincerely,

Ryan Berghoff
Center for Food Safety

Exhibit A

to Comments on the Department of Water Resources Draft Environmental Impact Report for the Water Supply Contract Extension Project

The State Water Project

Final Delivery Reliability Report

2011

June 2012

State of California
Natural Resources Agency
Department of Water Resources

State of California
Edmund G. Brown Jr., Governor

California Natural Resources Agency
John Laird, Secretary for Natural Resources

Department of Water Resources
Mark W. Cowin, Director

Susan Sims
Chief Deputy Director

Kasey Schimke
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Asst. Director, Public Affairs

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Prepared by AECOM

Director's Message

The *State Water Project Delivery Reliability Report 2011* (2011 Report) is the latest update to a biannual report that describes the existing and future conditions for State Water Project (SWP) water supply that are expected if no significant improvements are made to convey water past the Sacramento–San Joaquin Delta (Delta) or to store the more variable runoff that is expected with climate change.

This report is presented in a different format than previous versions. The four previous reports were written for a dual audience—both the general public and those interested in a greater level of technical detail, such as the SWP contractors. By contrast, this report is written primarily with the public in mind. As a result, it not only provides updated information about the SWP's water delivery reliability, but is also designed to educate Californians about the SWP and its operations. This report presents a concise description of the historical events leading to the construction of the SWP and describes the SWP's facilities and operations. It then defines and explains the concept of water delivery reliability and the types of SWP water available to contractors, and describes various factors that affect the reliability of water deliveries. Because of the public interest in water project pumping from the Delta and the dependence of SWP water supply on Delta pumping, a new chapter has been added that focuses specifically on SWP pumping (exports) at the Harvey O. Banks Pumping Plant in the Delta.

The 2011 Report shows that the SWP continues to be subject to reductions in deliveries similar to those contained in the *State Water Project Delivery Reliability Report 2009* (2009 Report), caused by the operational restrictions of biological opinions (BOs) issued in December 2008 and June 2009 by the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) to govern SWP and Central Valley Project operations. Federal court decisions have remanded the BOs to USFWS and NMFS for further review and analysis. We expect that the current BOs will be replaced sometime in the future. The operational rules defined in the 2008 and 2009 BOs, however, continue to be legally required and are the rules used for the analyses supporting the 2011 Report.

The following "Summary" includes key findings of the analyses in the 2011 Report. A technical addendum is also available which provides detail on the assumptions of the analyses and the results for the 2011 Report. The results of the studies, as presented in this report and the technical addendum, are designed to assist water planners and managers in updating their water management and infrastructure development plans. These results emphasize the need for local agencies to develop a resilient and robust water supply, and a distribution and management system to maximize the efficient use of our variable supply. They also illustrate the urgent need to improve the method of conveying water past the Delta in a more sustainable manner that meets the dual goals of increasing water delivery reliability and improving conditions for endangered and threatened fish species.

Mark Cowin
Director
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Summary

This report is intended to inform the public about key factors important to the operation of the SWP and the reliability of its water deliveries.

California faces a future of increased population growth coupled with the potential for water shortages and pressures on the Delta. For many SWP water contractors, water provided by the SWP is a major component of all the water supplies available to them. SWP contractors include cities, counties, urban water agencies, and agricultural irrigation districts. These local utilities and other public and private entities provide the water that Californians use at home and work every day and that helps to nourish the state's bountiful crops. Thus, the availability of water to the SWP becomes a planning issue that ultimately affects the amount of water that local residents and communities can use.

The availability of these water supplies may be highly variable. A wet water year may be followed by a dry or even critical year. Knowing the probability that they will receive a certain amount of SWP water in a given year—whether it be a wet water year, a critical year, or somewhere in between—gives contractors a better sense of the degree to which they may need to implement increased conservation measures or plan for new facilities.

The Delta is the key to the SWP's ability to deliver water to its agricultural and urban contractors. All but three of the 29 SWP contractors receive water deliveries from the Delta (pumped by either the Harvey O. Banks or Barker Slough Pumping Plant).

Yet the Delta faces numerous challenges to its long-term sustainability. Among these are continued subsidence of Delta islands, many of which are already below sea level, and the related threat of a catastrophic levee failure as water pressure increases on fragile levees. Climate change poses the threat of increased variability in floods and droughts, and sea level rise complicates efforts to manage salinity levels and preserve water quality in the Delta so that the water remains suitable for urban and agricultural uses.

Protection of endangered and threatened fish species, such as the delta smelt, is also an important factor of concern for the

Delta. Ongoing regulatory restrictions, such as those imposed by federal biological opinions on the effects of SWP and CVP operations on these species, also contribute to the challenge of determining the SWP's water delivery reliability.

The analyses in this report factor in all of the regulations governing SWP operations in the Delta and upstream, and assumptions about water uses in the upstream watersheds.

Modeling was conducted that considered the amounts of water that SWP contractors use and the amounts of water they choose to hold for use in a subsequent year.

Many of the same specific challenges to SWP operations described in the *State Water Project Delivery Reliability Report 2009* (2009 Report) remain in 2011. Most notably, the effects on SWP pumping caused by issuance of the 2008 and 2009 federal biological opinions, which were reflected in the 2009 Report, continue to affect SWP delivery reliability today. The analyses in this report factor in climate change and the effects of sea level rise on water quality, but do not incorporate the probability of catastrophic levee failure. The resulting differences between the 2009 and 2011 Reports can be attributed primarily to updates in the modeling assumptions and inputs.

As noted in the discussion of SWP exports in Chapter 5 of this report, Delta exports (that is, SWP water of various types pumped by and transferred to contractors from the Banks Pumping Plant) have decreased since 2005, although the bulk of the change occurred by 2009 as the federal BOs went into effect, restricting operations. These effects are also reflected in the SWP delivery estimates provided in Chapters 6 and 7 of this report. Chapters 6 and 7 characterize the SWP's water delivery reliability under existing conditions and future conditions, respectively. The following are a few of the key points from Chapters 5, 6, and 7:

- Estimates of average annual SWP exports under conditions that exist for 2011 are 2,607 thousand acre-feet (taf), 350 taf or 12% less than the estimate under 2005 conditions.
- The estimated average annual SWP exports decrease from 2,607 taf/year to 2,521 taf/year (86 taf/year or about 3%) between the existing- and future-conditions scenarios.
- The estimates in this report for Table A water supply deliveries are not significantly different from those in the 2009 Report. The average annual delivery estimated for existing conditions (2,524 taf/year) is 2% greater, and the estimated amount for future conditions (2,466 taf/year) is 1% less than the corresponding estimates in the 2009 Report.
- The likelihood of SWP Article 21 deliveries (supplemental deliveries to Table A water) being equal to or less than 20 taf/year has increased relative to that estimated in the 2009 Report. However, both this report and the 2009 Report show a high likelihood that Article 21 water deliveries will be equal to or less than 20 taf/year, ranging between 71% and 78% for both existing and future conditions.

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Chapter 1

Water Delivery Reliability: A Concern for Californians

California's water supplies are crucial to maintaining a high quality of life for the state's residents. The State Water Project (SWP), operated by the California Department of Water Resources (DWR), is an integral part of the effort to ensure that business and industry, urban and suburban residents, and farmers throughout much of California have sufficient water at all times. This *State Water Project Delivery Reliability Report 2011* describes the expected existing and future SWP water deliveries.

The term "water delivery reliability," as used in this report, is defined as the annual amount of SWP water that can be expected to be delivered with a certain frequency. To put this another way: What is the likelihood, or probability, that a certain amount of water will be delivered by the SWP in a year?

Reasons to Assess SWP Water Delivery Reliability

Let's look at two important factors that underscore the importance of assessing the SWP's water delivery reliability: the effects of population growth on California's water supply, and State legislation intended to help maintain a reliable water supply.

Population Growth, Land Use, and Water Supply

Water and development have had a close yet complex relationship since California's early days. Indeed, the SWP was established in the wake of a second economic "gold rush" that began after the end of World War II. Increased statewide population and commerce made it clear to water managers that local water supplies (including groundwater) would not be sufficient to meet their communities' future needs.

Population growth and resulting development in California since World War II have been substantial, fueling the need for increased water supply.

California's population has grown rapidly in recent years, with resulting changes in land use. This growth is expected to continue. From 1990 to 2005, California's population increased from about 30 million to about 36.5 million. Based on this trend, California's population has been projected to be more than 47.5 million by 2020. The "current trends" scenario depicted in the *California Water Plan 2009* for year-2050 conditions assumed a population of nearly 60 million—double the 1990 population.

The amount of water available in California—or in different parts of the state—can vary greatly from year to year. Some areas may receive 2 inches of rain a year, while others are deluged with 100 inches or more. As land uses have changed, population centers have grown up in many locations where there is not a sufficient local water supply. Thus, Californians have always been faced with the problem of how best to conserve, control, and move water from areas of abundant water to areas of water need and use.

To help assure that their water supply is sufficient to meet their demands, water districts develop "water management portfolios" that reflect diversity in water sources and locations. Components of a sustainable water portfolio include conservation, improved efficiency in use, rainwater and runoff capture, use of groundwater aquifers for storage and treatment, improved water treatment, desalination, and a water recycling program.

Legislation on Ensuring a Reliable Water Supply

The laws described below impose specific requirements on both urban and agricultural water suppliers. These laws increase the importance to water suppliers of estimates of SWP water delivery reliability.

California Urban Water Management Planning Act

The California Urban Water Management Planning Act was enacted in 1983. As amended, this law (California Water Code, Sections 10610–10656) requires urban water suppliers to adopt water management plans every 5 years and submit those plans to DWR. Adoption of the most recent (2010) round of urban water management plans was required by July 1, 2011; the plans were due to DWR by August 1, 2011.

In their water management plans, urban water suppliers must assess whether their current and planned water supplies will be enough to meet the water demands expected during the next 20 years. The plans also consider various drought scenarios and the proper ways to respond in case of an unexpected water shortage.

DWR is required to review local water management plans and report on the status of these plans. DWR published a guidebook to preparing urban water management plans in March 2011. Guidance documents are available at http://www.water.ca.gov/urbanwatermanagement.

Water Conservation Act

The Water Conservation Act of 2009 (Senate Bill X7.7, Steinberg), enacted in November 2009, includes distinct requirements related to both urban and agricultural water use.

This law requires that the State of California reduce urban per capita water use statewide by 10% by the end of 2015 and 20% by the end of 2020. DWR is required to report on progress toward meeting these urban per capita water use goals.

In addition, agricultural water suppliers must adopt agricultural water management plans by the end of 2012, then update the plans by the end of 2015 and every 5 years thereafter.

Through its Agricultural Water Management Planning & Implementation Program (http://www.water.ca.gov/wateruseefficiency/agricultural/agmgmt.cfm), DWR helps water districts develop agricultural water management plans and implement cost-effective, efficient water management practices. DWR is currently preparing a guidebook for developing agricultural water management plans.

Background of This Report

This *State Water Project Delivery Reliability Report 2011* is the fifth in a series of reports on the SWP's water delivery reliability. DWR is legally required to prepare and distribute this report every 2 years to all SWP contractors (recipients of SWP water), city and county planning departments, and regional and metropolitan planning departments in the SWP's service area. Reports were previously produced for 2002, 2005, 2007, and 2009.

The requirement for a biennial water delivery reliability report was established in a settlement agreement among the Planning and Conservation League, DWR, SWP contractors, and others that was approved by the 3rd Circuit Court of Appeals in May 2003. The settlement agreement was reached in the aftermath of the "Monterey Amendments" case, which resolved a dispute about the environmental analysis of amendments to the long-term water supply contracts for the SWP that were entered into by DWR and most of the SWP contractors in the 1990s. The terms of the SWP contracts were amended after water shortages during the 1987–1992 drought drastically reduced SWP water deliveries to SWP contractors in the San Joaquin Valley and Southern California.

Attachment B to the settlement agreement specifies that each SWP delivery reliability report must include all of the following information:

- the overall water delivery capacity of the SWP facilities at the time of the report;
- the allocation of that SWP water to each SWP contractor;
- a discussion of the range of hydrologic conditions, which must include the historic extended dry cycle and long-term average; and
- the total amount of SWP water delivered to all contractors and the amount of SWP water delivered to each contractor during each of the 10 years immediately preceding the report.

DWR's water delivery reliability reports are used by various entities for water planning purposes. The reports must be presented in a format understandable by the public. The information presented in the reports is intended to help local agencies, cities, and counties that use SWP water to develop adequate, affordable water supplies for their communities.

Contents and Use of This Report

The following topics are addressed in this *State Water Project Delivery Reliability Report 2011*:

- The Summary at the front of this report briefly summarizes the updated findings on water delivery reliability detailed in previous chapters.
- Chapter 1, "Water Delivery Reliability: A Concern for Californians," summarizes important issues (including selected State legislation) that underlie the need to assess the SWP's water delivery reliability, provides background on DWR's water delivery reliability reports, and defines key terms.
- Chapter 2, "A Closer Look at the State Water Project," describes the SWP's purpose, background, and facilities. This chapter also introduces factors that interact in the Sacramento–San Joaquin Delta (Delta) to affect SWP operations: precipitation and snowmelt patterns, variable river inflows, operations of the federal Central Valley Project (CVP), Delta water quality concerns, regulatory requirements, and the Delta's physical conditions.
- Chapter 3, "SWP Contractors and Water Contracts," lists the SWP water contractors and shows where they are located, and describes the different types of SWP water allocations.
- Chapter 4, "Factors that Affect Water Delivery Reliability," explains generally how water delivery reliability is calculated. The chapter then describes a variety of factors that make forecasting water delivery

reliability inherently challenging. Among these complicating factors are climate change, environmental and policy planning efforts pertaining to the Delta, and the potential for levee breaches in the Delta.

- Chapter 5, “SWP Delta Exports,” discusses how the delivery estimates for the SWP have been reduced as a result of more restrictive operational rules. This chapter also presents the results of DWR’s modeling of SWP exports from the Harvey O. Banks Pumping Plant for existing conditions (2011) and future conditions (2031).
- Chapter 6, “Existing SWP Water Delivery Reliability (2011),” estimates the SWP’s delivery reliability for existing conditions (2011) and compares these estimates with the existing-condition results presented in the *State Water Project Delivery Reliability Report 2009*.
- Chapter 7, “Future SWP Water Delivery Reliability (2031),” estimates the SWP’s delivery reliability for conditions 20 years in the future (2031), reflecting potential hydrologic changes that could result from climate change. This chapter also compares these estimates with the future-condition results presented in the *State Water Project Delivery Reliability Report 2009*.
- Appendix A, “Historical SWP Delivery Tables for 2001–2010,” presents the historical deliveries for SWP contractors over the last 10 years.

In addition, a technical addendum has been prepared for this report and includes more specific details of the technical analyses and results. Urban and agricultural water suppliers can use the information in this report and the technical addendum when they prepare or amend their water management plans. These details will help them decide whether they need new facilities or programs to meet future water demands. The technical addendum is available upon request and is posted online, along with this report, at http://baydeltaoffice.water.ca.gov.

Urban water suppliers can also use this information when, as required by the California Environmental Quality Act, they analyze whether enough water is available for proposed subdivisions or development projects.

Chapter 2

A Closer Look at the State Water Project

Northern California typically receives abundant rainfall and runoff from mountain snowpack. However, a larger percentage of California's population lives in Southern California and most irrigated farmland lies in Central California. These regions are mostly arid, and local water suppliers cannot fully meet the needs of many of their communities. These areas rely on additional imported water, especially to meet shortages during dry years and the demands of increasing populations. The SWP was constructed to help meet these needs.

Purpose and Background of the SWP

The SWP is the largest state-built, multipurpose, user-financed water project in the United States. More than two-thirds of California's residents—25 million people—receive at least part of their water from the SWP. Project water also supplies thousands of industries and irrigates about 750,000 acres of California farmland. Of the SWP's contracted water supply, 70% goes to urban users and 30% goes to agricultural users.

The primary purpose of the SWP is to provide a water supply—that is, to divert and store water during wet periods in Northern and Central California and distribute it to areas of need in Northern California, the San Francisco Bay area, the San Joaquin Valley, the Central Coast, and Southern California. Other SWP purposes include flood control, power generation, recreation, fish and wildlife enhancement, and water quality improvement in the Delta.

These purposes have been discussed at length for many decades. The concept of a statewide water development project was first raised in 1919 when Lt. Robert B. Marshall of the U.S. Geological Survey proposed transporting water from the Sacramento River system to the San Joaquin Valley, then moving it over the Tehachapi Mountains into Southern California.

In the 1930s, State Engineer Edward Hyatt proposed the "State Water Plan," which identified the facilities needed and economic means to transfer water from north to south. The California Legislature authorized the project in the Central Valley Act of 1933, and a $170 million bond act was approved by California voters in December 1933. However, the Great Depression precluded the State from obtaining the necessary funding. The U.S. government funded the construction of major components of the plan, which became the federal CVP. (See "The Central Valley Project and Its Relationship to the SWP" later in this chapter.)

As California's population grew after World War II, investigations of statewide water resources resumed. In 1945, DWR's predecessor, the Division of Water Resources of the Department of Public Works, conducted a variety of studies that culminated in the Feather River Project, presented to the State Legislature in 1951 by State Engineer A. D. Edmonston. A revised project proposal was presented in 1955. The Legislature appropriated funds for detailed studies of the Feather River Project, which evolved to become the SWP.

In 1959, the Legislature passed the California Water Resources Development Bond Act. This law, also known as the Burns-Porter Act, authorized $1.75 billion in bonds to build the SWP's initial facilities, contingent on voter approval. After California voters approved the Burns-Porter Act in November 1960, construction of the SWP by DWR began in the early 1960s, with water deliveries following.

SWP Facilities

Today, the SWP includes 33 storage facilities, 21 reservoirs and lakes, 20 pumping plants, four pumping-generating plants, five hydroelectric power plants, and about 700 miles of canals and pipelines. Figure 2-1 shows the primary SWP facilities.

Facilities North of the Delta

The SWP's watershed encompasses the mountains and waterways around the Feather River in Plumas County. Rain and melting snow run off mountainsides and into waterways that flow into Lake Oroville, where the SWP officially begins. With a capacity of about 3.5 million acre-feet, Lake Oroville is the SWP's largest storage facility. The water management facilities of Lake Oroville are designed to maximize energy production and include six power generating units and six pumping/generating units. Three hydroelectric power plants operate at Oroville.

Oroville Dam.

When water is needed, Oroville Dam releases water into the Feather River, which converges with the Sacramento River north of the city of Sacramento. Releases from Shasta and Folsom Reservoirs, facilities of the federal CVP, also flow into the Sacramento River. The Sacramento River flows into the Delta, where it mixes with water from the San Francisco Bay and is influenced by the tides. From the Delta, some of this water is pumped by the Barker Slough Pumping Plant into the North Bay Aqueduct for municipal use by Napa and Solano Counties.

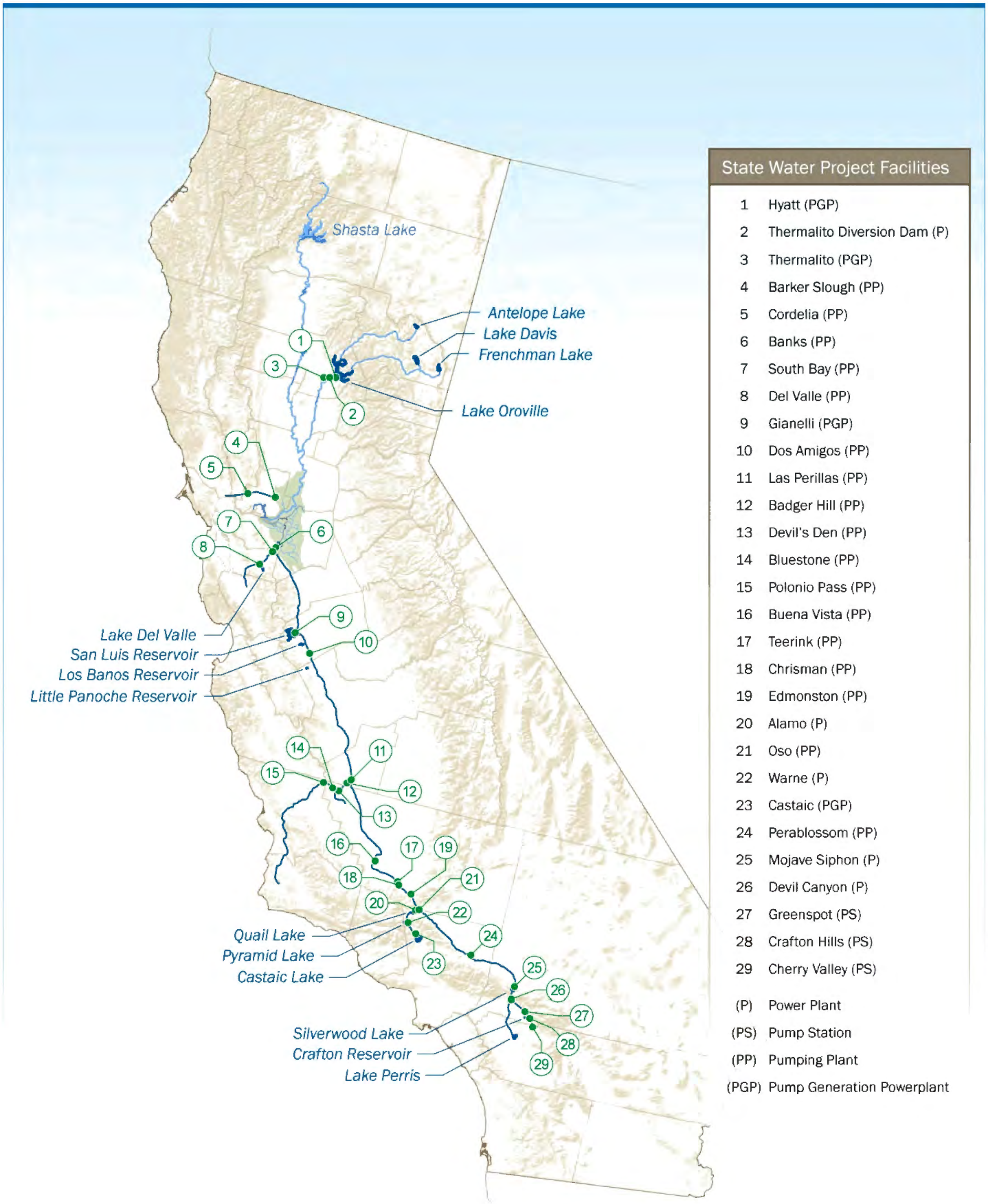


Figure 2-1. Primary State Water Project Facilities

Facilities in the Delta and Central California

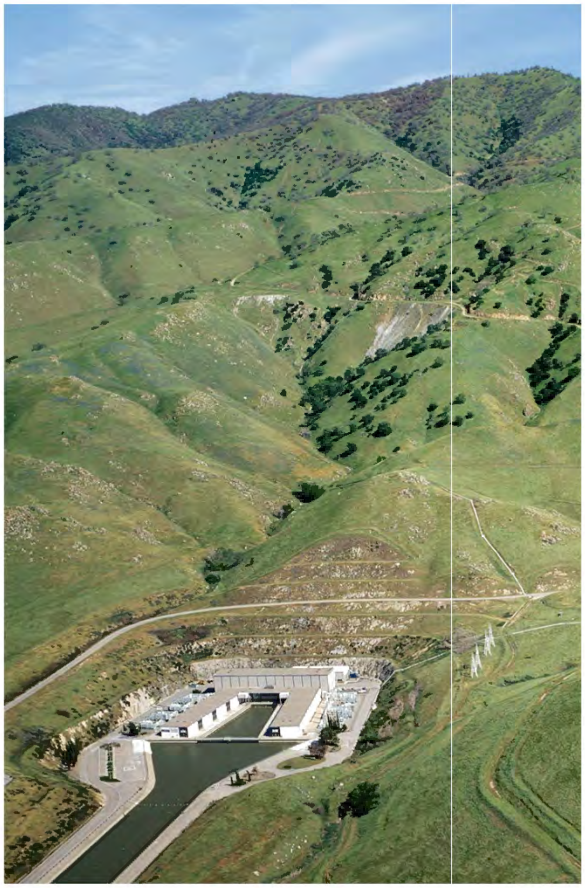
The SWP's primary pumping plant, the Harvey O. Banks Pumping Plant, is located in the south Delta in Alameda County. The pumps at the Banks Pumping Plant lift Delta water stored in the Clifton Court Forebay into the California Aqueduct, which at 444 miles long is the longest water conveyance system in California. At Bethany Reservoir, some SWP water is diverted from the California Aqueduct into the South Bay Aqueduct, which serves urban and agricultural uses in Alameda and Santa Clara Counties.

Harvey O. Banks Pumping Plant.

Water in the California Aqueduct flows into the San Luis Joint-Use Complex located in Merced County, which is jointly owned by the SWP and the CVP. Among the facilities at the complex is San Luis Reservoir, which is the world's largest offstream reservoir, with storage space for more than 2 million acre-feet of water. (An "offstream reservoir" is a water body that does not impede and store natural flows directly within a stream course, but instead is located "offstream"; stored water is diverted elsewhere and conveyed to the offstream reservoir by a pipeline or aqueduct.) Generally, water is pumped into San Luis Reservoir from late fall through early spring and is stored temporarily before being released back to the California Aqueduct to meet the higher summertime water demands of SWP (and CVP) contractors.

Facilities in the San Joaquin Valley and Southern California

After leaving the San Luis Joint-Use Complex, water travels through the central San Joaquin Valley via a jointly owned federal/State portion of the California Aqueduct. Along the way, deliveries are made to San Joaquin Valley contractors of both the SWP and the CVP. Near Kettleman City in Kings County, the SWP's Coastal Branch Aqueduct branches off to serve SWP contractors in San Luis Obispo and Santa Barbara Counties. The California Aqueduct continues southeast until, at the base of the Tehachapi Mountains, it reaches the A. D. Edmonston Pumping Plant, the SWP's largest pumping station.



A. D. Edmonston Pumping Plant.

The Edmonston Pumping Plant, located in Kern County, is an engineering marvel. It is the highest single-lift pumping plant in the world. The 14 pumps at this facility, each weighing more than 400 tons and powered by 80,000-horsepower motors, raise water from the California Aqueduct 1,926 feet—more than one and one-half times the height of New York's Empire State Building—to enter 10 miles of tunnels and siphons that cross the Tehachapi Mountains.

After crossing the mountains, the water splits into two branches, the West Branch and East Branch, and is delivered to SWP contractors in Southern California. The southernmost SWP facility, located at the end of the East Branch, is Lake Perris in Riverside County.

The Delta and Factors Affecting SWP Operations and Deliveries

The Delta forms the eastern portion of the San Francisco estuary. It is composed of 738,000 acres of land interlaced with hundreds of miles of waterways that receive runoff from about 40% of the state's land area. The Delta is one of the few estuaries in the world that is used as a major source of drinking water supply. The Delta is important not only to SWP operations, but to California's economy. About $400 billion of California's $1.5 trillion economy is supported by water from the Delta, as noted by DWR and the California Department of Fish and Game (DFG) in the 2008 report, *Risks and Options to Reduce Risks to Fishery and Water Supply Uses of the Sacramento/San Joaquin Delta*.

Numerous competing demands converge in the Delta—especially the need to provide water for both agricultural and urban uses and the desire to protect habitat for endangered species.

In the SWP conveyance system, the Delta is the critical link between the water supplies in the Sacramento Valley and the water demands of, and deliveries to, the rest of the Central Valley and Southern California. Physically, the Delta is the focal point for water distribution in California because most of the SWP contractors are located at points south of the Delta.

However, the Delta has long been an area of numerous competing demands; for example, the Delta provides water for millions of Californians, but also serves as important habitat for hundreds of animal, plant, and fish species, some of which are listed under the federal Endangered Species Act (ESA) and/or California Endangered Species Act (CESA) as threatened or endangered. It also supports a local population of more than 500,000 and millions of visitors who use the Delta's recreational areas, navigable waterways, and marinas. Further, not only do SWP and CVP contractors use Delta water for agriculture, but local farmers within the Delta itself use its water to irrigate their crops planted on the numerous Delta islands.

The SWP's ability to pump water from the Delta is not affected only by the physical size and capacity of the pumps at the Banks Pumping Plant. As described below, the Delta is affected by numerous factors that interact to affect SWP operations and water deliveries:

- Delta inflows (i.e., the combined total of water flowing into the Delta from the Sacramento River, San Joaquin River, and other rivers and waterways),
- beneficial uses and water rights,
- Delta water quality standards,
- regulatory requirements,
- concurrent CVP operations and pumping, and
- physical factors.

Delta Inflows

Delta inflow varies considerably from year to year. Levels of development upstream of the Delta along the rivers and their watersheds—in the areas from which the water originates—affect Delta inflows. For example, in an above-normal year, nearly 85% of the total Delta inflow comes from the Sacramento River, more than 10% comes from the San Joaquin River, and the rest comes from three eastside streams (the Mokelumne, Cosumnes, and Calaveras Rivers) (Figure 2-2).

The type of water year is also an important factor affecting the volume of Delta inflows. When hydrology is analyzed, water years are designated by DWR as "wet," "above normal," "below normal," "dry," or "critical" based on the amount of rain and snow that fell during the preceding period of October 1–September 30. DWR hydrologists and meteorologists measure snowpack in the northern Sierra Nevada on or about the first of January, February, March, April, and May, in the watersheds where most of the state's water supply originates, to forecast snowmelt runoff—and thus available water supply—for the coming spring and summer.

All other factors (such as upstream development) being equal, much less water will flow into the Delta during a dry or critical water year—that is, during a drought—than during a wet or above normal water year. Fluctuations in inflows are a substantial overall concern for the Delta, and a specific concern for the SWP; such fluctuations affect Delta water quality and fish habitat, which in turn trigger regulatory requirements that constrain SWP Delta pumping. For example:

- As discussed below under "Delta Water Quality Standards," lower inflows can cause Delta water to become increasingly saline and trigger additional upstream reservoir releases and/or reduced Delta pumping to meet regulatory requirements.
- Conditions for fish in the Delta are less suitable in drier years, as seen during California's 1987–1992 drought, which can also trigger regulatory requirements that reduce SWP pumping.

Delta inflows will also vary by time of year because the amount of precipitation varies by season. About 80% of annual precipitation occurs between November and March, and very little rain typically falls from June through September. A seasonal mismatch of water supply and demand typically exists; runoff is greatest in winter and spring, but water demands peak in summer. Upstream reservoirs dampen this variability by reducing flood flows and storing water to be released later in the year to meet water demands and flow and water quality requirements.

Delta Water Quality Standards

Water quality standards for the Delta also affect SWP operations. The Porter-Cologne Water Quality Control Act (Division 7 of the California Water Code) defines "beneficial uses" of waters of the State (both surface water and groundwater) that must be protected against quality degradation. These beneficial uses include domestic, municipal, agricultural, and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves. The criteria based on those uses, called "water quality objectives," are found in the water quality control plans adopted by the State Water Resources Control Board and the nine regional water quality control boards. The SWP and CVP must meet specific criteria for salinity during certain times of the year at various locations in the Delta, as described further under "Factors that Can Influence the SWP's Water Delivery Reliability" in Chapter 4.

Salinity levels can be affected by the water year type: Inflows into the Delta decline in dry and

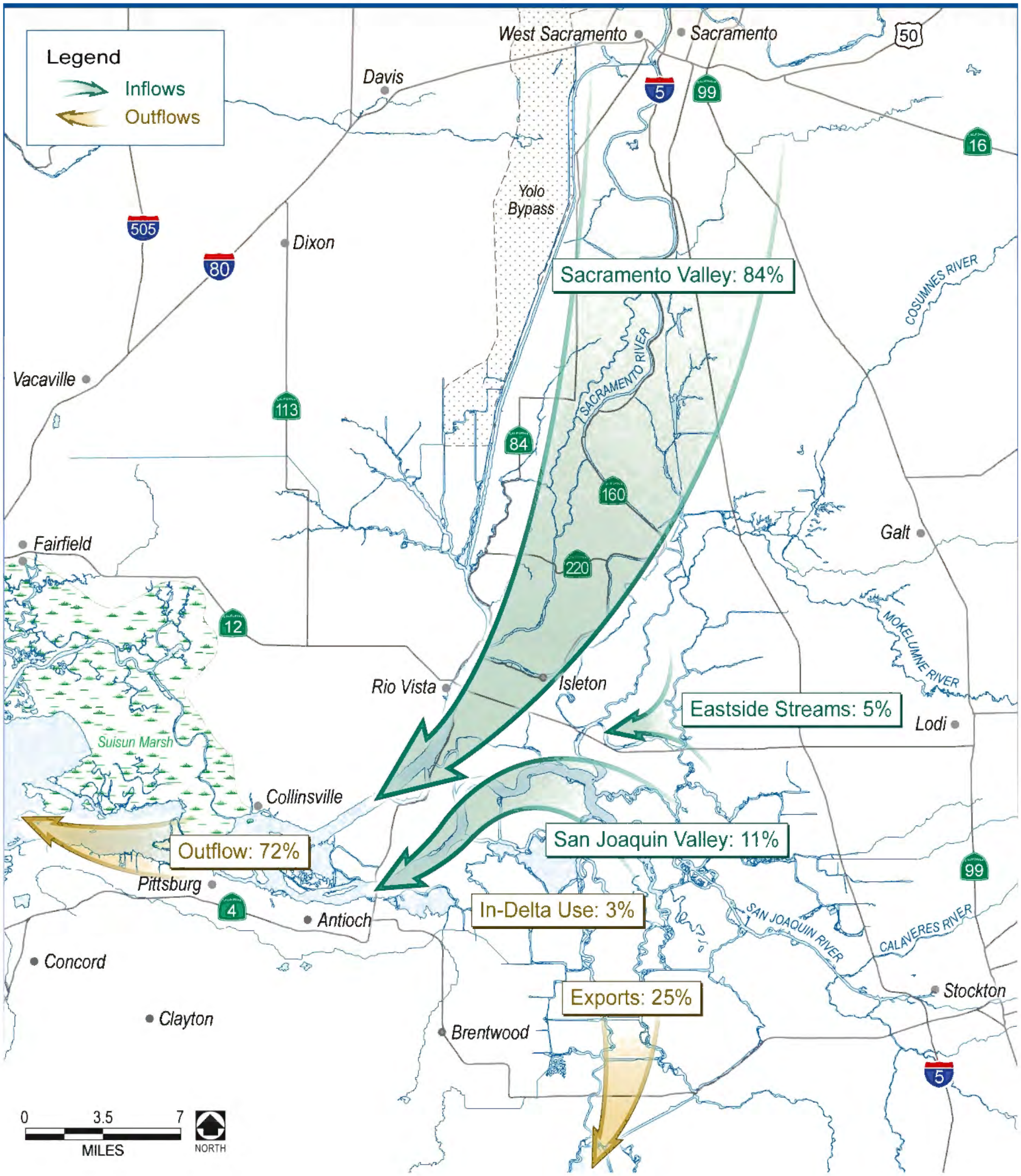


Figure 2-2. Water Year 2000 (Above-Normal) Delta Water Balance (Percent of Total)

critical water years, but daily tidal inflow of salty water into the Delta from the Pacific Ocean remains generally the same, thus increasing Delta salinity. Excessive salinity may adversely affect crop yields and require more water for salt leaching, may require additional municipal and industrial treatment, may increase salinity levels in agricultural soils and groundwater, and is the primary water quality constraint to recycling wastewater. Salty water is both undrinkable and unusable for irrigation (and thus unsuitable for SWP and CVP contractors and farmers in the Delta), and is harmful to fish inhabiting the Delta, including endangered and threatened species. Climate change is also causing sea level rise, which is projected to substantially increase Delta salinities. Generally, Delta water quality is best during winter and spring and poorer through the summer irrigation season and early fall.

SWP operations are closely regulated by the water quality standards contained in State Water Resources Control Board Water Right Decision 1641 (D-1641). D-1641 was issued in December 1999 (with a revised version issued in March 2000) to implement the 1995 *Water Quality Control Plan for the San Francisco Bay/Sacramento–San Joaquin Delta* (1995 WQCP). The 1995 WQCP established beneficial uses of Delta water, associated water quality objectives for the reasonable protection of beneficial uses, and an implementation program to achieve the water quality objectives.

D-1641 assigned primary responsibility for meeting many of the water quality objectives established in the 1995 WQCP to the SWP (thus, to DWR) and the CVP (thus, to Reclamation). To meet these objectives, D-1641 limits or curtails SWP and CVP pumping operations in certain parts of the year. For example, D-1641 imposed limits on the ratio of SWP and CVP exports to total inflow into the Delta. This “export-inflow ratio” varies by time of year.

Regulatory Requirements

The Delta provides important habitat for fish species listed as threatened or endangered under either the federal ESA or the CESA, or both. Several resource agencies have taken actions under their authorities to protect these species. Regulatory requirements based on recent biological opinions (BOs) issued by the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) for CVP and SWP operations are a particularly important factor affecting SWP operations. DFG also regulates the protection of species under the CESA, and has issued consistency determinations in the past when it has found federal BOs to be consistent with CESA for State-listed species.

Delta smelt.

A BO is a determination by USFWS or NMFS on whether a proposed federal action is likely to jeopardize the continued existence of a threatened or endangered species or result in the destruction or adverse modification of designated critical habitat. If jeopardy is determined, certain actions are required to protect species of concern. Usually BOs apply specifically to federal actions, but DWR coordinates with Reclamation in the agencies’ operation of the SWP and federal CVP. Since the passage of the federal ESA in 1973, various BOs have been issued by USFWS and NMFS for the effects on federally listed endangered species of these coordinated operations.

NMFS administers the ESA for marine fish species, including anadromous salmonids (those that spend a part of their life cycle in the sea and return to freshwater streams to spawn), such as

Central Valley steelhead, winter-run and spring-run Chinook salmon, and green sturgeon. USFWS administers the ESA for nonanadromous and nonmarine fish species, such as delta smelt and longfin smelt. Both anadromous and nonanadromous fish species are found in the Delta and are federally listed under the ESA.

If USFWS or NMFS finds that a proposed action is likely to jeopardize a listed species or adversely modify its critical habitat, the agency is required to identify "reasonable and prudent alternatives" (defined in Title 50, Section 402.02 of the Code of Federal Regulations) that it has determined would enable the project to go forward in compliance with the ESA.

Especially important to the SWP are the BOs issued by USFWS and NMFS in 2008 and 2009, respectively, for the coordinated operations of the CVP and SWP. Both of these BOs, which DFG found consistent with the CESA for State-listed species, have directly and substantially affected SWP operations and pumping levels in recent years: They incorporate terms that directly or indirectly limit the amount of CVP and SWP Delta pumping under certain conditions. Relative to prior years, SWP water deliveries estimated in the *State Water Project Delivery Reliability Report 2009*—the last edition of this report—were, in general, reduced by the operational restrictions of these BOs.

Concurrent Central Valley Project Operations and Pumping

CVP operations also affect the Delta as Reclamation diverts water for agricultural and urban uses. To make the most efficient use of the common water supply available to the CVP and SWP, Reclamation and DWR must work as closely as possible to coordinate their respective reservoir releases and Delta pumping operations. The CVP and SWP operate in conjunction according to the Coordinated Operation Agreement signed in 1986 by the two agencies.

Subsidence (sinking) of islands in the Delta places even more pressure on already fragile Delta levees.

The two projects share some of their facilities in the San Joaquin Valley—most notably the San Luis Unit, for which the major storage reservoir is San Luis Reservoir, and more than 100 miles of the California Aqueduct. In addition, the CVP and SWP are allowed to use each other's export pumping facilities in the south Delta—to pump water for each other—when operation of one set of pumps is affected by facility maintenance, capacity limitations, or fish protection requirements. Use of this "joint point of diversion" is subject to an operations plan that protects fish and wildlife and other legal users of water.

Physical Factors

The stability and reliability of SWP water deliveries can be threatened by physical factors affecting facilities or water quality anywhere in the SWP system. The Delta is particularly vulnerable. Delta islands have been subsiding and in some places the land has sunk to 20 feet below sea level. This places extra pressure on the Delta's levees because it means they must hold back water constantly rather than only during peak-flow periods.

Climate change is causing sea level to rise, increasing pressure on Delta levees even further. Delta levees are also vulnerable because they were built 150 years ago and could be affected if an earthquake were to strike anywhere near the Delta.

THE CENTRAL VALLEY PROJECT AND ITS RELATIONSHIP TO THE SWP

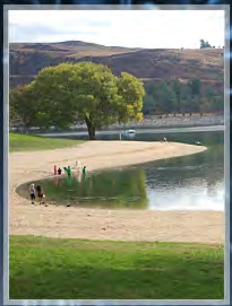
The federal Central Valley Project, operated by the U.S. Bureau of Reclamation, was originally conceived as a State of California project to protect the Central Valley from water shortages and floods. During the Great Depression, however, the State was unable to sell bonds to finance project construction, and beginning in the late 1930s, the U.S. government constructed the CVP as a public works project.

The CVP operates 18 dams and reservoirs, 11 powerplants, and 500 miles of canals and other facilities between the Cascade Range near Redding and the Tehachapi Mountains near Bakersfield. It serves agricultural, municipal, and industrial needs in the Central Valley and urban centers in parts of the San Francisco Bay Area, and is the primary water source for many Central Valley wildlife refuges. In an average year the CVP delivers about 7 million acre-feet of water for agriculture, urban, and wildlife use, irrigating about one-third (3 million acres) of California's agricultural lands and supplying water for nearly 1 million households (Reclamation 2009).

The CVP and SWP share some of their facilities, especially the San Luis Unit, and their respective operations staffs work closely together. The Coordinated Operations Agreement between the CVP and SWP, signed in 1986, outlines the shared responsibilities of each project to meet Delta water quality and flow objectives and provides for equitable sharing of surplus water that enters the Delta.

Chapter 3

SWP Contractors and Water Contracts



During the 1960s, as the SWP was created, long-term contracts were signed by DWR and 29 urban and agricultural water suppliers in various locations within California. The contracts are essentially uniform and will expire in 2035. These urban and agricultural water suppliers are referred to in this report as the "SWP contractors" or "contractors." This chapter introduces the SWP contractors, explains the basics of SWP water contracts, and describes the various types of project water, especially "Table A" water. The discussion also outlines some of the factors that influence delivery of Table A water.

About the SWP Contractors

The SWP contractors are located along the Feather River north of the Delta, in the north and south San Francisco Bay Area, along the Central Coast, in the San Joaquin Valley, and in Southern California. They include cities, counties, urban water agencies, and agricultural irrigation districts. Most contractors use the project water they receive for municipal purposes; several use the water for agriculture. The SWP contractors mostly use project water to supplement local supplies, including groundwater, or other imported water. The 29 SWP contractors are listed below and their locations are shown in Figure 3-1.

Feather River Area Contractors

- Butte County
- Yuba City
- Plumas County Flood Control and Water Conservation District

North Bay Area Contractors

- Napa County Flood Control and Water Conservation District
- Solano County Water Agency

South Bay Area Contractors

- Alameda County Flood Control and Water Conservation District, Zone 7
- Alameda County Water District
- Santa Clara Valley Water District

San Joaquin Valley Area Contractors

- Dudley Ridge Water District
- Empire West Side Irrigation District
- Kern County Water Agency
- Kings County
- Oak Flat Water District
- Tulare Lake Basin Water Storage District

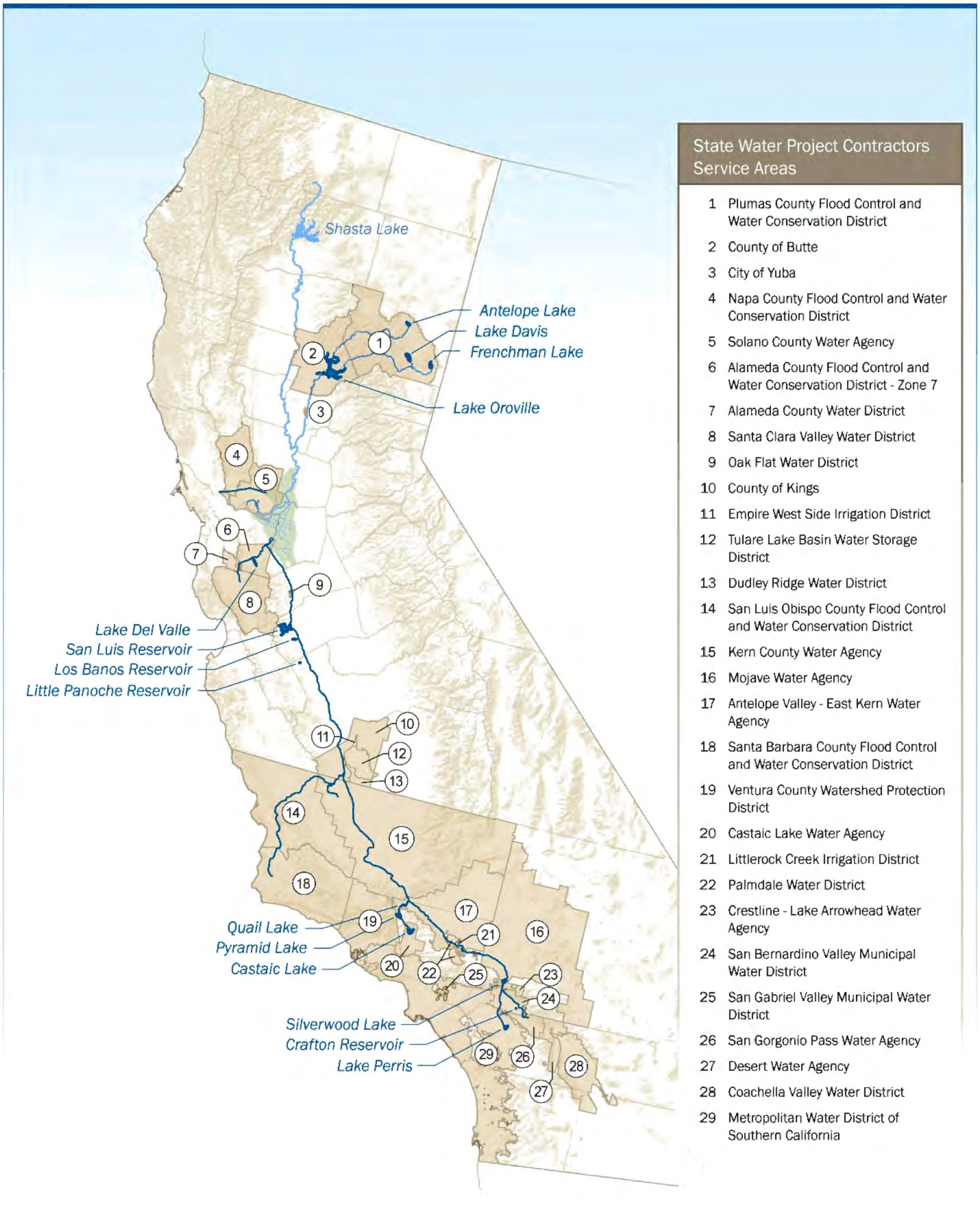

State Water Project Contractors Service Areas
1 Plumas County Flood Control and Water Conservation District
2 County of Butte
3 City of Yuba
4 Napa County Flood Control and Water Conservation District
5 Solano County Water Agency
6 Alameda County Flood Control and Water Conservation District - Zone 7
7 Alameda County Water District
8 Santa Clara Valley Water District
9 Oak Flat Water District
10 County of Kings
11 Empire West Side Irrigation District
12 Tulare Lake Basin Water Storage District
13 Dudley Ridge Water District
14 San Luis Obispo County Flood Control and Water Conservation District
15 Kern County Water Agency
16 Mojave Water Agency
17 Antelope Valley - East Kern Water Agency
18 Santa Barbara County Flood Control and Water Conservation District
19 Ventura County Watershed Protection District
20 Castaic Lake Water Agency
21 Littlerock Creek Irrigation District
22 Palmdale Water District
23 Crestline - Lake Arrowhead Water Agency
24 San Bernardino Valley Municipal Water District
25 San Gabriel Valley Municipal Water District
26 San Gorgonio Pass Water Agency
27 Desert Water Agency
28 Coachella Valley Water District
29 Metropolitan Water District of Southern California
Shasta Lake
Antelope Lake
Lake Davis
Frenchman Lake
Lake Oroville
Lake Del Valle
San Luis Reservoir
Los Banos Reservoir
Little Panoche Reservoir
Quail Lake
Pyramid Lake
Castaic Lake
Silverwood Lake
Crafton Reservoir
Lake Perris

Figure 3-1. State Water Project Contractors

Central Coastal Area Contractors

- San Luis Obispo County Flood Control and Water Conservation District
- Santa Barbara County Flood Control and Water Conservation District

Southern California Area Contractors

- Antelope Valley–East Kern Water Agency
- Castaic Lake Water Agency
- Coachella Valley Water District
- Crestline–Lake Arrowhead Water Agency
- Desert Water Agency
- Littlerock Creek Irrigation District
- Metropolitan Water District of Southern California
- Mojave Water Agency
- Palmdale Water District
- San Bernardino Valley Municipal Water District
- San Gabriel Valley Municipal Water District
- San Gorgonio Pass Water Agency
- Ventura County Watershed Protection District

How Water Contracts Work

Under the terms of their long-term water supply contracts with DWR, the 29 SWP contractors receive specified amounts of water from the SWP each year, called "annual allocations."

The SWP's long-term water supply contracts define the terms and conditions governing water delivery and repayment of project costs. In return for the allocated water, the SWP contractors repay principal and interest on both the bonds that initially funded construction of the SWP and the bonds that paid for additional facilities. The contractors also pay all costs, including labor and power, to maintain and operate project facilities. They also pay transportation charges based on the distance between the Delta and each contractor's water delivery point.

The contractors also contribute mitigation costs for any environmental impacts of SWP operations on fish and wildlife.

"Table A" Water

Table A is an exhibit to the SWP's water supply contracts. This section explains Table A water and outlines the primary factors that influence the amount of such water actually delivered to SWP contractors.

What Is Table A Water?

The water supply–related costs of the SWP are paid for by SWP contractors. All water contracts signed in the 1960s included an estimate of the date that SWP water would first be delivered and a schedule of the amount of water the contractor could expect to be delivered annually. That amount of water, known as the contractor's annual Table A amount, was designed to increase gradually until the designated maximum for that SWP contractor was reached.

The total combined maximum Table A amount for all SWP contractors was initially 4,230 thousand acre-feet per year (taf/year), assuming full development of the SWP. At that time, this amount was referred to as the "maximum project yield." As a result of amendments to the water supply contracts in the 1990s, the current combined maximum Table A amount is 4,172 taf/year. Of this amount, 4,133 taf/year is the maximum Table A water available for delivery from the Delta. It is recognized that deliveries will be less than the established maximum Table A amount in some years and more than this amount in other years.

The maximum Table A amount is the basis for apportioning water supply and costs to the SWP contractors. Once the total amount of water to be delivered is determined for the year, all available water is allocated in proportion to each contractor's annual maximum SWP Table A amount. To reiterate, however, in some years the SWP cannot deliver the maximum amount of 4,172 taf, but in other years, project supply exceeds that amount. Additionally, in some years contractors receive other classifications of water from the SWP, such as Article 21 water and turnback pool water. (See "Other Types of SWP Water" later in this chapter.)

The established maximum Table A amounts for the 29 SWP contractors vary widely (Table 3-1). The median is 42 taf; thus, the maximum allocations of Table A water for half of the SWP contractors exceed this amount, and for the other half they are less. As shown in Table 3-1, the largest Table A amount is held by the Metropolitan Water District of Southern California at 1,911,500 acre-feet; the smallest is held by the Littlerock Creek Irrigation District at 2,300 acre-feet.

The Table A amounts determine the maximum water a contractor may request each year from DWR. Table A amounts may also be used as a factor to allocate other available water supplies to each contractor. "Table A" or "Table A water" represents a portion or all of the annual Table A requested by the SWP water contractors and approved for delivery by DWR, based on hydrologic conditions, current reservoir storage, and combined requests from the SWP water contractors. DWR is not always able to deliver the quantity of water requested by contractors. In these cases, and under certain conditions, a lesser amount is allocated and delivered according to the long-term water supply contracts by prorating the amount in proportion to each SWP water contractor's maximum Table A amount.

As discussed below, the water year type and the contractors' demand levels are among the factors involved in determining the amount of Table A water that will be delivered by DWR to each contractor. At various times of the year, DWR issues projections of anticipated Table A allocations based on then-current conditions, and updates those projections as warranted. The deliveries of Table A water to each of the SWP contractors in the last 10 years are shown in Appendix A.

Factors Influencing Percentages of Table A Water Delivery Amounts

The percentage of its maximum Table A amount that an SWP contractor will receive in any given year will vary depending on a variety of factors. The discussion below presents basic questions underlying these factors, which are described in greater detail later in this report.

Winter snowpack is an important factor determining annual Table A water deliveries.

Physical Availability of Water from Precipitation and Runoff

The amount and timing of precipitation and ensuing runoff to streams are important in determining how much water will be physically available to the SWP to pump and export from the Delta. The type of precipitation matters as well, along with anticipated patterns of use and consumption of the source water by entities other than the SWP.

The answers to the following questions influence the amount of water delivered to contractors each year:

- How much rain and snow fell within the last year?
- Which parts of California received the precipitation, and how much runoff resulted?

Table 3-1. Maximum Annual SWP Table A Water Delivery Amounts for SWP Contractors

Contractor	Maximum Table A Delivery Amounts (acre-feet)
Feather River Area Contractors	
Butte County	27,500
Yuba City	9,600
Plumas County Flood Control and Water Conservation District	2,700
Subtotal	**39,800**
North Bay Area Contractors	
Napa County Flood Control and Water Conservation District	29,025
Solano County Water Agency	47,506
Subtotal	**76,531**
South Bay Area Contractors	
Alameda County Flood Control and Water Conservation District, Zone 7	80,619
Alameda County Water District	42,000
Santa Clara Valley Water District	100,000
Subtotal	**222,619**
San Joaquin Valley Area Contractors	
Dudley Ridge Water District	50,343
Empire West Side Irrigation District	2,000
Kern County Water Agency	982,730
Kings County	9,305
Oak Flat Water District	5,700
Tulare Lake Basin Water Storage District	88,922
Subtotal	**1,139,000**
Central Coastal Area Contractors	
San Luis Obispo County Flood Control and Water Conservation District	25,000
Santa Barbara County Flood Control and Water Conservation District	45,486
Subtotal	**70,486**
Southern California Area Contractors	
Antelope Valley–East Kern Water Agency	141,400
Castaic Lake Water Agency	95,200
Coachella Valley Water District	138,350
Crestline–Lake Arrowhead Water Agency	5,800
Desert Water Agency	55,750
Littlerock Creek Irrigation District	2,300
Metropolitan Water District of Southern California	1,911,500
Mojave Water Agency	82,800
Palmdale Water District	21,300
San Bernardino Valley Municipal Water District	102,600
San Gabriel Valley Municipal Water District	28,800
San Gorgonio Pass Water Agency	17,300
Ventura County Watershed Protection District	20,000
Subtotal	**2,623,100**
TOTAL TABLE A AMOUNTS	**4,171,536**

- Did rain come as a short intense storm or a long wet spell?
- Did more of the precipitation occur as snow in colder storms, or were storms warmer, resulting in more rain that produced higher peak runoff?
- Was snowmelt fast or gradual, and when did the bulk of the runoff occur?

For example, if substantial snowfall occurs late in the wet season, Sierra Nevada rivers can be full of melting snow later than usual in the year, as occurred in 2011. This allows the SWP's Delta pumping to continue at or near capacity for an extended duration, increasing the percentage of Table A water delivered. Conversely, if rain falls on snow early in the year, the resulting early snowmelt results in less water available for Delta pumping later in the year. Other factors affecting SWP delivery reliability are discussed in Chapter 4.

Local Facilities and Demands

A contractor's local diversion, storage, and conveyance facilities are important considerations in receiving water and in storing the water it receives. A contractor's water demands can also be affected by local weather patterns and water conservation measures. In some years, some contractors may rely more on water from sources such as groundwater or the Colorado River, while in other years they may rely more on the SWP.

The pattern of water demand on a water system can greatly affect the system's reliability. For example, if the demand occurs for only 3 months in summer, a water system with sufficient annual supply but insufficient water storage may not be able to reliably meet its customers' demands. If, however, the demand is distributed over the year, the system can more easily meet the demand because the need for water storage is reduced or storage could be increased.

Other Types of SWP Water

Regardless of water year type, Table A water is given first priority for delivery over other types of SWP water. Contractors have several options for what to do with the water that is allocated to them: use it, store it for later use, or transfer it to another contractor. Each long-term water contract describes several types of SWP water that are available to SWP contractors to supplement Table A water: "Article 21" water, carryover water, and turnback pool water. These other types of project water are discussed below and the related deliveries that occurred in each of the last 10 years are shown in Appendix A.

Article 21 Water

Article 21 water (so named because it is described in Article 21 of the water contracts) is water that SWP contractors may receive on a short-term basis in addition to their Table A water, if they request it. Because most SWP contactors often cannot meet their full demands with Table A water, Article 21 water should not be viewed as "surplus" or "extra" water. In fact, Article 21 water is used by many SWP contractors to help meet demands when allocations are less than 100%. Article 21 water is available to an SWP contractor only if the following conditions are met:

- "Excess water" is flowing through the Delta—that is, when releases from SWP and CVP reservoirs and unregulated flows into the Delta exceed Sacramento Valley water diversions, Delta exports, and flows needed to meet Delta water quality and flow requirements. If this scenario occurs, it is usually during December through May.
- The contractor is able to use the surplus water, such as by offsetting the use of groundwater that would otherwise occur, or can store it in its own system. (That is, the water will not be stored in an SWP facility, such as San Luis Reservoir.)

- Delivering this water would not interfere with Table A allocations, other SWP deliveries, or SWP operations.

SWP contractors requesting Article 21 water receive this water in the same proportion as their Table A water. Article 21 water becomes available only during wet months of the year, generally December through March. Unless the SWP contractor has facilities to routinely store or manage the Article 21 water it receives, such water is not likely to contribute significantly to local water supply reliability.

Carryover Water

"Carryover water" is SWP water that is allocated to an SWP contractor and approved for delivery to that contractor in a given year, but not used by the end of the year. (Note that SWP water deliveries are managed by calendar year, January 1–December 31, while hydrology is measured by water year, October 1–September 30.) This water is exported from the Banks Pumping Plant, but instead of being delivered to the contractor, it is stored in the SWP's share of San Luis Reservoir, when space is available, for the contractor to use in the following year.

Carryover water is like a water savings account that allows water managers flexibility in tough times—such as if the next year is a drought year and the contractor's allocation of SWP water is small. Carryover water was designed to encourage the most effective and beneficial use of water and to avoid obligating the contractors to use or lose the water by December 31 of each year.

With advance notice, SWP contractors can carry over water when they submit their initial request for Table A water, or within the last 3 months of the delivery year. They might do this for various reasons, such as local wet conditions or exchange and transfer arrangements. Storage for carryover water no longer becomes available to the contractors if it interferes with storage of SWP water for project needs.

Carryover water is stored in San Luis Reservoir.

Turnback Pool Water

SWP contractors may offer the portion of their allocated Table A water within the current year that exceeds their needs in a "turnback pool," where another contractor may purchase this water. DWR sets the price for water offered in turnback pools, which are established in February and March. Contractors that sell their extra Table A water in a turnback pool receive payments from contractors that buy water through the turnback pool.

Historical SWP Deliveries (2001–2010)

Please see Appendix A for tables listing annual historical deliveries from the Delta by various water classifications for each SWP contractor for 2001–2010. Similar delivery tables for years 1999–2008 are included in the 2009 Report.

Figure 3-2 shows that deliveries of SWP Table A water from the Delta for 2001–2010 range from an annual minimum of 1,049 taf to a maximum of 2,963 taf, with an average of 2,087 taf. Historical deliveries of SWP Table A water from the Delta over this 10-year period are less than the maximum of 4,133 taf/year.

Total historical SWP deliveries from the Delta, including Table A, Article 21, turnback pool, and carryover water, range from 1,236 to 3,727 taf/year, with an average of 2,524 taf/year for the period of 2001–2010 (Figure 3-3).

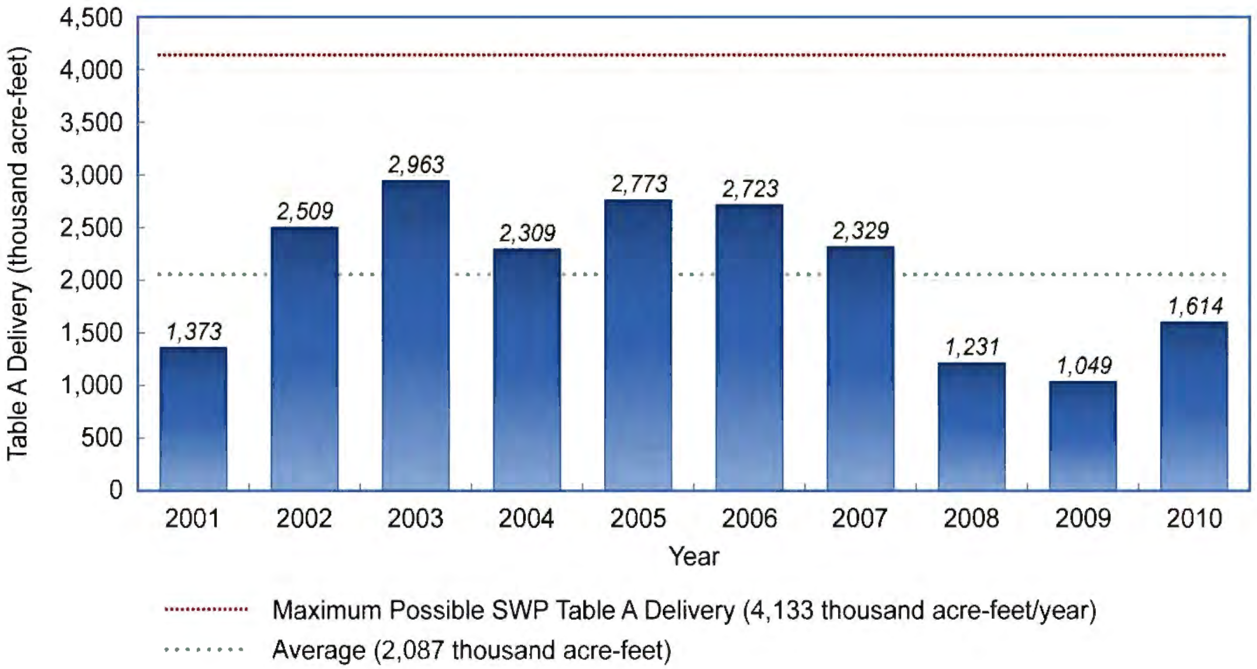
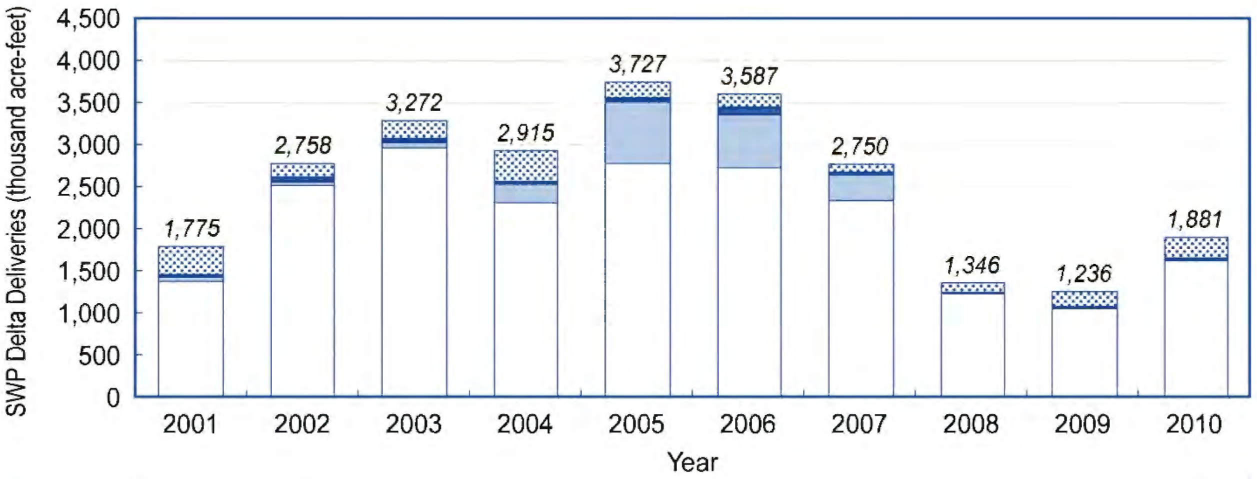


Figure 3-2. Historical Deliveries of SWP Table A Water from the Delta, 2001–2010



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
▨ Carryover	335	161	220	370	185	160	94	110	180	248
■ Turnback	18	45	30	17	38	73	16	3	2	11
▨ Article 21	48	43	60	218	731	631	310	3	6	8
☐ Table A	1,373	2,509	2,963	2,309	2,773	2,723	2,329	1,230	1,049	1,614

Note: Due to rounding, the total delivery may not equal the sum of individual delivery type line items.

Figure 3-3. Total Historical SWP Deliveries from the Delta, 2001–2010 (by Delivery Type)

Chapter 4

Factors that Affect Water Delivery Reliability

This chapter explains the concept of SWP water delivery reliability and how it is calculated by DWR. Some of the factors that influence the percentages of SWP Table A deliveries were introduced in Chapter 3, “SWP Contractors and Water Contracts.” This chapter builds on that discussion, describing the most important factors that combine to affect SWP water delivery reliability. Among these natural and human-created factors are the availability of source water, regulatory restrictions on SWP operations, and the effects of climate change.

Uncertainty also exists because of the potential for an emergency such as an earthquake striking in or near the Delta, which, if substantial enough, could interrupt SWP exports from the Delta. This chapter describes various statewide efforts by DWR and other agencies to reduce risks to the Delta and enhance emergency response capabilities.

What Water Delivery Reliability Means to SWP Contractors

Water delivery reliability is the annual amount of SWP water that can be expected to be delivered to SWP contractors with a certain frequency. But what does that actually mean in practice?

In essence, it is a matter of probability—specifically, the likelihood that a contractor will receive a certain amount of water from the SWP in a particular year. From the contractor’s perspective, water delivery reliability indicates an acceptable or desirable level of dependability of water deliveries to the people receiving the water. This information is vitally important to SWP contractors for their long-term water planning and operations. Will farmers have the amount of water they will need to plant permanent crops? Will urban and suburban water districts have sufficient water to serve planned development, or will they need to call for greater conservation measures by residents and businesses? These are examples of critical questions to which SWP contractors must have answers to serve their customers.

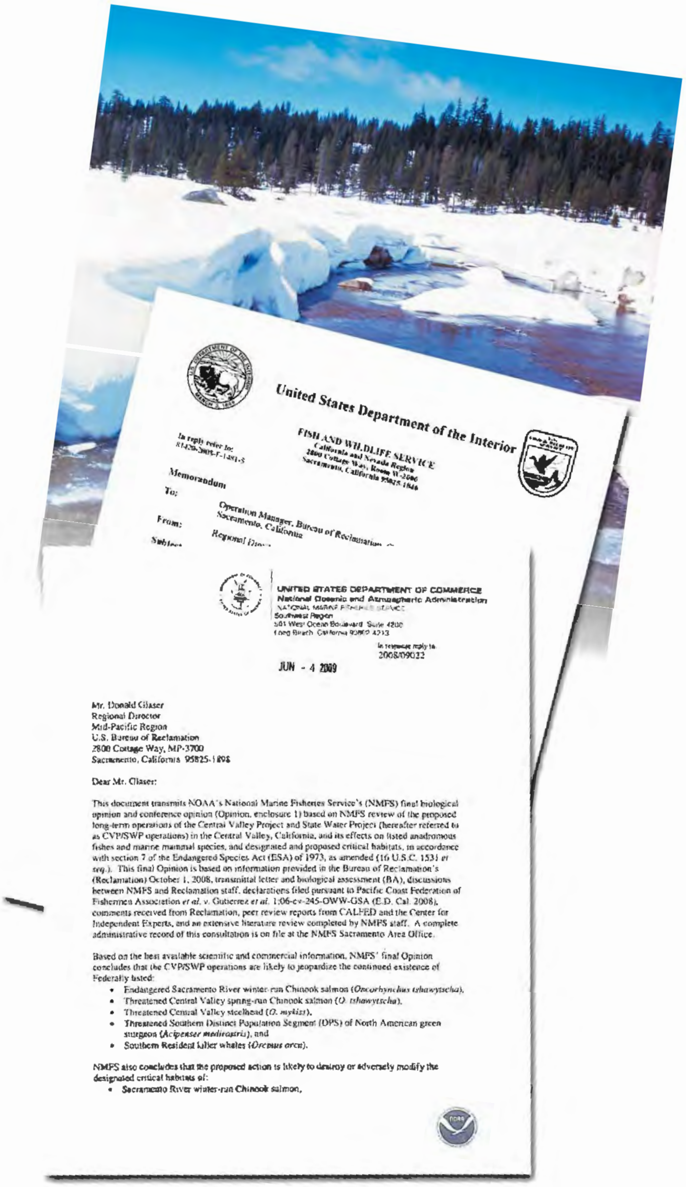
Usually, a local water agency, in coordination with the public it serves, determines the level of water delivery reliability that it considers acceptable. The water agency then plans for new facilities, programs, or additional sources of water to meet or maintain this level of reliability.

Calculating SWP Water Delivery Reliability

DWR calculates the water delivery reliability of the SWP using the CalSim-II computer model, which simulates existing and future operations of the SWP. No model or tool can predict what actual, natural water supplies will be for any year or years, but a system of probability can be used to calculate water delivery reliability. The analyses of SWP delivery reliability contained in Chapters 6 and 7 of this report are based on modeling conducted using 82 years of historical data (water years 1922–2003) for rainfall and runoff. Those data were adjusted to reflect current and future levels of development in the source areas. The resulting data were then used to forecast the amount of water available to the SWP under current and future conditions (with the effects of climate change factored into the modeling for future conditions). The annual amounts of estimated SWP water deliveries are ranked from smallest to largest and the probability that various quantities of SWP Table A water will be delivered to each SWP contractor is estimated.

Factors that Can Influence the SWP's Water Delivery Reliability

Forecasting water delivery reliability is a difficult task because California is such a large state with numerous microclimates. In a typical year, some areas receive as little as 2 inches of rain, while others receive more than 100 inches. In addition, the determinants of water delivery for a specific water supply system continually change over time and can be difficult to determine and/or model. For example, water use in Sacramento River watersheds has increased over time. The historical data upon which a water supply forecast is based must be adjusted to reflect the current and, if necessary, future use in these watersheds.



United States Department of the Interior

FISH AND WILDLIFE SERVICE
California and Nevada Region
2800 Cottage Way, Room W-2606
Sacramento, California 95825-1846

In reply refer to:
81420-2008-F-1481-5

Memorandum

To: Operation Manager, Bureau of Reclamation
Sacramento, California

From: Regional

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

In response reply to:
2008/09022

JUN - 4 2009

Mr. Donald Glaser
Regional Director
Mid-Pacific Region
U.S. Bureau of Reclamation
2800 Cottage Way, MP-3700
Sacramento, California 95825-1898

Dear Mr. Glaser:

This document transmits NOAA's National Marine Fisheries Service's (NMFS) final biological opinion and conference opinion (Opinion, enclosure 1) based on NMFS review of the proposed long-term operations of the Central Valley Project and State Water Project (hereafter referred to as CVP/SWP operations) in the Central Valley, California, and its effects on listed anadromous fishes and marine mammal species, and designated and proposed critical habitats, in accordance with section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*). This final Opinion is based on information provided in the Bureau of Reclamation's (Reclamation) October 1, 2008, transmittal letter and biological assessment (BA), discussions between NMFS and Reclamation staff, declarations filed pursuant to Pacific Coast Federation of Fishermen Association *et al.* v. Gutierrez *et al.* 1:06-cv-245-OWW-GSA (E.D. Cal. 2008), comments received from Reclamation, peer review reports from CALFED and the Center for Independent Experts, and an extensive literature review completed by NMFS staff. A complete administrative record of this consultation is on file at the NMFS Sacramento Area Office.

Based on the best available scientific and commercial information, NMFS' final Opinion concludes that the CVP/SWP operations are likely to jeopardize the continued existence of Federally listed:

- Endangered Sacramento River winter-run Chinook salmon (*Oncorhynchus tshawytscha*),
- Threatened Central Valley spring-run Chinook salmon (*O. tshawytscha*),
- Threatened Central Valley steelhead (*O. mykiss*),
- Threatened Southern Distinct Population Segment (DPS) of North American green sturgeon (*Acipenser medirostris*), and
- Southern Resident killer whales (*Orcinus orca*).

NMFS also concludes that the proposed action is likely to destroy or adversely modify the designated critical habitats of:

- Sacramento River winter-run Chinook salmon,

Natural factors such as snowmelt and human influences such as federal biological opinions can both influence the SWP's water delivery reliability.

The following factors affect the ability to estimate existing and especially future water delivery reliability:

- water availability at the source,
- water rights with priority over the SWP,
- regulatory restrictions on SWP Delta exports (imposed by federal biological opinions [BOs] and State water quality plans),
- climate change,

- ongoing environmental and policy planning efforts, and
- Delta levee failure.

Water Availability at the Source

This factor affects the SWP's water delivery reliability because it is inherently variable; availability of water at the source depends on the amount and timing of rain and snow that fall in any given year, the amount and timing of runoff, and the level of development (that is, the use of water) in the SWP's source areas. The location, amount, and form of precipitation in California in any given year cannot be accurately predicted, introducing the greatest uncertainty to the availability of future SWP source water and hence future SWP deliveries.

Generally, during a single dry year or two, surface water and groundwater storage can supply most water deliveries, but dry years can result in critically low water reserves.

DWR measures the water content of snowpack in the northern Sierra Nevada to forecast snowmelt runoff.

Greater reliance on groundwater during dry years results in high costs for many users and increases groundwater overdraft. Further, the ability of some contractors to use local groundwater may be limited; some groundwater basins may be contaminated by toxins such as methyl tertiary butyl ether (commonly known as MBTE), an ingredient in gasoline, and other aquifers may be too deep to reach economically. This makes the availability of the SWP's surface water to contractors especially important.

DWR manually measures snowpack in the northern Sierra Nevada monthly between early January and early May to forecast snowmelt runoff. These surveys and real-time electronic measurements taken throughout the winter measure the snowpack's water content. The size of the snowpack in the Feather River watershed on April 1—when snowpack water content normally is at its peak before the spring runoff—and the storage in Lake Oroville are key components of the SWP's delivery capabilities from April through September.

However, in some years, even measurements taken in the northern Sierra Nevada earlier in the year can demonstrate an apparent trend in water delivery reliability for the rest of the year (assuming that the weather follows typical patterns in spring). For example, manual readings conducted by DWR on December 28, 2010, off U.S. Highway 50 near Echo Summit showed snow-water equivalents in the state's northern mountains at 169% of normal for that date and 57% of the normal value for April 1. By contrast, the readings taken on the same date in 2009 had indicated snow-water equivalents in the northern mountains at 77% of normal for the date and 26% of the normal value for April 1. These findings indicated the potential for SWP deliveries in 2011 to increase relative to deliveries that occurred in 2010, a below-normal water year.

Water Rights with Priority Over the SWP

California's water rights system affects the SWP indirectly. There are two types of legally protected rights to surface water in California:

- *Appropriative* water rights allow the user to divert surface water for beneficial use. The user must first have obtained a permit from the State Water Resources Control Board (State Water Board), unless the appropriative water right predates 1914. Appropriative water rights may be lost if the water has gone unused for 5 years. The SWP diverts water from the Delta under appropriative water rights.
- *Riparian* water rights apply to lands traversed by or bordering on a natural watercourse. No permit is required to use this water, which must be used on riparian (adjacent) land and cannot be stored for later use.

Generally, the priority of an appropriative water right in California is "first in time, first in right"; therefore, an appropriative water right is subordinate to all prior water rights, whether appropriative or riparian. This means that if another entity with a prior water right increases its use of one of the SWP's sources of water supply—the Delta, the upstream Sacramento or San Joaquin River, or a tributary to either river—the overall amount of water available to the SWP will decrease. Thus, water users with prior water rights are assigned top priority for water in DWR's modeling of the SWP's water delivery reliability, even ahead of SWP Table A water deliveries.

Regulatory Restrictions on SWP Delta Exports

Multiple needs converge in the Delta: the need to protect a fragile ecosystem, to support Delta recreation and farming, and to provide water for agricultural and urban needs throughout much of California. Various regulatory requirements are placed on the SWP's Delta operations to protect special-status species such as delta smelt and spring- and winter-run Chinook salmon. As a result, as described below, restrictions on SWP operations imposed by State and federal agencies contribute substantially to the challenge of accurately determining the SWP's water delivery reliability in any given year.

Biological Opinions on Effects of Coordinated SWP and CVP Operations

Several fish species listed under the federal Endangered Species Act (ESA) as endangered or threatened are found in the Delta. The continued viability of populations of these species in the Delta depends in part on Delta flow levels. For this reason, the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) have issued several BOs since the 1990s on the effects of coordinated SWP/CVP operations on several species.

These BOs affect the SWP's water delivery reliability for two reasons. Most obviously, they include terms that specifically restrict SWP pumping levels in the Delta at certain times under certain conditions. In addition, the BOs' requirements are based on physical and biological phenomena that occur daily while DWR's water supply models are based on monthly data.

The first BOs on the effects of SWP (and CVP) operations were issued in February 1993 (NMFS BO on effects of project operations on winter-run Chinook salmon) and March 1995 (USFWS BO on project effects on delta smelt and splittail). Among other things, the BOs contained requirements for Delta inflow, Delta outflow, and reduced export pumping to meet specified incidental take limits. These fish protection requirements imposed substantial constraints on Delta water supply operations. Many were incorporated into the 1995 *Water Quality Control Plan for the San Francisco Bay/Sacramento–San Joaquin Delta* (1995 WQCP), as described in the "Water Quality Objectives" section later in this chapter.

The terms of the USFWS and NMFS BOs have become increasingly restrictive in recent years. In December 2008, USFWS issued a new BO covering effects of the SWP and CVP on delta smelt, and in June 2009, NMFS issued a BO covering effects on winter-run and spring-run Chinook salmon, steelhead, green sturgeon, and killer whales. These BOs replaced BOs issued earlier by the federal agencies.

The USFWS BO includes additional requirements in all but 2 months of the year. The BO calls for "adaptively managed" (adjusted as necessary based on the results of monitoring) flow restrictions in the Delta intended to protect delta smelt at various life stages. USFWS determines the required target flow, with the reductions accomplished primarily by reducing SWP and CVP exports. Because this flow restriction is determined based on fish location and decisions by USFWS staff, predicting the flow restriction and corresponding effects on export pumping with any great certainty poses a challenge. The USFWS BO also includes an additional salinity requirement in the Delta for September and October in wet and above-normal water years, calling for increased releases from SWP and CVP reservoirs to reduce salinity. Among other provisions included in the NMFS BO, limits on total Delta exports have been established for the months of April and May. These limits are mandated for all but extremely wet years.

The 2008 and 2009 BOs were issued shortly before and shortly after the Governor proclaimed a statewide water shortage state of emergency in February 2009, amid the threat of a third consecutive dry year. NMFS calculated that implementing its BO would reduce SWP and CVP Delta exports by a combined 5% to 7%, but DWR's initial estimates showed an impact on exports closer to 10% in average years, combined with the effects of pumping restrictions imposed by BOs to protect delta smelt and other species. The 2008 USFWS and 2009 NMFS BOs have been subject to considerable litigation. Recent decisions by U.S. District Judge Oliver Wanger changed specific operational rules for the fall/winter of 2011–2012, and both the USFWS BO and NMFS BO have been remanded to the agencies for further review and analysis. However, the operational rules specified in the 2008 and 2009 BOs continue to be legally required and are the rules used in the analyses presented in Chapters 5, 6, and 7 of this report. Chapter 5 presents a comparison of monthly Delta exports as estimated for this 2011 Report with those estimated for the 2005 Report, illustrating how the 2008 and 2009 BOs have affected export levels from the Delta.

The California Department of Fish and Game (DFG) issued consistency determinations for both BOs under Section 2080.1 of the California Fish and Game Code. The consistency determinations stated that the USFWS BO and the NMFS BO would be consistent with the California Endangered Species Act (CESA). Thus, DFG allowed incidental take of species listed under both the federal ESA and CESA to occur during SWP and CVP operations without requiring DWR or the U.S. Bureau of Reclamation to obtain a separate State-issued permit.

Specific restrictions on Delta exports associated with the USFWS and NMFS BOs and their effects on SWP pumping levels are described further in Chapter 5, "SWP Delta Exports," of this report.

Water Quality Objectives

Because the Delta is an estuary, salinity is a particular concern. In the 1995 WQCP, the State Water Board set water quality objectives to protect beneficial uses of water in the Delta and Suisun Bay. The objectives must be met by the SWP (and federal CVP), as specified in the water right permits issued to DWR and the U.S. Bureau of Reclamation. Those objectives—minimum Delta outflows, limits on SWP and CVP Delta exports, and maximum allowable salinity levels—are enforced through the provisions of the State Water Board's Water Right Decision 1641 (D-1641), issued in December 1999 and updated in March 2000.

DWR and Reclamation must monitor the effects of diversions and SWP and CVP operations to ensure compliance with existing water quality standards. Monitoring stations are shown in Figure 4-1.

Among the objectives established in the 1995 WQCP and D-1641 are the "X2" objectives. D-1641 mandates the X2 objectives so that the State Water Board can regulate the locations of the Delta estuary's salinity gradient during the months of February–June. X2 is the position in the Delta where the electrical conductivity (EC) level, or salinity, of Delta water is 2 parts per thousand. The location of X2 is used as a surrogate measure of Delta ecosystem health. For the X2 objective to be achieved, the X2 position must remain downstream of Collinsville in the Delta (shown in Figure 4-1) for the entire 5-month period, and downstream of other specific locations in the Delta on a certain number of days each month from February through June. This means that Delta outflow must be at certain specified levels at certain times—which can limit the amount of water the SWP may pump at those times at its Harvey O. Banks Pumping Plant in the Delta. Because of the relationship between seawater intrusion and interior-Delta water quality, meeting the X2 objective also improves water quality at Delta drinking-water intakes; however, meeting the X2 objectives can require a relatively large volume of water for outflow during dry months that follow months with large storms.

The 1995 WQCP and D-1641 also established an export/inflow (E/I) ratio. The E/I ratio, presented in Table 3 of the 1995 WQCP (SWRCB 1995:18–22), is designed to provide protection for the fish and wildlife beneficial uses in the Bay-Delta estuary (SWRCB 1995:15). The E/I ratio limits the fraction of Delta inflows that are exported. When other restrictions are not controlling, Delta exports are limited to 35% of total Delta inflow from February through June and 65% of inflow from July through January.

Climate Change

The *California Water Plan Update 2009* identified climate change as a key consideration in planning for the State's water management. California's reservoirs and water delivery systems were developed based on historical hydrology; future weather patterns have long been assumed to be similar to those in the past. However, as climate change continues to affect California, past hydrology is no longer a reliable guide to future conditions. This section discusses effects on the SWP that could result from specific aspects of climate change.

Decreased Water Availability with Reduced Snowpack

As the effects of climate change continue, mean temperatures are predicted to increase, both globally and regionally. Climate projections used to assess the reliability of California's future water supply forecast average air temperature increases for the Sacramento region of 1.3 to 4.0 degrees Fahrenheit by the middle of the 21st century and 2.7 to 8.1 degrees by the end of the century (California Climate Change Center 2009a:8). Climate change is anticipated to bring warmer storms that result in less snowfall at lower elevations, reducing total snowpack. Loss of snowpack is projected to be greater in the northern Sierra Nevada—and thus closer to the Feather River watershed, the origin of SWP water—than in the southern Sierra Nevada because of the relative proportions of land at low and middle elevations.

Snowmelt provides an average of 15 million acre-feet of water for California per year, slowly released from about April to July each year (DWR 2006:2-22). Much of the state's water infrastructure, including the SWP, was designed to capture slow spring runoff and deliver it during the drier summer and fall months. However, during the 20th century, the average early-spring

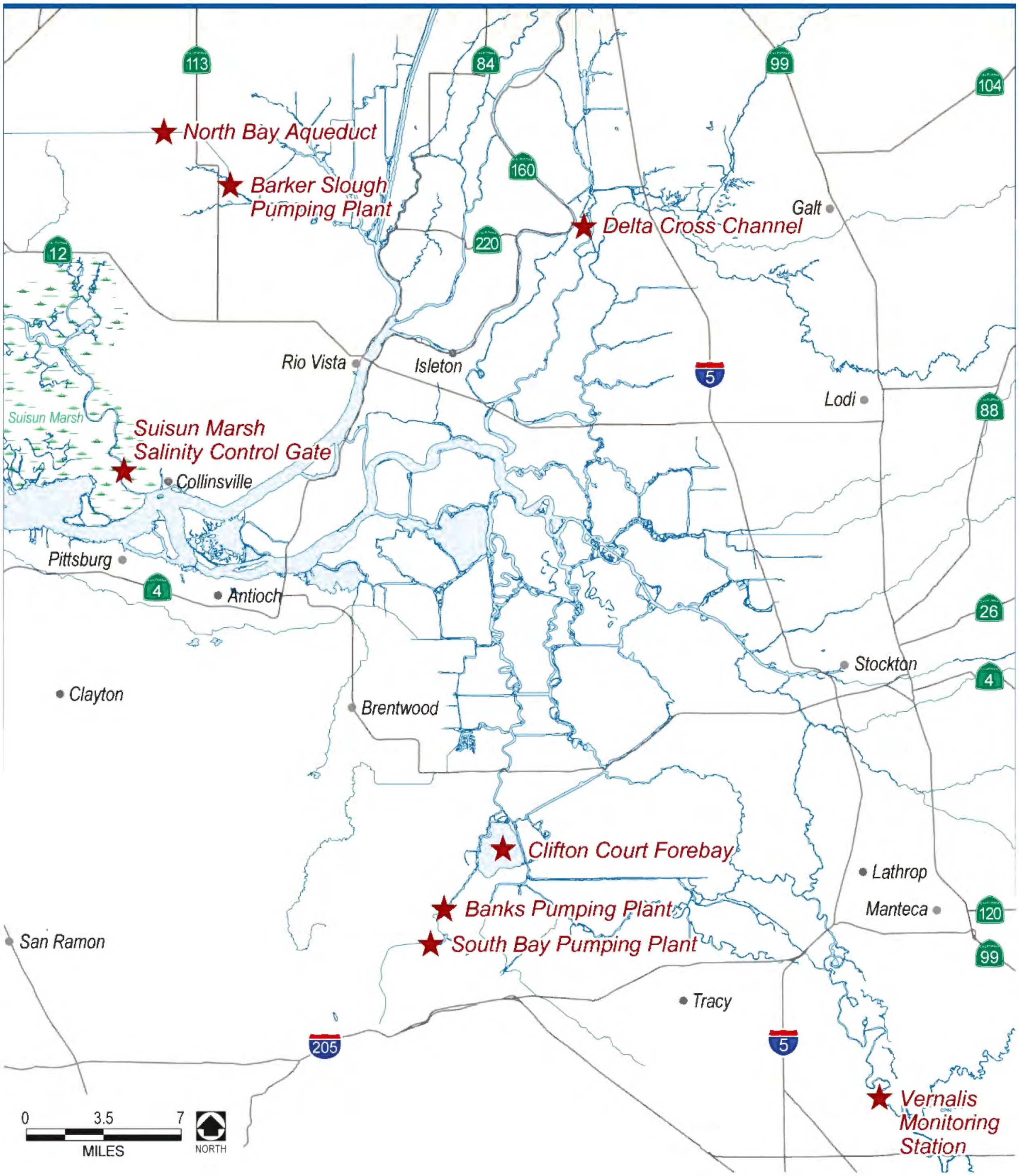


Figure 4-1. Delta Salinity Monitoring Locations of Importance to the SWP

snowpack in the Sierra Nevada decreased by about 10%, resulting in the loss of 1.5 million acre-feet of snowpack storage (DWR 2008:3). Using historical data and modeling, DWR projects that by 2050 the Sierra snowpack will be reduced from its historical average by 25% to 40% (DWR 2008:4). Increased precipitation falling as rain instead of snow during winter could result in a larger number of "rain-on-snow" events. This would cause the snow to melt earlier in the year and over fewer days than historically, thus adversely affecting availability of water for pumping by the SWP during summer.

Such reductions in snowpack could have dire consequences. Under climate change and in some years, water levels in Lake Oroville, the SWP's main supply reservoir, could fall below the lowest release outlets, making the system vulnerable to operational interruption. DWR expects that a water shortage worse than the one during the 1977 drought could occur in 1 out of every 6–8 years by the middle of the 21st century and in 1 out of every 3–4 years at the end of the century (California Climate Change Center 2009a:46). In those years, it is estimated that an additional 575,000–850,000 acre-feet per year of water would be needed to meet current regulatory requirements and to maintain minimum system operations. This could preclude the SWP from pumping as much water as it would otherwise.

Climate change is also expected to reduce the SWP's median reservoir carryover storage. Carryover water is like a water savings account for water managers to use during shortage periods. Thus, a climate change–generated reduction in the amount of carryover water available to SWP contractors would reduce the system's flexibility during dry and critical water years.

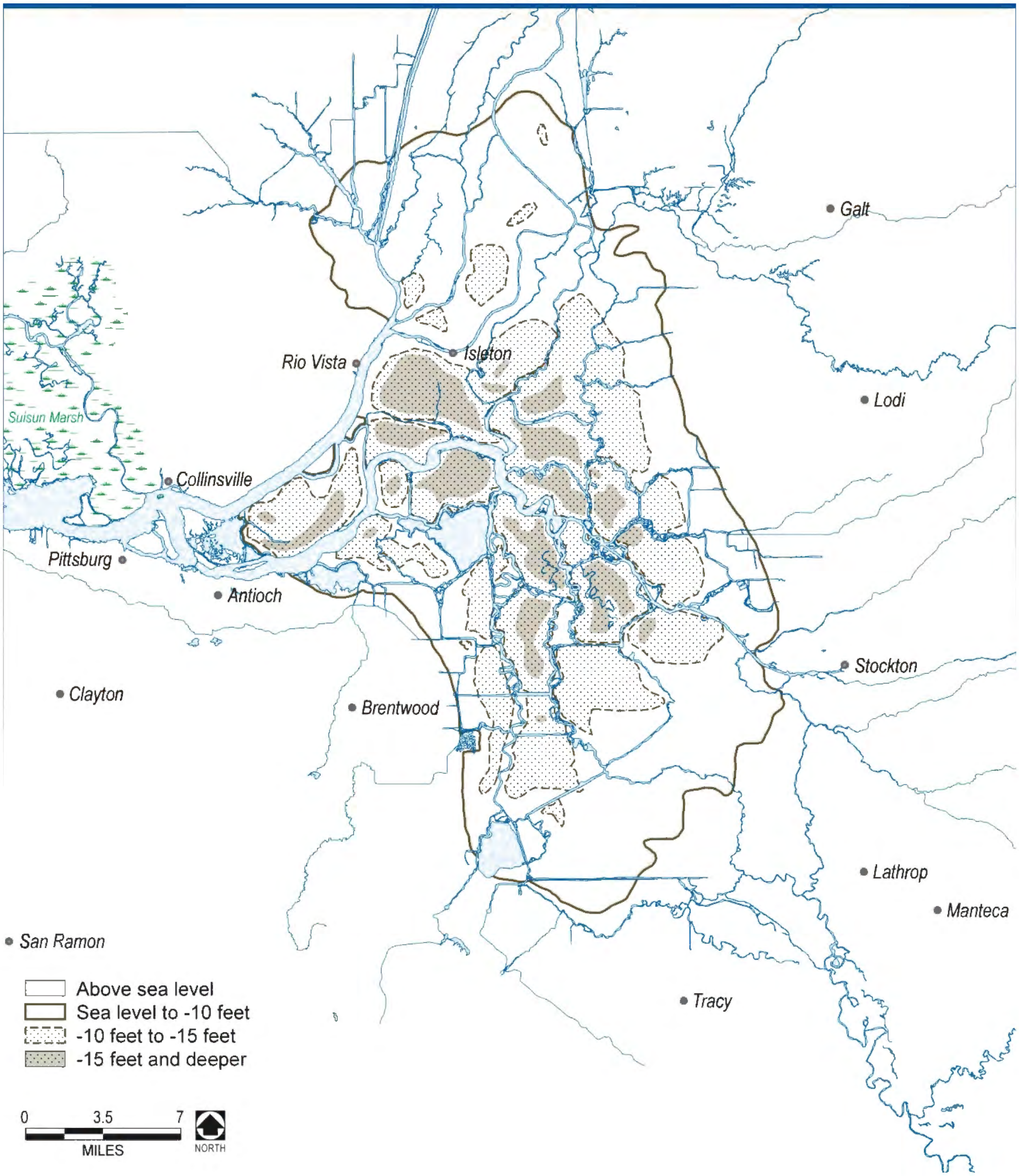
Increased SWP Water Demands

Even as water shortages may result from reduced snowpack, climate change may also cause water demand by SWP contractors to increase. Warmer temperatures may increase rates of evapotranspiration (loss of water from soil by evaporation and plant transpiration) and may extend growing seasons. A larger amount of water may be needed for irrigation of certain crops, urban landscaping, and environmental needs. Warmer temperatures will also increase evaporation from surface reservoirs. Reduced soil moisture and surface flow will disproportionately affect the environment and other water users that rely heavily on annual rainfall such as rainfed agriculture, livestock grazing on nonirrigated rangeland, and recreation.

Sea Level Rise

During the last century, sea level rose 7 inches along California's coast. Estimates of future sea level rise range from 4 to 16 inches by the middle of the 21st century and 7–55 inches by 2100 (DWR 2009b:4-37). The increases in sea level that are expected to continue could affect SWP water delivery reliability in several ways:

- Most of the land in the Delta is below sea level—by as much as 20 feet—as a consequence of ongoing subsidence (Figure 4-2). Increases in sea level could place more pressure on the Delta's already fragile levee system and, as a consequence, cause levee breaches that could threaten SWP Delta exports.
- As salty water from the Pacific Ocean moves farther upstream into the Delta, DWR could be required to increase the amounts of freshwater released from Lake Oroville to maintain compliance with Delta water quality standards.
- Sea level rise is expected to cause salt water to flow farther inland. The resulting increase in saltwater intrusion into coastal aquifers would make increasing amounts of groundwater unsuitable for water supply or irrigation (California Climate Change Center 2009b:80–81). The reduced availability of groundwater would likely contribute to further increases in demands for surface water from the SWP, especially by the coastal SWP contractors.



Source: DWR 1995:28

Figure 4-2. Areas of the Delta that Have Subsided to Below Sea Level

Adapting to Climate Change Effects in Forecasting Water Delivery Reliability

Chapter 7, "Future SWP Water Delivery Reliability (2031)," of this report estimates the SWP's delivery reliability for conditions 20 years in the future (2031), reflecting potential hydrologic changes that could result from climate change. Further details on these future projections are included in a technical addendum to this report (posted on the Internet and available upon request).

For purposes of this report and the technical addendum, the 2031 delivery estimates are based on a single median-impact future climate projection. To identify this projection, DWR analyzed the 12 climate projections for midcentury that were used in *Using Future Climate Projections to Support Water Resources Decision Making in California* (California Climate Change Center 2009a). The resulting water supply effects were examined to determine which one most closely represented the "central" or "median" projection. The analysis examined the following projected climate and hydrology variables and their effects on SWP exports: temperature, precipitation, total inflow to major reservoirs, shifts in timing of runoff, and Delta exports.

Ongoing Environmental and Policy Planning Efforts

As discussed earlier, the Delta is an essential part of the conveyance system for the SWP. SWP pumping at the Banks Pumping Plant is regulated to protect the many uses of the Delta. However, today's uses in the Delta are not sustainable over the long term under current management practices and regulatory requirements. As discussed below, two large-scale plans for the Delta that are in development could affect SWP water delivery reliability: the Delta Plan and the Bay Delta Conservation Plan (BDCP).

Delta Plan

After years of concern about the Delta amid rising water demand and habitat degradation, the Delta Stewardship Council was created in legislation to achieve State-mandated coequal goals for the Delta. As specified in Section 85054 of the California Water Code:

> "Coequal goals" means the two goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem. The coequal goals shall be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place.

The draft Delta Plan seeks to reduce reliance on Delta water supplies. In a series of policies and recommendations, the draft plan aims to encourage farms and cities to increase conservation and become more self-sufficient, particularly in the event of a disaster in the Delta. It calls for agricultural water agencies to change pricing to encourage conservation. It also urges the State Water Board to set enforceable flow objectives for the Delta and its tributaries that take into account wildlife and habitat needs. In the future, government projects in the Delta must prove they are consistent with the Delta Plan.

The Delta Stewardship Council is preparing the draft Delta Plan and environmental impact report. Scheduled for adoption and implementation in 2012, the Delta Plan is intended to serve as California's guiding policy document for the Delta and Suisun Marsh for the next 88 years (that is, through the year 2099), with frequent updates.

Bay Delta Conservation Plan

The BDCP is being prepared by a group of local water agencies, environmental and conservation organizations, State and federal agencies, and other interest groups. An outgrowth of the CALFED Bay-Delta Plan's Ecosystem Restoration Program Conservation Strategy, the BDCP has been in development since 2006. The heart of the BDCP is a long-term conservation strategy that sets forth actions needed for a healthy Delta. The BDCP would do all of the following:

- identify conservation strategies to improve the overall ecological health of the Delta;
- identify ecologically friendly ways to move freshwater through and/or around the Delta;
- address toxic pollutants, invasive species, and impairments to water quality; and
- establish a framework and funding to implement the plan over time.

A draft environmental impact report is planned to be released for public review in mid-2012. The report is targeted to be final in 2013, after which a decision to proceed with the program would be made. Upon adoption, the BDCP would provide the basis for issuance of endangered species permits for the continued operation of the SWP and CVP. The plan would be implemented over a 50-year period.

Delta Levee Failure

The fragile Delta faces a multitude of risks that could affect millions of Californians. Foremost among those risks, as they could affect the SWP's water delivery reliability, are the potential for levee failure and the ensuing flooding and water quality issues.

The Delta Risk Management Strategy (DRMS) was initiated in response to Assembly Bill 1200 (2005), which directed DWR to use 50-, 100-, and 200-year projections to evaluate the potential impacts on Delta water supplies associated with continued land subsidence, earthquakes, floods, and climate change. The discussions below describe DRMS Phase 1, which evaluated the risks, and DRMS Phase 2, which is proposing various solutions. Also discussed are other efforts currently being undertaken by DWR and other agencies to reduce risks to the Delta, enhance emergency response capabilities, and reduce the risk of interruption of Delta water exports by the SWP and CVP.

Effects of Emergencies on Water Supplies: Delta Risk Management Strategy, Phase 1

Phase 1 of the DRMS, completed in 2008, assessed the performance of Delta and Suisun Marsh levees under various stressors and hazards and evaluated the consequences of levee failures to California as a whole.

The Delta is protected by levees built about 150 years ago. The levees are vulnerable to failure because most original levees were simply built with soils dredged from nearby channels, and were never engineered. Most islands in the Delta have flooded at least once over the past 100 years. For example, on June 3, 2004, a huge dry-weather levee failure occurred without warning on Upper Jones Tract in the south Delta, inundating 12,000 acres of farmland with about 160,000 acre-feet of water. Because many Delta islands are below sea level, deep and prolonged flooding could occur during a levee failure event, which could disrupt the quality and use of Delta water.

Levee failure can result from the combination of high river inflows, high tide, and high winds; however, levees can also fail in fair weather—even in the absence of a flood or seismic event—in a so-called "sunny day event." Damage caused by rodents, piping (in which a pipe-like opening develops below the base of the levee), or foundation movement could cause sunny-day levee breaches.

Many vulnerable Delta levees require installation of rock revetments, riprap, or other engineered structures along eroding banks to reduce erosion and protect levee foundations.

A breach of one or more levees and island flooding may affect Delta water quality and SWP operations. Depending on the hydrology and the size and locations of the breaches and flooded islands, a large amount of salt water may be pulled into the interior Delta from Suisun and San Pablo Bays. When islands are flooded, DWR may need to drastically decrease or even cease SWP Delta exports to evaluate the distribution of salinity in the Delta and avoid drawing saltier water toward the pumps.

Delta levees are prone to failure, increasing risks to State water supplies.

An earthquake could also put Delta levees, and thus SWP water supplies, at risk. In 2008, the 2007 Working Group on California Earthquake Probabilities estimated a probability of 63% that a magnitude 6.7 or greater earthquake would strike the San Francisco Bay Area in the next 30 years (Working Group 2008:6). An earthquake could severely damage Delta levees, causing islands to flood with salty water. The locations most likely to be affected by an earthquake are the west and southwest portions of the Delta because these areas are closer to potential earthquake sources. Flooding of the west and southwest Delta is also more likely to interfere with conveyance of freshwater to export pumps (DWR 2007:17).

Modeling of the effects of earthquakes on Delta islands was conducted by DWR for the DRMS Phase 1 report. Described in the *California Water Plan Update 2009*, the assessment found a 40% probability that a major earthquake occurring between 2030 and 2050 would cause 27 or more islands to flood at the same time. If 20 islands were flooded as a result of a major earthquake, the export of freshwater from the Delta could be interrupted by about a year and a half (DWR 2009b:5-15). Water supply losses of up to 8 million acre-feet would be incurred by SWP (and CVP) contractors and local water districts.

Managing and Reducing Risks: Delta Risk Management Strategy, Phase 2

The Phase 2 report for the DRMS, issued in June 2011, evaluates alternatives to reduce the risk to the Delta and the state from adverse consequences of levee failure (DWR 2011b). "Building blocks" (individual improvements or projects, such as improving levees or raising highways) and trial scenarios (various combinations of building blocks) were developed for the DRMS Phase 2 report. The building blocks fall into three main categories:

- conveyance improvements/
  flood risk reduction and life safety,
- infrastructure risk reduction, and
- environmental risk mitigation.

The first of these categories is most relevant to the SWP in terms of reducing the risk of disruption of SWP Delta exports, but the environmental risk mitigation category includes a building block (Building Block 3.6) calling for reduction of water exports from the Delta.

Four trial scenarios were developed to represent a range of possible risk reduction strategies:

- *Trial Scenario 1—Improved Levees:* Improve the reliability of Delta levees against flood-induced failures by providing up to 100-year flood protection.
- *Trial Scenario 2—Armored Pathway (Through-Delta Conveyance):* Improve the reliability of water conveyance by creating a route through the Delta that has high reliability and the ability to minimize saltwater intrusion into the south Delta.
- *Trial Scenario 3—Isolated Conveyance Facility:* Provide high reliability for conveyance of export water by building an isolated conveyance facility on the east side of the Delta.
- *Trial Scenario 4—Dual Conveyance:* Improve reliability and flexibility for conveyance of export water by constructing an isolated conveyance facility and a through-Delta conveyance. (This scenario would be much like a combination of Trial Scenarios 2 and 3.)

The findings of the DRMS Phase 2 report on these scenarios, as they apply to seismic risk and potential for disruption of SWP Delta exports, are as follows:

- Trial Scenario 1 (Improved Levees) would not reduce the risk of potential water export interruptions, nor would it change the seismic risk of most levees.
- Trial Scenario 2 (Armored Pathway [Through-Delta Conveyance]) would have the joint benefit of reducing the likelihood of levee failures from flood events and earthquakes and of significantly reducing the likelihood of export disruptions.
- The effects of Trial Scenario 3 (Isolated Conveyance) would be similar to those for the Armored Pathway scenario, but Trial Scenario 3 would not reduce the seismic risk of levee failure on islands that are not part of the isolated conveyance facility.
- Trial Scenario 4 (Dual Conveyance) would avoid the vulnerability of water exports associated with Delta levee vulnerability and would offer flexibility in water exports from the Delta and/or the isolated conveyance facility. However, seismic risk would not be reduced on islands not part of the export conveyance system or infrastructure pathway.

As noted in the discussion of the “enhanced emergency preparedness/response” building block in the DRMS Phase 2 report, analyses on resuming water exports after a levee failure were conducted by the Metropolitan Water District of Southern California, an SWP contractor. The studies found that a promising way to resume water exports would be to place structural barriers at selected channel locations in the Delta and complete strategic levee repairs, thus isolating an emergency freshwater conveyance “pathway” through channels that may be surrounded by islands flooded with saline water (Moffatt and Nichol 2007, cited in DWR 2011b:5-1).

Delta Flood Emergency Preparedness, Response, and Recovery Program and Delta Multi-Hazard Coordination Task Force

In the last 5 years, DWR has worked to improve its ability to respond quickly and effectively to simultaneous levee failures on multiple islands within the Delta. The *Delta Emergency Operations Plan Concept Paper* released in April 2007 (DWR 2007) was the initial product of this effort. To enhance the State’s ability to prepare for, respond to, and recover from a catastrophic Delta levee failure, DWR subsequently began development of the Delta Flood Emergency Preparedness, Response, and Recovery Program. This program is intended to supplement DWR’s emergency operations plan. The goal is to protect lives, property, and critical infrastructure in the Delta while minimizing impacts on the ecosystem. The program consists of three components:

- develop DWR’s Delta response and recovery plan,
- coordinate DWR’s plan with other Delta flood emergency response agencies, and

- design and implement flood emergency response facilities within the Delta.

The flood emergency response plan for the Delta will describe the actions DWR will take before, during, and after a levee-endangering event or levee failure in the Delta. The Delta Flood Emergency Preparedness, Response, and Recovery Program is conducting an extensive effort to model water quality implications of levee failure and salinity changes associated with different levee repair strategies. DWR is coordinating this effort with the U.S. Army Corps of Engineers and expects to reach out to the five Delta counties during plan development.

DWR is also a member of the Sacramento–San Joaquin Delta Multi-Hazard Coordination Task Force, which was created in 2008 in the wake of passage of the Sacramento–San Joaquin Delta Emergency Preparedness Act of 2008. The task force is led by the California Emergency Management Agency (CalEMA); in addition to DWR, the Delta Protection Commission and representatives from each of the five Delta counties also participate in task force activities. An Emergency Preparedness and Response White Paper was prepared for the Delta Stewardship Council on November 8, 2010, describing the operations of this task force.

The Sacramento–San Joaquin Delta Multi-Hazard Coordination Task Force was created to make recommendations to CalEMA on creating a framework for an interagency unified command system, coordinate the development of a draft emergency preparedness and response strategy for the Delta region, and develop and conduct an all-hazards emergency response exercise in the Delta. The task force's draft emergency preparedness and response strategy includes a process for allocating scarce resources and a statement of priorities agreed to by the members of the task force. The original deadline for the task force's report has been legislatively extended to January 1, 2013.

Chapter 5

SWP Delta Exports

The purpose of this chapter is to illustrate the effects of factors described in Chapter 4, “Factors that Affect Water Delivery Reliability,” on SWP water supplies transferred through the Delta and pumped at the Harvey O. Banks Pumping Plant in the south Delta. These supplies are referred to as “Delta exports.” Past SWP delivery reliability reports characterized SWP deliveries in their entirety but did not focus specifically on Delta exports. This chapter describes SWP Delta exports to illustrate how regulatory requirements and climate change have affected or will affect the SWP’s Delta water supplies, and to describe the general pattern of monthly SWP exports from the Delta.

This chapter focuses only on Delta exports that are associated with the SWP, not on CVP water that may have been exported through the Banks Pumping Plant via the CVP/SWP joint point of diversion.

This chapter briefly explains the difference between Delta exports and SWP deliveries, then describes trends in projected average annual exports and SWP Table A water deliveries under various recent existing-conditions scenarios. In addition, monthly exports estimated for this *State Water Project Delivery Reliability Report 2011* (2011 Report) are compared with those estimated for the *State Water Project Delivery Reliability Report 2005* (2005 Report) to illustrate the effect of regulatory restrictions.

This chapter also summarizes the primary factors influencing the SWP’s Delta export operations and deliveries, presents estimates of exports for the existing-conditions and future-conditions scenarios, and characterizes the likelihood of such exports. Estimated SWP Delta exports by water year type are depicted relative to exports that were estimated for the existing-conditions and future-conditions scenarios in the *State Water Project Delivery Reliability Report 2009* (2009 Report).

SWP Delta Exports versus SWP Deliveries

SWP Delta exports and SWP deliveries are characterized in separate chapters (this chapter for Delta exports, Chapters 6 and 7 for SWP deliveries) because these two terms are not one and the same.

Water pumped from the Delta is the primary source of SWP supply for 24 of the

29 SWP water contractors listed in Chapter 3, "SWP Contractors and Water Contracts." (Occasionally, during very wet periods, flood flows can enter the aqueduct and contribute to SWP supply south of the Delta.) As used in this report, "Delta exports" are the water supplies that are transferred ("exported") directly to SWP contractors or to San Luis Reservoir storage via the Banks Pumping Plant.

SWP Delta exports do not include deliveries of SWP water to the two North Bay Area contractors, which receive SWP water pumped by the Barker Slough Pumping Plant and conveyed by the North Bay Aqueduct. (Water conveyed to the SWP's three Feather River Area contractors is not transferred through the Delta and is not the focus of this chapter or of Chapters 6 and 7.)

By contrast, SWP Table A water deliveries from the Delta include both water pumped by the Banks Pumping Plant and conveyed by the California Aqueduct and water pumped by the Barker Slough Pumping Plant and conveyed by the North Bay Aqueduct. Thus, Table A water deliveries, as described in Chapters 6 and 7, also include deliveries to the two North Bay Area contractors, for a total of 26 SWP contractors.

SWP Delta exports include nearly all types of SWP water, not merely Table A water (see the explanation of SWP water types in Chapter 3). As allowed under the SWP's water supply contracts, the amount pumped from the Delta can be exported in the same year as Table A water, or can be exported as Article 21 water if available. A contractor can opt to have exported Table A water held in San Luis Reservoir as carryover water—that is, as part of the contractor's supply for a subsequent year or made available to another SWP contractor as turnback pool water. Article 21 water must be delivered immediately to SWP contractors when exported and cannot be stored in SWP facilities.

Recent Trends in SWP Delta Exports and Table A Deliveries

SWP Delta exports and Table A deliveries estimated for this 2011 Report are reduced by the operational restrictions imposed on the SWP by the biological opinions (BOs) issued by the U.S. Fish and Wildlife Service (USFWS) in December 2008 and the National Marine Fisheries Service (NMFS) in June 2009. This same scenario occurred in the 2009 Report. By contrast, the *State Water Project Delivery Reliability Report 2007* (2007 Report) incorporated interim, less restrictive operational rules established by U.S. District Judge Oliver Wanger in December 2007 while the USFWS and NMFS BOs were rewritten. The 2005 Report was based on much less restrictive operational rules contained in the BOs that had been issued in late 2004 and 2005.

Overall trends in both SWP Delta exports and Table A deliveries under existing conditions are summarized below. (For further detail on estimated SWP Table A deliveries for the existing-conditions and future-conditions scenarios, respectively, see Chapters 6 and 7.)

Annual Exports and Table A Deliveries—2005–2011 Scenarios

Figure 5-1 illustrates the effect of the operational restrictions imposed by the USFWS and NMFS BOs on estimated average annual Delta exports and Table A water deliveries. The figure depicts the average values estimated for existing conditions in the 2005, 2007, 2009, and 2011 Reports.

As shown in Figure 5-1, estimated average annual Delta exports and SWP Table A water deliveries have generally decreased since 2005, when rules affecting SWP pumping operations began to become more restrictive. Under existing conditions, average annual Delta exports have decreased since 2005 from 2,958 thousand acre-feet per year (taf/year) to 2,607 taf/year in 2011, a decrease of 351 taf or 11.9%; average annual Table A deliveries have decreased since 2005 from 2,818 taf/year to

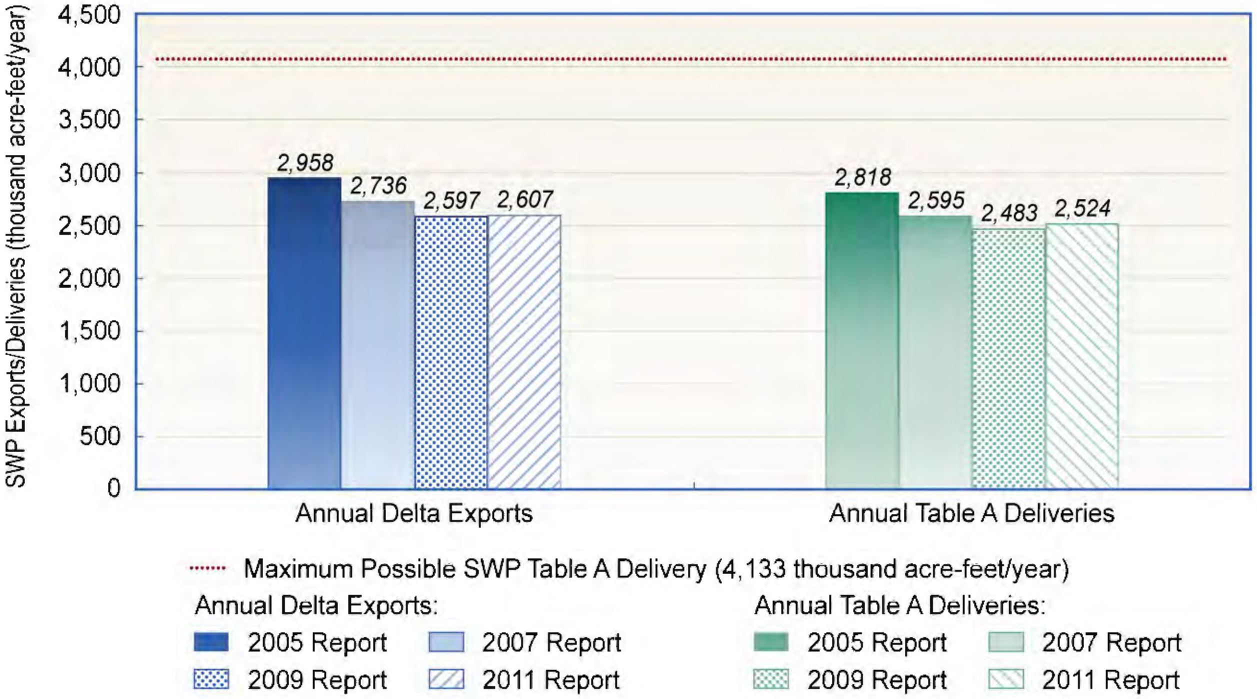


Figure 5-1. Trends in Estimated Average Annual Delta Exports and SWP Table A Water Deliveries (Existing Conditions)

2,524 taf/year in 2011, a decrease of 294 taf or 10.4%. The reasons for these decreases are described under "Primary Factors Affecting SWP Delta Export Operations and Table A Water Deliveries," below.

Monthly Delta Exports—2011 Scenario versus 2005 Scenario

Figure 5-2 illustrates the effects of the operational restrictions imposed by the BOs on SWP Delta exports since 2005 by comparing monthly existing-conditions exports estimated for this 2011 Report with those estimated for the 2005 Report. The bar charts show the average exports for each month under each scenario estimated for both reports.

As shown in Figure 5-2, average monthly SWP Delta exports estimated for the 2011 Report are lower than those estimated for the 2005 Report both in the first half of the year and from October through December. The reductions in exports for January through June are substantial, ranging from 22% in June to 58% in April. Exports for July and August as estimated for the 2011 Report exceed those estimated for the 2005 Report, but the increases (17% in August and approximately 45% in July) are generally smaller than the reductions seen earlier in the year.

Compiling the monthly average values for exports for the entire year under each scenario reveals that, as indicated previously in the description of annual exports, the average annual exports estimated for the 2011 Report are 11.9% less than those estimated for the 2005 Report.

Primary Factors Affecting SWP Delta Export Operations and Table A Water Deliveries

Under current operational constraints on the SWP, maximum exports from the Banks Pumping Plant are generally limited to 6,680 cubic feet per second, except between December 15 and March 15, when exports can be increased by one-third of the San Joaquin River

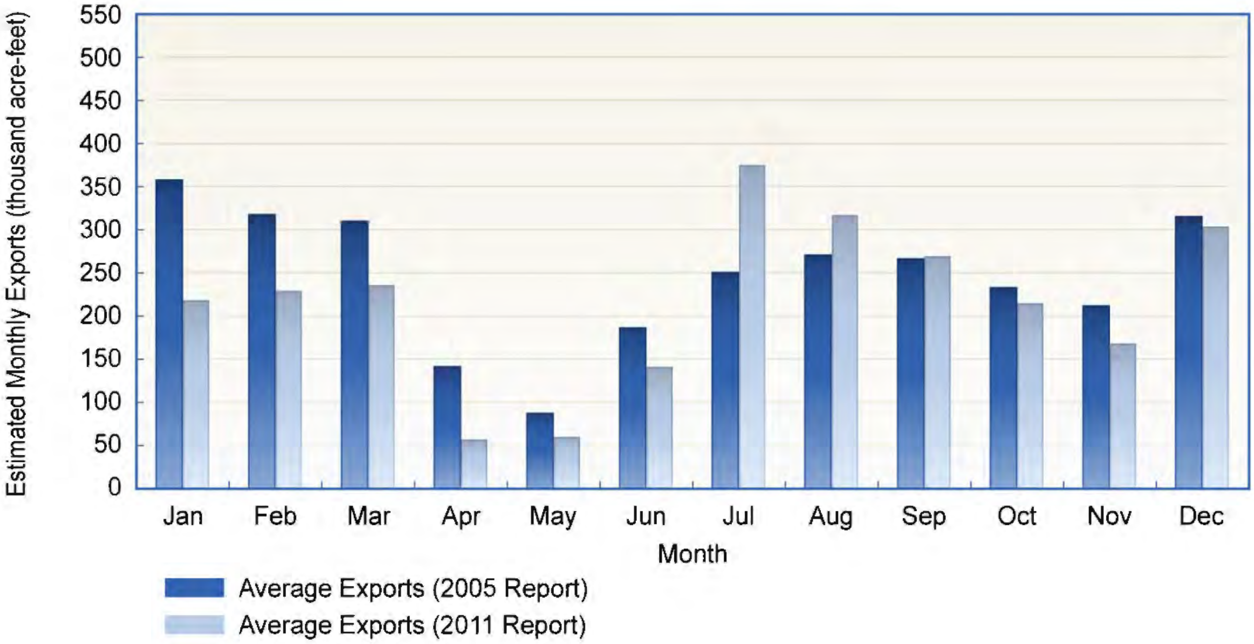


Figure 5-2. Estimated Monthly SWP Delta Exports (Existing Conditions), 2011 Scenario versus 2005 Scenario

flow at the Vernalis gauge (when the Vernalis flow is greater than 1,000 cubic feet per second). As explained previously in Chapter 4, regulatory restrictions on the SWP's Delta operations have been among the major factors affecting SWP water delivery reliability. Several of those influence SWP exports from the Banks Pumping Plant and, at times, impose particular limitations on exports. These limits are summarized here to illustrate how they affect the values shown in Figure 5-2:

- *2008 USFWS and 2009 NMFS BOs:* These BOs are much more restrictive than the BOs they replaced. The USFWS BO includes flow restrictions to protect delta smelt, with requirements in all but 2 months of the year. The NMFS BO contains similar limits for January through mid-June, but the greatest restriction imposes limits on total Delta exports in the months of April and May in most years to protect salmon and steelhead.
- *X2:* The "X2" objective mandated by the State Water Resources Control Board (State Water Board) regulates Delta salinity levels in the months of February–June. For the X2 position to be located in the appropriate location to achieve the State Water Board's salinity objective, Delta outflow must be at certain specified levels at certain times between February and June—which can constrain SWP pumping at the Banks Pumping Plant at those times.
- *Export/inflow ratio:* The 1995 *Water Quality Control Plan for the San Francisco Bay/Sacramento–San Joaquin Delta* and State Water Board Decision 1641 (D-1641) limits Delta exports to 35% of total Delta inflow from February through June. Thus, even if substantial runoff occurs during those months (such as during a year with considerable rain-on-snow events, projected to be more likely as the effects of climate change increase), the SWP is limited in its ability to benefit from the availability of that extra water in the Delta by increasing its pumping beyond this limit. Allowable exports increase to 65% of inflow from July through January.
- *Spring Export Limitations:* Spring is an important time in the life cycles of fish

protected by the USFWS and NMFS BOs. As a result, requirements for Delta exports exist in several places. D-1641 limits SWP and CVP exports to 100% of the base flow of the San Joaquin River for 31 days during the April/May period. The NMFS BO limits the combined exports during all of April and May to a given percentage of the flow: 25% during above-normal and wet years to 100% in critical years. Finally, the previously mentioned flow requirements contained in the USFWS BO to protect delta smelt can also restrict exports during this time.

Figure 5-2 shows reductions in the values estimated for the 2011 Report during January through June and October through December that result from these restrictions. The period of July through September is the time when exports are less restricted. As a result—and to recover some of the water supply lost during the other months—the exports estimated for the 2011 Report for July–September are higher than those estimated for the 2005 Report.

Another factor described in Chapter 4, climate change, is expected to affect the Delta—and SWP exports from the Banks Pumping Plant—under future conditions. The effects of climate change on SWP operations have been factored into DWR's modeling for future conditions.

Estimated SWP Export Amounts—Existing Conditions and Future Conditions

This section provides estimates of average, maximum, and minimum annual Delta exports for both existing (2011) and future (2031) conditions. (Discussions of the assumptions used to develop both existing and future scenarios for this report are included in Chapters 6 and 7, respectively.) This section also summarizes SWP Delta exports by month and by water year type, demonstrating the effects of the USFWS and NMFS BOs and other factors influencing SWP Delta exports.

Average, Maximum, and Minimum Annual Delta Exports

Table 5-1 presents the estimated average, maximum, and minimum annual SWP Delta exports for the existing-conditions and future-conditions scenarios.

Table 5-1. Estimated Average, Maximum, and Minimum Annual SWP Exports (Existing and Future Conditions)

	Existing	Future
Average	2,607	2,521
Maximum	4,066	4,106
Minimum	876	810

Table 5-2. Average Estimated SWP Exports by Month (Existing and Future Conditions)

Month	Estimated SWP Exports (thousand acre-feet)		Difference, Existing vs. Future Conditions (thousand acre-feet and %)
	Existing	Future	
January	214	217	+4 (+2%)
February	228	217	-10 (-5%)
March	232	228	-5 (-2%)
April	60	65	+5 (+8%)
May	65	67	+2 (+4%)
June	145	131	-14 (-9%)
July	365	352	-12 (-3%)
August	316	311	-6 (-2%)
September	268	271	+3 (+1%)
October	223	186	-37 (-16%)
November	174	169	-5 (-3%)
December	317	305	-12 (-4%)

Exports by Month

Table 5-2, above, shows the average estimated SWP exports from the Delta by month under existing and future conditions. As shown in the table, in most months, the average estimated monthly SWP exports for future conditions are generally similar to or slightly lower than the estimated monthly exports for existing conditions. The most notable exceptions are in

April and May. Under both existing and future conditions, the values for those months are essentially the same, reflecting the regulations in place during that time of the year.

Figure 5-3 depicts the annual pattern of the monthly values for existing conditions as well as the maximum and minimum estimated exports for each month. The pattern and ranges of the monthly values under future conditions are very similar to those shown in Figure 5-3.

As shown in Figure 5-3 and Table 5-2, estimated SWP exports are highest on average in July, averaging 365 taf under existing conditions and 352 taf under future conditions. Exports are consistently lowest in April and May, averaging 60 taf in April and 65 taf in May for 2011, and 65 taf in April and 67 taf in May for 2031.

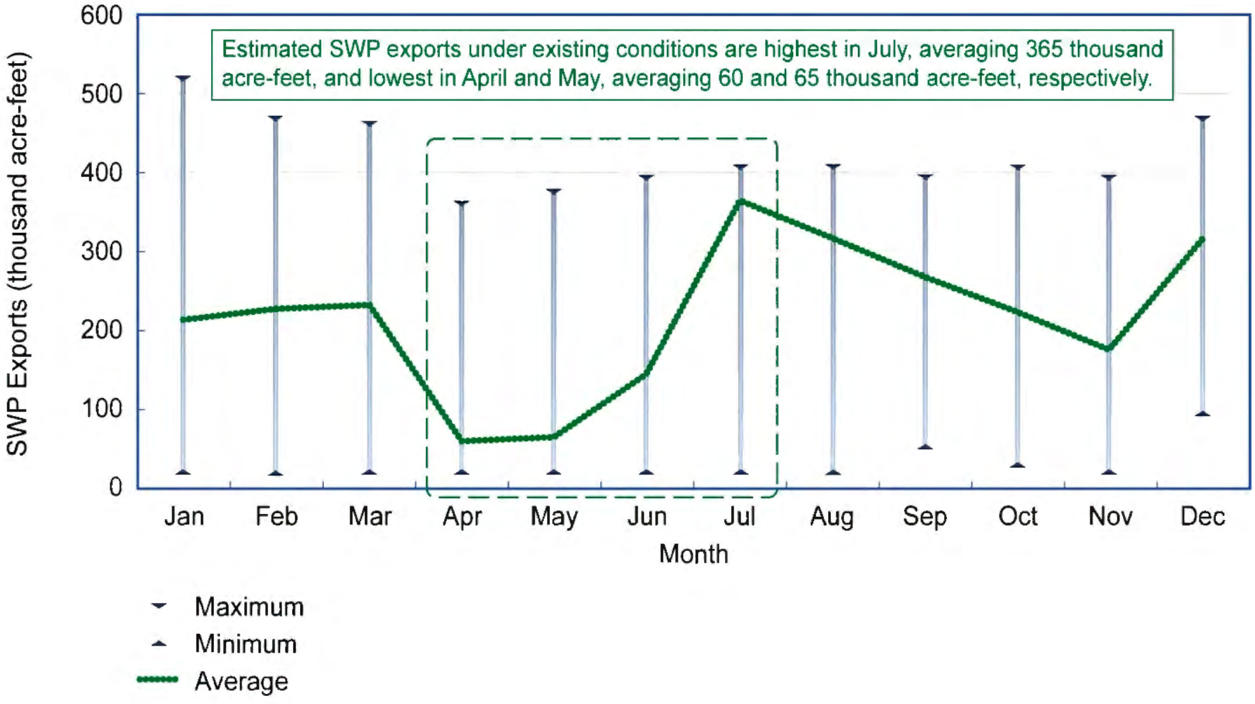


Figure 5-3. Monthly Range of Estimated SWP Exports (Existing Conditions)

Exports by Water Year Type

Tables 5-3 and 5-4 compare SWP exports by water year type under existing conditions and future conditions, as estimated for the 2009 Report and for this 2011 Report. As shown, the existing SWP exports estimated for this 2011 Report are very similar to the existing SWP exports estimated for the 2009 Report for most water year types. The same can be said of the values estimated for future conditions.

Table 5-3. Estimated SWP Exports by Water Year Type—Existing Conditions

Water Year Type	Estimated Existing SWP Exports (thousand acre-feet)	
	2009 Report	2011 Report
Wet	3,233	3,210
Above Normal	2,774	2,784
Below Normal	2,617	2,643
Dry	2,290	2,320
Critical	1,486	1,512
Average	*2,598*	*2,607*

Table 5-4. Estimated SWP Exports by Water Year Type—Future Conditions

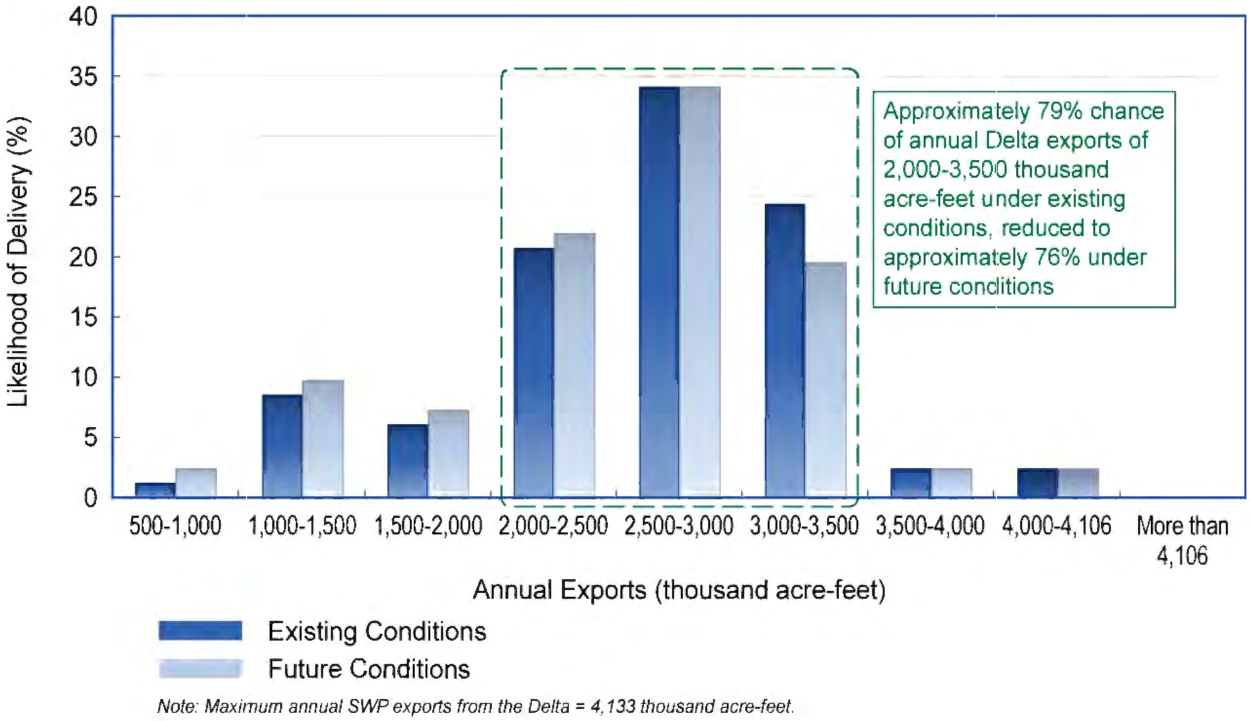
Water Year Type	Estimated Future SWP Exports (thousand acre-feet)	
	2009 Report	2011 Report
Wet	3,196	3,182
Above Normal	2,734	2,753
Below Normal	2,557	2,556
Dry	2,173	2,120
Critical	1,526	1,414
Average	*2,550*	*2,521*

Likelihood of SWP Exports—Existing and Future Conditions

The estimated likelihood of a given level of SWP exports under existing conditions and under future conditions is presented in Figure 5-4. As shown in the figure, 4,106 taf is the largest export amount that was modeled for the 2011 Report.

As shown in Figure 5-4, in 79% of simulated cases for existing conditions, estimated SWP exports are between 2,000 and 3,500 taf/year. SWP exports of other amounts are less likely, with the next most likely export amount being between 1,000 and 1,500 taf/year.

Likewise, in about 76% of simulated cases for future conditions, estimated SWP exports are between 2,000 and 3,500 taf/year (Figure 5-4). SWP exports of other amounts are less likely, with the next most likely export amount again being between 1,000 and 1,500 taf/year.



Note: Maximum annual SWP exports from the Delta = 4,133 thousand acre-feet.

Figure 5-4. Estimated Likelihood of SWP Exports, by Increments of 500 Acre-Feet (under Existing and Future Conditions)

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Chapter 6

Existing SWP Water Delivery Reliability (2011)

This chapter presents estimates of the SWP's existing (2011) water delivery reliability. The estimates are presented below, alongside the reliability results obtained from the *State Water Project Delivery Reliability Report 2009* (2009 Report). Like this *State Water Project Delivery Reliability Report 2011* (2011 Report), the 2009 Report incorporated into its results the requirements of biological opinions issued by the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) in December 2008 and June 2009, respectively, on the effects of coordinated operations of the SWP and Central Valley Project. These BOs are discussed in detail in Chapter 2, "A Closer Look at the State Water Project," and Chapter 4, "Factors that Affect Water Delivery Reliability."

The discussions of SWP water delivery reliability in this chapter and Chapter 7 present the results of DWR's updated modeling of the SWP's water delivery reliability. A tabular summary of the modeling results is presented in the technical addendum to this report, which is available online at http://baydeltaoffice.water.ca.gov/. The technical addendum also contains curves of annual delivery probability (i.e., exceedence plots) to graphically show the estimated percentage of years in which a given annual delivery is equaled or exceeded.

Hydrologic Sequence

SWP delivery amounts are estimated in this 2011 Report for existing conditions using computer modeling that incorporates the historic range of hydrologic conditions (i.e., precipitation and runoff) that occurred from water years 1922 through 2003. The historic hydrologic conditions are adjusted to account for land-use changes (i.e., the current level of development) and upstream flow regulations that characterize 2011. By using this 82-year historical flow record, the delivery estimates modeled for existing conditions reflect a reasonable range of potential hydrologic conditions from wet years to critically dry years.

Existing Demand for Delta Water

Demand levels for the SWP water users in this report are derived from historical data and information from the SWP contractors themselves. The amount of water that SWP contractors request each year (i.e., demand) is related to:

- the magnitude and types of water demands,
- the extent of water conservation measures,
- local weather patterns, and
- water costs.

The existing level of development (i.e., the level of water use in the source areas from which the water supply originates) is based on recent land uses, and is assumed to be representative of existing conditions for the purposes of this 2011 Report.

SWP Table A Water Demands

The current combined maximum Table A amount is 4,172 thousand acre-feet per year (taf/year). See "'Table A' Water" in Chapter 3, "SWP Contractors and Water Contracts," for a full discussion of Table A, which is a table within each water supply contract. Of the combined maximum Table A amount, 4,133 taf/year is the SWP's maximum Table A water available for delivery from the Delta. The estimated demands by SWP contractors for deliveries of Table A water from the Delta under existing conditions, as determined for the 2011 Report and previously for the 2009 Report, are shown in Table 6-1. The estimated average demand for SWP Table A water is shown, along with maximum and minimum demands, because demands vary annually depending on local hydrologic patterns and other factors (e.g., demand management and the amount of water storage within the service area).

Table 6-1. Comparison of Estimated Average, Maximum, and Minimum Demands for SWP Table A Water (Existing Conditions)

	2009 Report	2011 Report
Average	3,711	3,722
Maximum	4,115	4,120
Minimum	3,007	3,043

As estimated for the 2011 Report, annual demands for SWP Table A water range between 3,043 taf and 4,120 taf under existing conditions, with an average demand of 3,722 taf. There is a 95% likelihood that more than 3,200 taf/year will be requested (i.e., demanded) for delivery under existing conditions. The estimated maximum SWP Table A water demand in the 2011 Report is very near the maximum possible Table A water delivery amount of 4,133 taf/year; however, the average annual demand of 3,722 taf is approximately 400 taf less than the possible maximum annual delivery.

Figure 6-1 shows that estimated annual demands for deliveries of SWP Table A water, as calculated for the 2009 and 2011 Reports, are essentially the same. Demands calculated for both reports range between 3,000 and 4,120 taf/year, regardless of whether a year is critical, wet, or anywhere in between.

SWP Article 21 Water Demands

Under Article 21 of the SWP's long-term water supply contracts, contractors may receive additional water deliveries only under the following specific conditions:

- such deliveries do not interfere with SWP Table A allocations and SWP operations;
- excess water is available in the Delta;
- capacity is not being used for SWP purposes or scheduled SWP deliveries; and
- contractors can use the SWP Article 21 water directly or can store it in their own system (i.e., the water cannot be stored in the SWP system).

The demand for SWP Article 21 water by SWP contractors is assumed to vary depending on the month and weather conditions (i.e., amounts of precipitation and runoff). For the purposes of this discussion of SWP Article 21 water demands, a Kern wet year is defined as a year when the annual Kern River flow is projected to be greater than 1,500 taf. Kern River inflows are significant

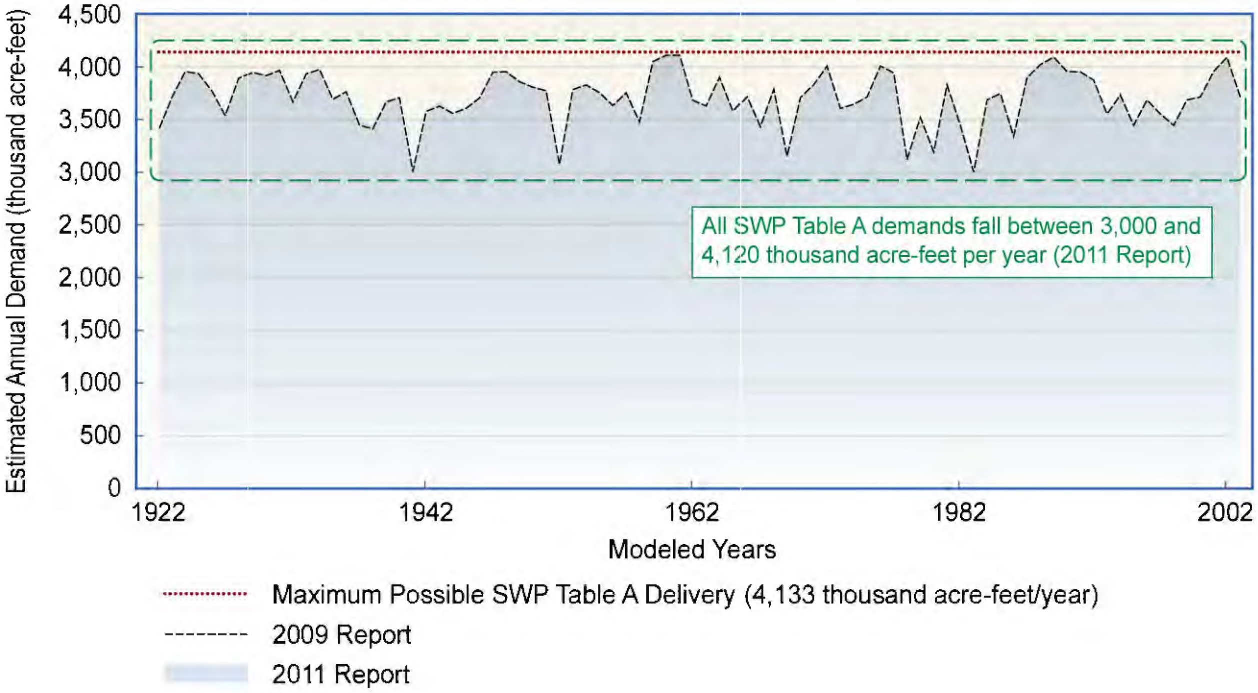


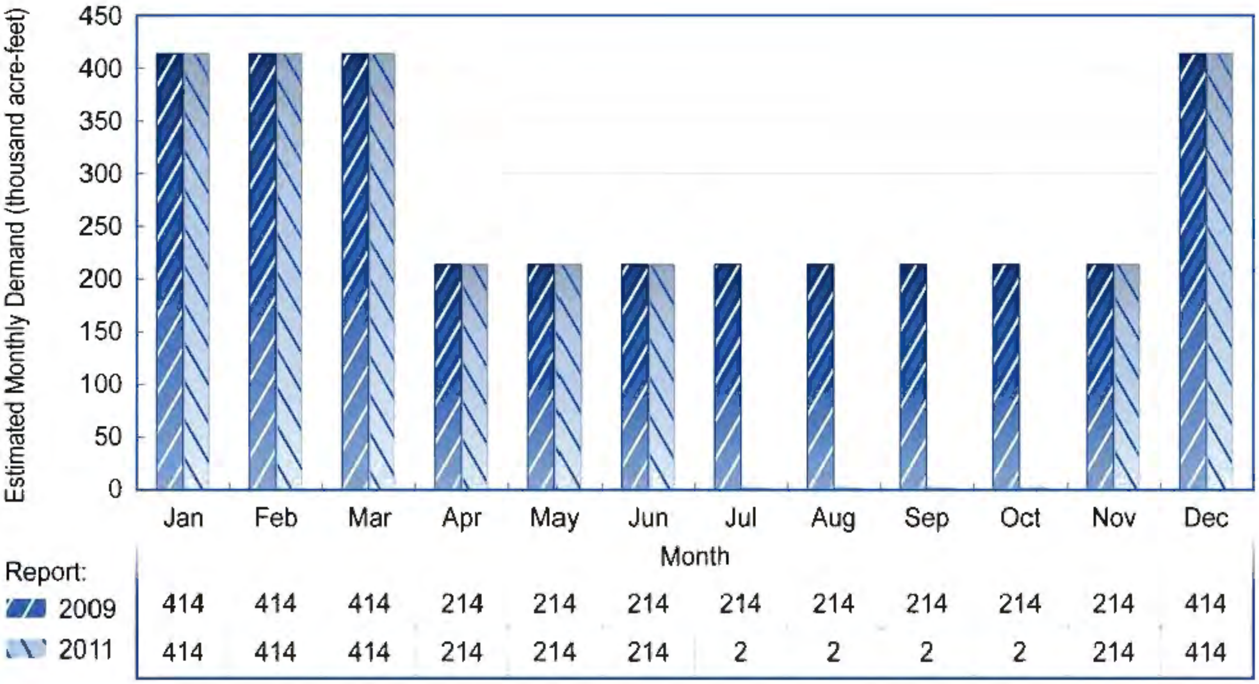
Figure 6-1. Comparison of Estimated Demands for SWP Table A Water on an Annual Basis, Using 82 Years of Hydrology (Existing Conditions)

because they are a major local water supply component for the Kern County Water Agency, which is the second largest SWP contractor and possesses significant local groundwater recharge capability. Using Kern River flows to recharge their groundwater storage significantly reduces their demand for Article 21 supply.

As shown in Figures 6-2 and 6-3, existing demands for SWP Article 21 water estimated for this 2011 Report are assumed to be high during the spring and late fall in non–Kern wet years (214 taf/month), as well as during the winter months of December through March in all weather year types (202 taf in Kern wet years and 414 taf in other years). Demands for SWP Article 21 water are assumed to be very low (2 taf/month) from April through November of Kern wet years and from July through October of other years.

Relative to levels of demand for SWP Article 21 water presented in the 2009 Report for existing conditions, the monthly existing-conditions demands for Article 21 water are 212 taf lower from July through October in normal weather years. This reduction in demand occurs because the modeling was revised for the 2011 Report to assume that only SWP contractors receiving water from the North Bay Aqueduct will have SWP Article 21 water demands during those months. A second revision to the modeling assumptions relative to the 2009 Report resulted in the addition of a year-round demand for 2 taf/month through the North Bay Aqueduct in 2011 during wet weather years.

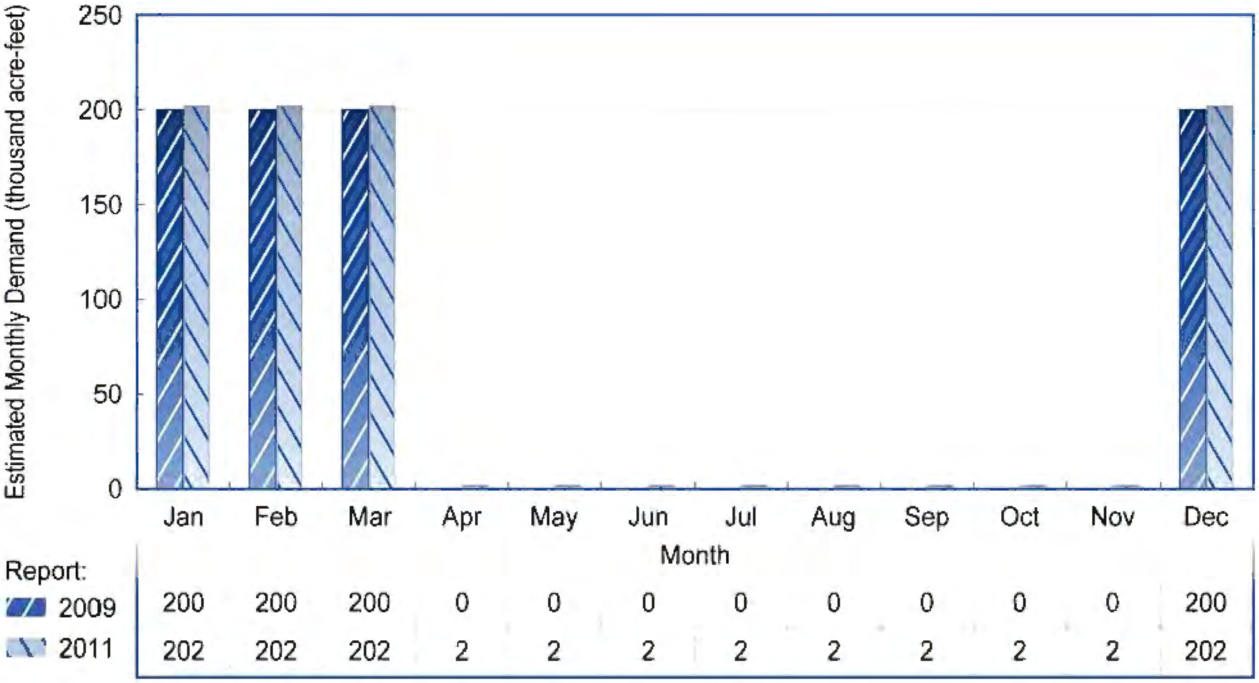
The estimated reduction in existing-conditions demand for SWP Article 21 water in this 2011 Report relative to the 2009 Report is the result of discussions with DWR's Operations and Maintenance staff and State Water Contractors staff, and it represents their best estimates of current practices. The SWP Article 21 water demands used in the 2009 Report, on the other



Report:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
▨ 2009	414	414	414	214	214	214	214	214	214	214	214	414
▧ 2011	414	414	414	214	214	214	2	2	2	2	214	414

Figure note: Values shown are the maximum amount that can be delivered monthly. However, the actual capability of SWP water contractors to take this amount of SWP Article 21 water is not the sum of these maximum monthly values.

Figure 6-2. Estimated Demands for SWP Article 21 Water in Years When Kern River Flow is Less than 1,500 Thousand Acre-Feet (Existing Conditions)



Report:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
▨ 2009	200	200	200	0	0	0	0	0	0	0	0	200
▧ 2011	202	202	202	2	2	2	2	2	2	2	2	202

Figure note: Values shown are the maximum amount that can be delivered monthly. However, the actual capability of SWP water contractors to take this amount of SWP Article 21 is not the sum of these maximum monthly values.

Figure 6-3. Estimated Demands for SWP Article 21 Water in Years When Kern River Flow is Greater than 1,500 Thousand Acre-Feet (Existing Conditions)

hand, match the demands assumed in the studies conducted for the 2008 USFWS BO and 2009 NMFS BO, and those demands capture the upper boundary of the potential impact of SWP Article 21 exports on the Delta ecosystem. This assumption reflects a condition in which SWP contractors are able to use essentially any available SWP Article 21 water when capacity for moving that water exists in the SWP delivery system.

Estimates of SWP Table A Water Deliveries

Table 6-2 presents the annual average, maximum, and minimum estimates of SWP Table A deliveries from the Delta for existing conditions, as calculated for the 2009 and 2011 Reports. The Table A deliveries are similar between the 2009 and 2011 Reports. Assumptions about Table A and Article 21 water demands, along with operations for carryover water, have been updated in the model based on discussions with State Water Contractors staff and DWR's Operations and Control Office.

Table 6-2. Comparison of Estimated Average, Maximum, and Minimum Deliveries of SWP Table A Water (Existing Conditions, in Thousand Acre-Feet per Year)

	2009 Report	2011 Report
Average	2,483	2,524
Maximum	3,338	3,365
Minimum	301	380

The estimated likelihood of delivery of a given amount of SWP Table A water under the existing conditions scenario, as estimated for both the 2009 and 2011 Reports, is presented in Figure 6-4. Figure 6-4 shows that the likelihood that 2,000–3,365 taf/year of Table A water will be delivered is now 82%. There is a 48% likelihood that 2,500–3,000 taf of Table A water will be delivered, a 5% likelihood of delivery of less than 1,000 taf, and 0% likelihood of delivery of more than 3,365 taf in a given year. To compare the results estimated for this 2011 Report with results from the 2009 Report, an SWP contractor is just slightly more likely to receive a larger Table A water delivery under the current estimates.

Dry-Year Deliveries of SWP Table A Water

Table 6-3 displays estimates of SWP Table A water deliveries under existing conditions during possible drought conditions and compares them with the corresponding delivery estimates calculated for the 2009 Report. Droughts are analyzed using the historical drought-period precipitation and runoff patterns from 1922 through 2003 as a reference, although existing 2011 conditions (e.g., land use, water infrastructure) are also accounted for in the modeling. For reference, the worst multiyear drought on record was the 1929–1934 drought, although the brief drought of 1976–1977 was more intensely dry.

The results of modeling existing conditions for potential drought-year scenarios indicate that SWP Table A water deliveries during dry years can be expected to range from between 380 and 1,573 taf/year.

Wet-Year Deliveries of SWP Table A Water

Table 6-4 presents estimates of SWP Table A water deliveries under existing conditions during possible wet conditions and compares them with corresponding delivery estimates calculated for the 2009 Report. Wet periods for 2011 are analyzed using historical precipitation and runoff patterns from 1922–2003 as a reference, while accounting for existing 2011 conditions (e.g., land use, water infrastructure). For reference, the wettest single year on record was 1983.

The results of modeling existing conditions for potential wet periods indicate that estimated SWP Table A water deliveries during wet years can be expected to range between 2,833 and 2,958 taf/year.

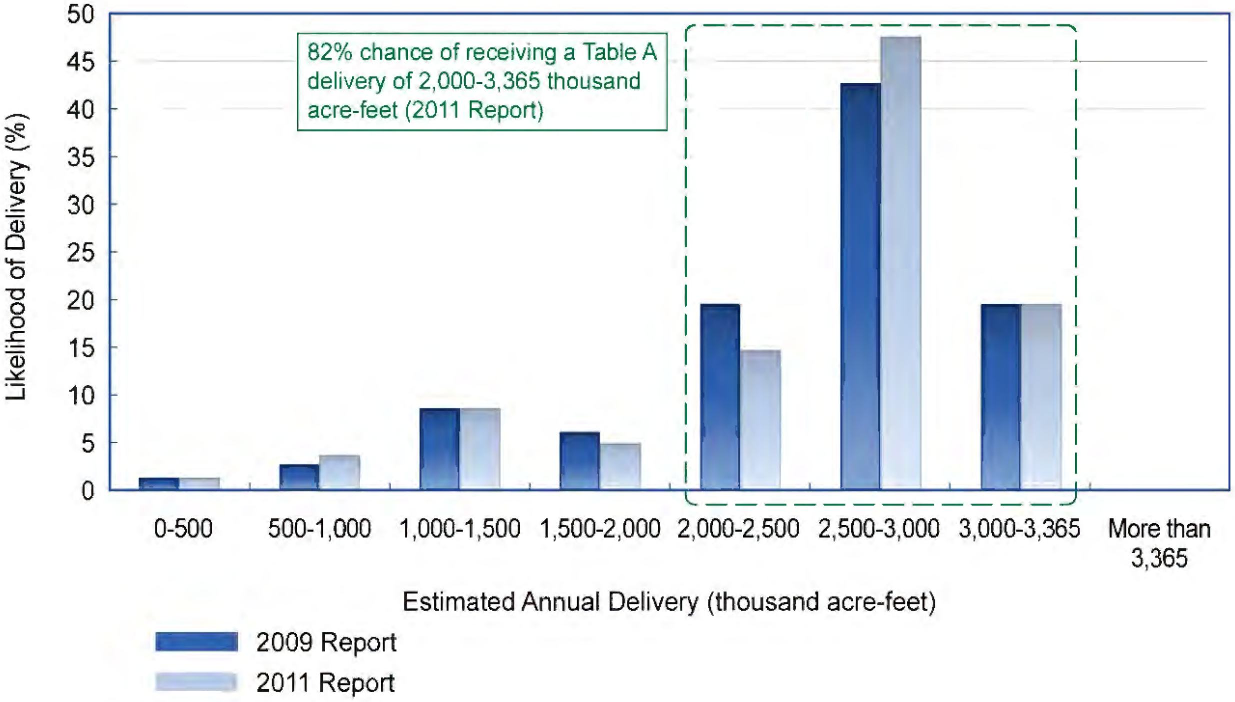


Figure 6-4. Estimated Likelihood of SWP Table A Water Deliveries (Existing Conditions)

Table 6-3. Estimated Average and Dry-Period Deliveries of SWP Table A Water (Existing Conditions), in Thousand Acre-Feet (Percent of Maximum SWP Table A Amount, 4,133 taf/year)

	Long-term Average	Single Dry Year (1977)	2-Year Drought (1976–1977)	4- Year Drought (1931–1934)	6-Year Drought (1987–1992)	6-Year Drought (1929–1934)
2009 Report	2,483 (60%)	302 (7%)	1,496 (36%)	1,402 (34%)	1,444 (35%)	1,398 (34%)
2011 Report	2,524 (61%)	380 (9%)	1,573 (38%)	1,454 (35%)	1,462 (35%)	1,433 (35%)

Table 6-4. Estimated Average and Wet-Period Deliveries of SWP Table A Water (Existing Conditions), in Thousand Acre-Feet (Percent of Maximum SWP Table A Amount, 4,133 taf/year)

	Long-term Average	Single Wet Year (1983)	2-Year Wet (1982–1983)	4-Year Wet (1980–1983)	6-Year Wet (1978–1983)	10-Year Wet (1978–1987)
2009 Report	2,483 (60%)	2,813 (68%)	2,935 (71%)	2,817 (68%)	2,817 (68%)	2,872 (67%)
2011 Report	2,524 (61%)	2,886 (70%)	2,958 (72%)	2,872 (69%)	2,873 (70%)	2,833 (69%)

Estimates of SWP Article 21 Water Deliveries

SWP water delivery is a combination of deliveries of Table A water and Article 21 water. Some SWP contractors store Article 21 water locally when extra water and capacity are available beyond that needed by normal SWP operations. Deliveries of SWP Article 21 water vary not only by year, but also by month. In the summer and early fall months (July through October), a maximum of 1 taf can be delivered. From November through June, maximum deliveries of SWP Article 21 water can be as high as 299 taf and as low as approximately 80 taf in a given month; however, water deliveries average in the range of 0–30 taf. The estimated range of monthly deliveries of SWP Article 21 water is displayed in Figure 6-5.

The estimated likelihood that a given amount of SWP Article 21 water will be delivered is presented in Figure 6-6. There is a 26% likelihood that more than 20 taf/year of SWP Article 21 water will be delivered under existing conditions. There is a 74% likelihood that less than 20 taf/year of SWP Article 21 water will be delivered.

Dry-Year Deliveries of SWP Article 21 Water

Although deliveries of SWP Article 21 water are smaller during dry years than during wet ones, opportunities exist to deliver SWP Article 21 water during multiyear drought periods. Deliveries in dry years are shown to often be small (less than 5 taf); however, longer drought periods can include several years that support Article 21 deliveries. Annual average Article 21 estimates for drought periods of 4 and 6 years vary significantly and can approach or exceed the average annual estimate, as shown in Table 6-5.

Wet-Year Deliveries of SWP Article 21 Water

Table 6-6 shows the estimates of deliveries of SWP Article 21 water during wet periods under existing conditions. Estimated deliveries in wet years are approximately 1.75 to seven times larger than the average delivery of SWP Article 21 water.

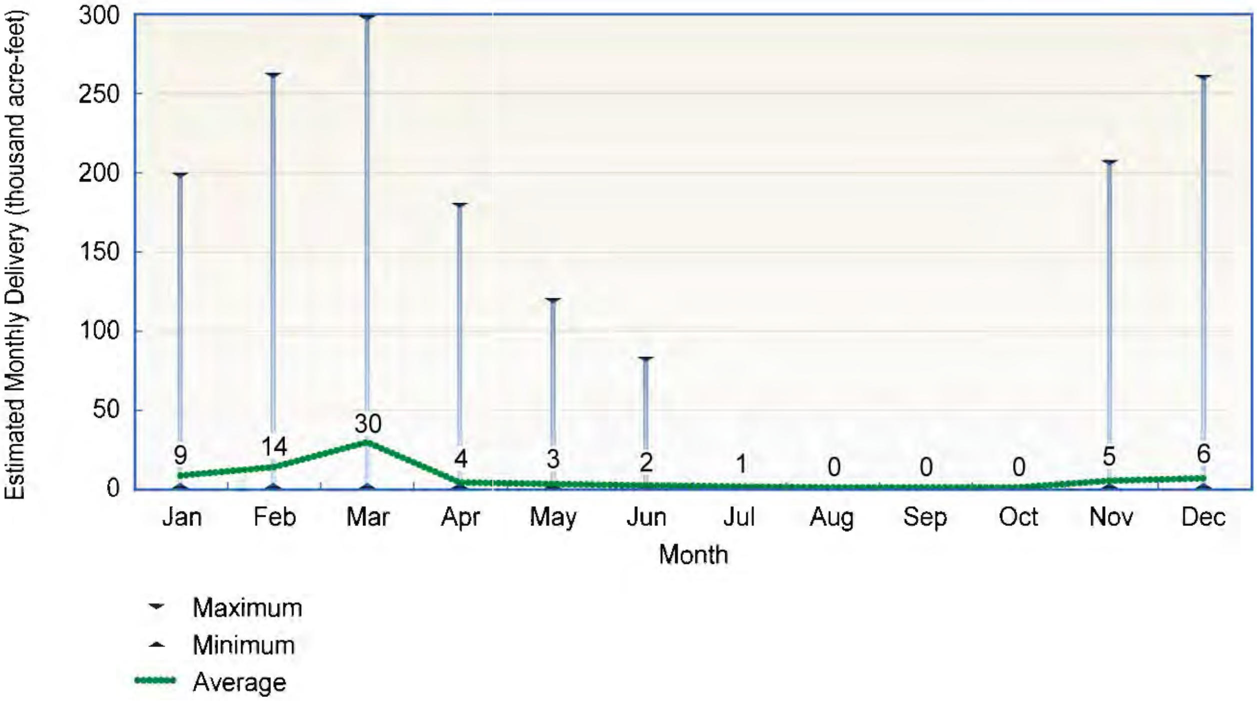


Figure 6-5. Estimated Range of Monthly Deliveries of SWP Article 21 Water (2011 Report—Existing Conditions)

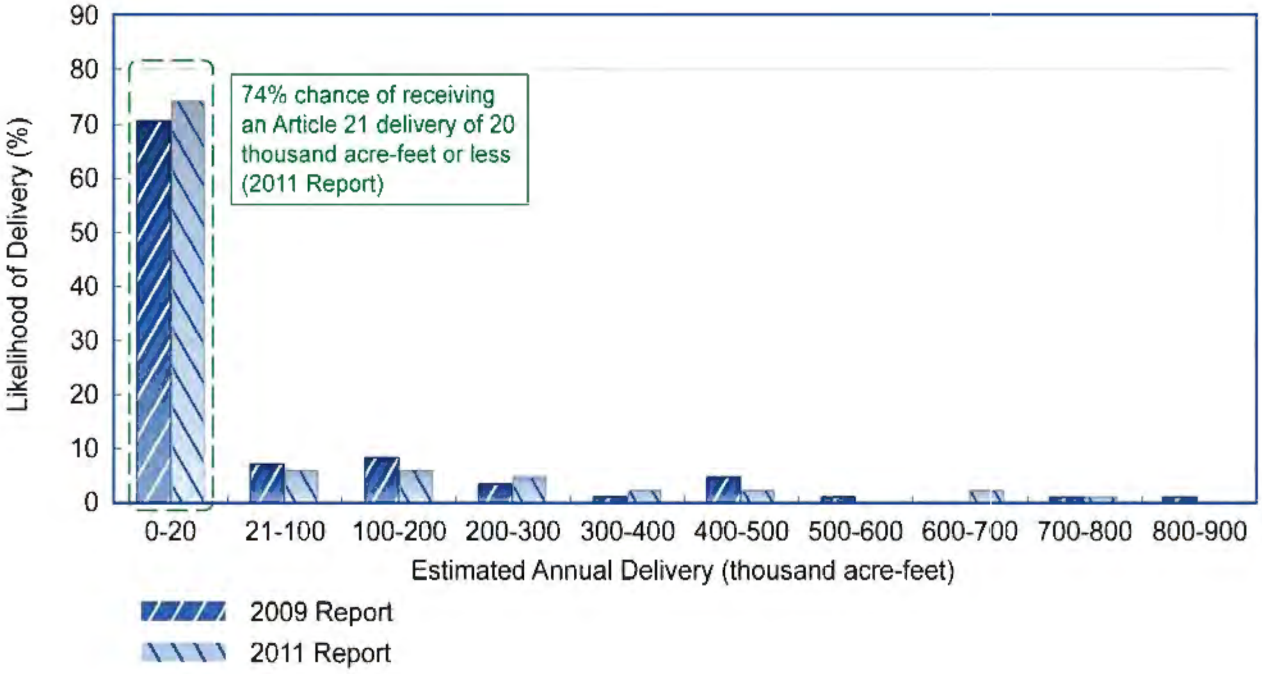


Figure 6-6. Estimated Probability of Annual Deliveries of SWP Article 21 Water (Existing Conditions)

Table 6-5. Estimated Average and Dry-Period Deliveries of SWP Article 21 Water (Existing Conditions, in Thousand Acre-Feet per Year)

	Long-term Average	Single Dry Year (1977)	2-Year Drought (1976-1977)	4- Year Drought (1931-1934)	6-Year Drought (1987-1992)	6-Year Drought (1929-1934)
2009 Report	85	2	6	142	10	98
2011 Report	76	3	5	69	9	49

Table 6-6. Estimated Average and Wet-Period Deliveries of SWP Article 21 Water (Existing Conditions, in Thousand Acre-Feet per Year)

	Long-term Average	Single Wet Year (1983)	2-Year Wet (1982-1983)	4-Year Wet (1980-1983)	6-Year Wet (1978-1983)	10-Year Wet (1978-1987)
2009 Report	85	853	659	379	273	230
2011 Report	76	608	533	307	225	207

Chapter 7

Future SWP Water Delivery Reliability (2031)

This chapter presents estimates of the SWP's delivery reliability for conditions 20 years in the future (2031). These estimates reflect hydrologic changes that could result from climate change, but they incorporate the same requirements that are assumed under existing conditions, including the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) biological opinions (BOs).

This chapter also compares these estimates of future conditions with the future-condition results presented in the *State Water Project Delivery Reliability Report 2009* (2009 Report) for the year 2029.

For consistency with previous reports, a tabular summary of the modeling results for the future conditions scenario is presented in the technical addendum to this report. The technical addendum also contains curves of annual delivery probability (i.e., exceedence plots) to graphically show the estimated percentage of years in which a given annual delivery is equaled or exceeded.

Future Demand for Delta Water

Demand levels for the SWP water users in this report are derived from historical data and information from the SWP contractors themselves. The 2031 level of development (i.e., the level of water use in the source areas from which the water supply originates) is based on the projected assumptions for land use for that year, and is assumed to be representative of future conditions for the purposes of this 2011 Report.

SWP Table A Water Demands

Future demands for SWP Table A water, as calculated for this 2011 Report, are assumed to be the maximum possible annual amount of 4,133 thousand acre-feet (taf). There is no assumed variation in demand as a result of different annual precipitation and runoff conditions; it is assumed that by 2031, the maximum amount of SWP Table A water will be requested every year. As a reminder, 4,133 taf/year is the maximum Delta SWP Table A amount.

The SWP Table A water demands under future conditions as presented in the 2009 Report are also assumed to be the maximum amount of 4,133 taf/year.

SWP Article 21 Water Demands

The assumed future demands for SWP Article 21 water are the same as those assumed for existing conditions (see Chapter 6, "Existing SWP Water Delivery Reliability [2011]").

Estimates of Future SWP Deliveries

When modeling water supply deliveries 20 years in the future, the unknowns are considerable and many assumptions must be made. As was assumed for existing conditions (see Chapter 6), modeling of SWP deliveries for 2031 take into account current Delta water quality regulations and the requirements of the USFWS and NMFS BOs. Climate change as well as changes to water uses in the upstream watersheds (i.e., source watersheds) are also taken into account when modeling water supply deliveries under future conditions. Additional discussion of how the modeling of SWP water delivery reliability is adjusted to account for climate change is provided in Chapter 4, "Factors that Affect Water Delivery Reliability."

One of the most important assumptions when modeling SWP water delivery under future conditions is that the rules and facilities related to Delta conveyance will remain at the status quo. That is, in the future-conditions scenario, no new facilities to convey water through or around the Delta are assumed to be in place because no new programs have been sufficiently developed that can be assumed with certainty.

Future Deliveries of SWP Table A Water

Table 7-1 presents the annual average, maximum, and minimum estimates of SWP Table A water deliveries from the Delta for future conditions, as calculated for the 2009 and 2011 Reports. The SWP Table A water deliveries under future conditions are similar between the 2009 and 2011 Reports. The maximum possible delivery of SWP Table A water, 4,133 taf/year, is not reached under future conditions.

Table 7-1. Comparison of Estimated Average, Maximum, and Minimum Deliveries of SWP Table A Water (Future Conditions, in Thousand Acre-Feet per Year)

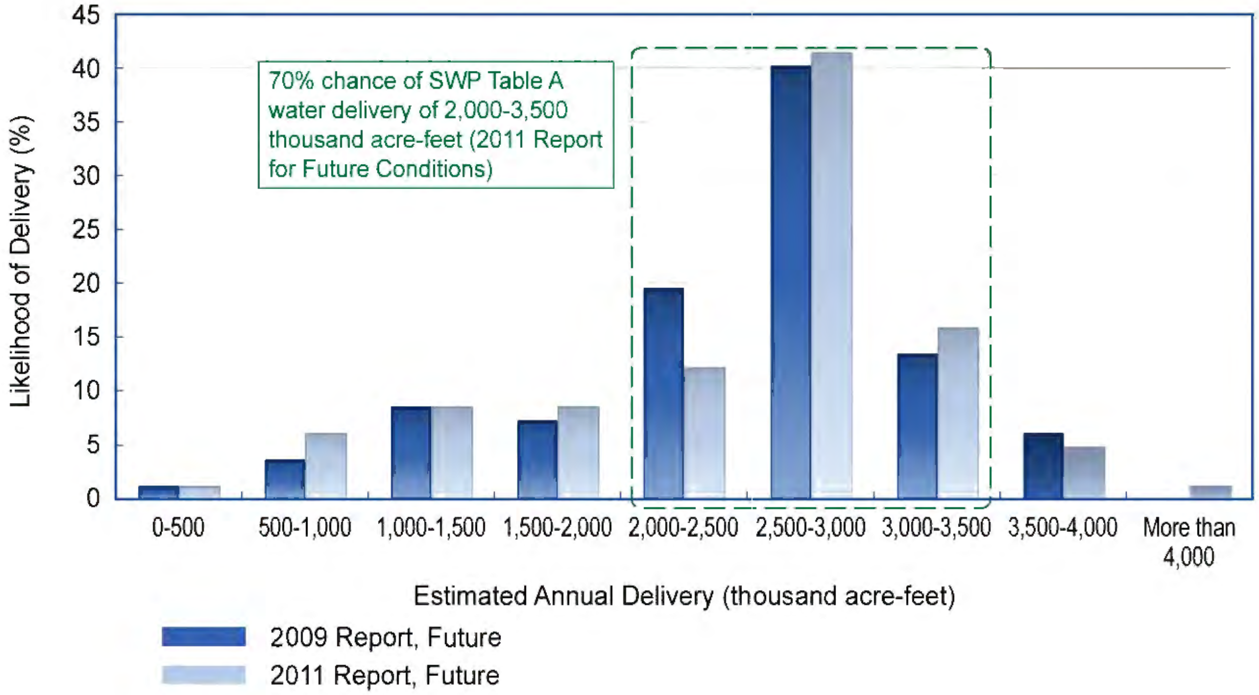
	2009 Report	2011 Report
Average	2487	2,466
Maximum	3,999	4,063
Minimum	458	443

The estimated likelihood that a given amount of SWP Table A water will be delivered under future conditions is presented in Figure 7-1. Currently, there is a 70% likelihood that 2,000–3,500 taf of SWP Table A water will be delivered under the future-conditions scenario. There is a 17% likelihood of an SWP Table A water delivery of 1,000–2,000 taf, a 7% likelihood of less than 1,000 taf, and a 6% likelihood of more than 3,500 taf. In general, the estimates of the likelihood that an SWP contractor will receive a specific amount of SWP Table A water under future conditions, as presented in the 2009 and 2011 Reports, are very similar.

Dry-Year Deliveries of SWP Table A Water under Future Conditions

Table 7-2 presents estimates of future SWP Table A water deliveries during possible drought conditions and compares them with the corresponding delivery estimates calculated for the 2009 Report. Drought scenarios for future conditions in this 2011 Report are analyzed using the historical drought-period precipitation and runoff patterns from 1922–2003 as a reference, while accounting for future 2031 conditions (e.g., land use, climate change).

The results of modeling future conditions under potential drought-year scenarios indicate that estimated dry-year SWP deliveries can be expected to range between 443 and 1,457 taf/year.



70% chance of SWP Table A water delivery of 2,000-3,500 thousand acre-feet (2011 Report for Future Conditions)

Figure 7-1. Estimated Likelihood of SWP Table A Water Deliveries, by Increments of 500 Thousand Acre-Feet (Future Conditions)

Table 7-2. Estimated Average and Dry-Period Deliveries of SWP Table A Water (Future Conditions), in Thousand Acre-Feet (Percent of Maximum SWP Table A Amount, 4,133 taf/year)

	Long-term Average	Single Dry Year (1977)	2-Year Drought (1976–1977)	4- Year Drought (1931–1934)	6-Year Drought (1987–1992)	6-Year Drought (1929–1934)
2009 Report	2,487 (60%)	458 (11%)	1,570 (38%)	1,431 (35%)	1,308 (32%)	1,480 (36%)
2011 Report	2,466 (60%)	443 (11%)	1,457 (35%)	1,401 (34%)	1,227 (30%)	1,366 (33%)

Wet-Year Deliveries of SWP Table A Water under Future Conditions

Table 7-3 presents estimates of future SWP Table A water deliveries during a wet year and compares them with the corresponding delivery estimates calculated for the 2009 Report. Wet periods were modeled for this 2011 Report using historical precipitation and runoff patterns from 1922–2003 as a reference and accounting for 2031 future conditions such as land use and climate change.

The results of modeling future conditions for potential wet periods indicate that estimated SWP Table A water deliveries during wet years can be expected to range between 2,972 and 4,063 taf/year.

SWP Article 21 Water Deliveries under Future Conditions

Estimated deliveries of SWP Article 21 water under future conditions vary not only by year, depending on the precipitation and runoff, but also by month. In the spring, summer, and early fall months (May through October), deliveries of SWP Article 21 water under future conditions are estimated to be low, with a maximum of approximately 10 taf/month and a minimum of 0 taf/month. From November through April, maximum estimated future deliveries of SWP

Table 7-3. Estimated Average and Wet-Period Deliveries of SWP Table A Water (Future Conditions), in Thousand Acre-Feet (Percent of Maximum SWP Table A Amount, 4,133 taf/year)

	Long-term Average	Single Wet Year (1983)	2-Year Wet (1982–1983)	4-Year Wet (1980–1983)	6-Year Wet (1978–1983)	10-Year Wet (1978–1987)
2009 Report	2,487 (60%)	3,990 (97%)	3,843 (93%)	3,401 (82%)	3,250 (79%)	2,975 (72%)
2011 Report	2,466 (60%)	4,063 (98%)	3,908 (95%)	3,396 (82%)	3,248 (79%)	2,972 (72%)

Article 21 water can be as high as 251 taf and as low as 50 taf in a given month; however, water deliveries average in the range of 2–22 taf. The estimated range of monthly deliveries of SWP Article 21 water is displayed in Figure 7-2.

The estimated likelihood that a given amount of SWP Article 21 water will be delivered under future conditions is presented in Figure 7-3. Currently, there is a 22% likelihood that more than 20 taf/year of SWP Article 21 water will be delivered under future conditions, and a 78% likelihood that 20 taf/year or less will be delivered.

In both the 2009 and 2011 Reports, estimated deliveries of SWP Article 21 water under future conditions are generally 20 taf/year or less (72% and 78% likelihood, respectively).

Dry-Year Deliveries of SWP Article 21 Water under Future Conditions

Table 7-4 shows the estimates of future deliveries of SWP Article 21 water during dry periods. The results of modeling future conditions for potential drought scenarios indicate that deliveries of SWP Article 21 water during dry years can be expected to range between 4 and 50 taf/year. This is a 0% to 92% decrease in Article 21 water deliveries from the average estimated future-conditions delivery calculated for this report. Although drought-period deliveries are typically less than deliveries in average years, Table 7-4 shows that opportunities to deliver SWP Article 21 water exist during multiyear drought periods.

Wet-Year Deliveries of SWP Article 21 Water under Future Conditions

Table 7-5 shows the estimates of deliveries of SWP Article 21 water during wet periods under future conditions. The results of modeling future conditions for potential wet periods indicate that wet-year SWP deliveries can be expected to range between 83 and 291 taf. This is a 66% to 483% increase in deliveries of SWP Article 21 water from the average estimated future-conditions delivery calculated for this report.

Table 7-4. Estimated Average and Dry-Period Deliveries of SWP Article 21 Water (Future Conditions, in Thousand Acre-Feet per year)

	Long-term Average	Single Dry Year (1977)	2-Year Drought (1976–1977)	4- Year Drought (1931–1934)	6-Year Drought (1987–1992)	6-Year Drought (1929–1934)
2009 Report	60	3	7	169	27	142
2011 Report	50	4	7	50	10	37

Table 7-5. Estimated Average and Wet-Period Deliveries of SWP Article 21 Water (Future Conditions, in Thousand Acre-Feet per year)

	Long-term Average	Single Wet Year (1983)	2-Year Wet (1982–1983)	4-Year Wet (1980–1983)	6-Year Wet (1978–1983)	10-Year Wet (1978–1987)
2009 Report	60	509	306	165	123	139
2011 Report	50	291	190	120	83	122

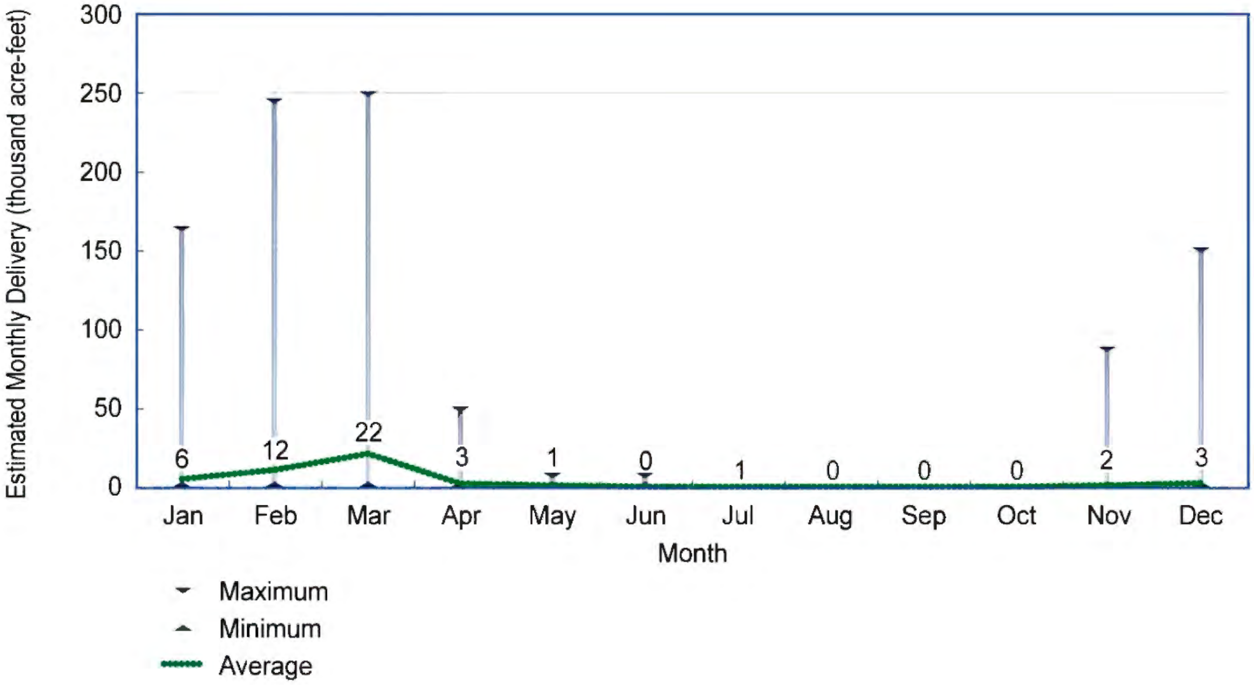


Figure 7-2. Estimated Range of Monthly Deliveries of SWP Article 21 Water (2011 Report—Future Conditions)

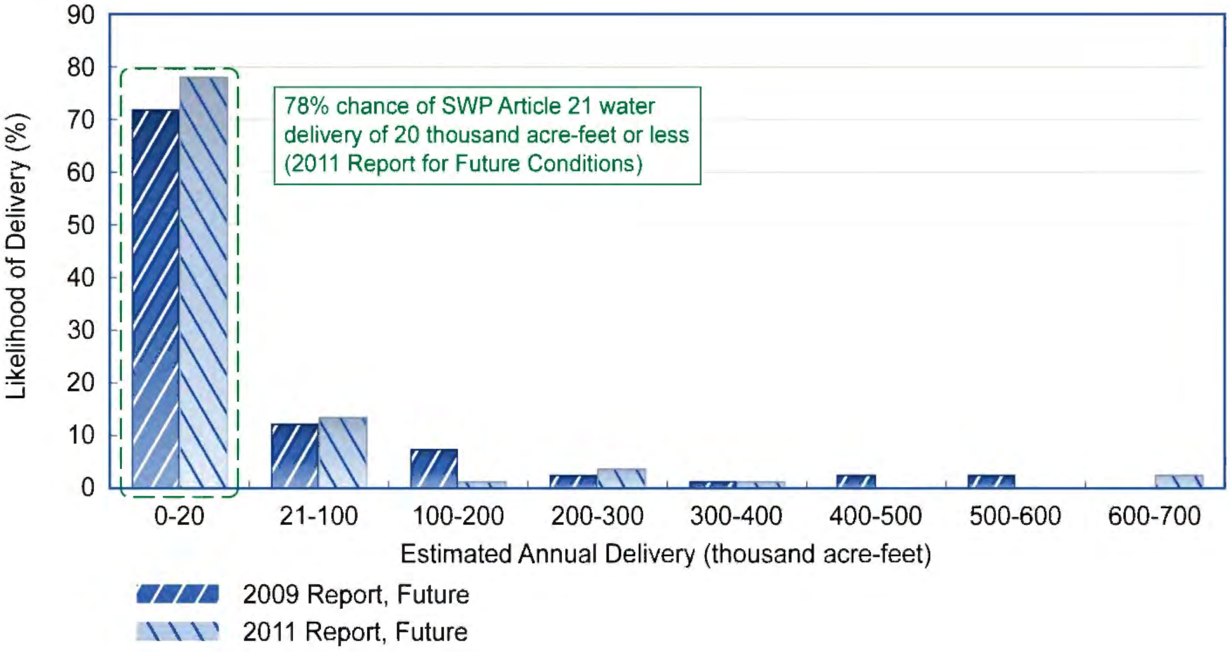


Figure 7-3. Estimated Probability of Annual Deliveries of SWP Article 21 Water (Future Conditions)

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Glossary

acre-foot The volume of water (about 325,900 gallons) that would cover an area of 1 acre to a depth of 1 foot. This is enough water to meet the annual needs of one to two households.

agricultural water supplier As defined by the California Water Code, a public or private supplier that provides water to 2,000 or more irrigated acres per year for agricultural purposes or serves 2,000 or more acres of agricultural land. This can be a water district that directly supplies water to farmers or a contractor that sells water to the water district.

annual Delta exports The total amount of water transferred ("exported") to areas south of the Delta through the Harvey O. Banks Pumping Plant (SWP) and the C. W. "Bill" Jones Pumping Plant (CVP) in 1 year.

appropriative water rights Rights allowing a user to divert surface water for beneficial use. The user must first have obtained a permit from the State Water Resources Control Board, unless the appropriative water right predates 1914.

Article 21 water Water that a contractor can receive in addition to its allocated Table A water. This water is only available if several conditions are met: (1) excess water is flowing through the Delta; (2) the contractor can use the surplus water or store it in the contractor's own system; and (3) delivering this water will not interfere with Table A allocations, other SWP deliveries, or SWP operations.

biological opinion A determination by the U.S. Fish and Wildlife Service or National Marine Fisheries Service on whether a proposed federal action is likely to jeopardize the continued existence of a threatened or endangered species or result in the destruction or adverse modification of designated "critical habitat." If jeopardy is determined, certain actions are required to be taken to protect the species of concern.

CALSIM II A computer model, jointly developed by DWR and the U.S. Bureau of Reclamation, that simulates existing and future operations of the SWP and CVP. The hydrology used by this model was developed by adjusting the historical flow record (1922–2003) to account for the influence of changes in land uses and regulation of upstream flows.

Among the SWP's facilities are more than 700 miles of canals that distribute water to urban and agricultural water suppliers in Northern California, the San Francisco Bay Area, the San Joaquin Valley, the Central Coast, and Southern California.

carryover deliveries See "carryover water."

carryover water A water supply "savings account" for SWP water that is allocated to an SWP contractor in a given year, but not used by the end of the year. Carryover water is stored in the SWP's share of San Luis Reservoir, when space is available, for the contractor to use in the following year.

Central Valley Project (CVP) Operated by the U.S. Bureau of Reclamation, the CVP is a water storage and delivery system consisting of 20 dams and reservoirs (including Shasta, Folsom, and New Melones Reservoirs), 11 power plants, and 500 miles of major canals. CVP facilities reach some 400 miles from Redding to Bakersfield and deliver about 7 million acre-feet of water for agricultural, urban, and wildlife use.

cubic feet per second (cfs) A measure of the rate at which a river of stream is flowing. The flow is 1 cfs if a cubic foot (about 7.48 gallons) of water passes a specific point in 1 second. A flow of 1 cubic foot per second for a day is approximately 2 acre-feet.

Delta exports Water transferred ("exported") to areas south of the Delta through the Harvey O. Banks Pumping Plant (SWP) and the C. W. "Bill" Jones Pumping Plant (CVP). The SWP's Delta exports are the primary component of total SWP deliveries.

Delta inflow The combined total of water flowing into the Delta from the Sacramento River, San Joaquin River, and other rivers and waterways.

exceedence curve For the SWP, a chart showing SWP delivery probability (especially for Table A water)—specifically, the likelihood that SWP contractors will receive a certain volume of water under current or future conditions.

existing-conditions scenario For the SWP delivery reliability reports, the results of modeling for SWP Delta exports or deliveries for the year the report was written.

future-conditions scenario For the SWP delivery reliability reports, the results of modeling for SWP Delta exports or SWP deliveries for 20 years into the future.

incidental take permit A permit issued by the U.S. Fish and Wildlife Service, under Section 10 of the federal Endangered Species Act, to private nonfederal entities undertaking otherwise lawful projects that might result in the "take" of an endangered or threatened species. In California, take may be authorized under Section 2081 of the California Fish and Game Code through issuance of either an incidental take permit or a consistency determination. The California Department of Fish and Game is authorized to accept a federal biological opinion as the take authorization for a State-listed species when a species is listed under both the federal and California Endangered Species Acts.

riparian water rights Water rights that apply to lands traversed by or bordering on a natural watercourse. No permit is required to use this water, which must be used on riparian (adjacent) land and cannot be stored for later use.

State Water Project (SWP) Operated by DWR, a water storage and delivery system of 33 storage facilities, 701 miles of open canals and pipelines, five hydroelectric power plants, and 20 pumping plants that extends for more than 600 miles in California. Its main purpose is to store and distribute water to 29 urban and agricultural water suppliers in Northern California, the San Francisco Bay Area, the San Joaquin Valley, the Central Coast, and Southern California. The SWP provides supplemental water to approximately 25 million Californians (two-thirds of California's population) and about 750,000 acres of irrigated farmland. Water deliveries have ranged from 1.4 million acre-feet in a dry year to more than 4.0 million acre-feet in a wet year.

SWP contractors Twenty-nine entities that receive water for agricultural or municipal and industrial uses through the SWP. Each contractor has executed a long-term water supply contract with DWR. Also sometimes referred to as "State Water Contractors."

Table A water (Table A amounts) The maximum amount of SWP water that the State agreed to make available to an SWP contractor for delivery during the year. Table A amounts determine the maximum water a contractor may request each year from DWR. The State and SWP contractors also use Table A amounts to serve as a basis for allocation of some SWP costs among the contractors.

turnback pool water Allocated water that individual SWP contractors may offer early in the year for other SWP contractors to buy later at a set price.

urban water supplier As defined by the California Water Code, a public or private supplier that provides water for municipal use directly or indirectly to more than 3,000 customers or supplies more than 3,000 acre-feet of water in a year. This can be a water district that provides the water to local residents for use at home or work, or a contractor that distributes or sells water to that water district.

Water Rights Decision 1641 (D-1641) A regulatory decision issued by the State Water Resources Control Board in 1999 (updated in 2000) to implement the 1995 *Water Quality Control Plan for the San Francisco Bay/Sacramento–San Joaquin Delta*. D-1641 assigned primary responsibility for meeting many of the Delta's water quality objectives to the SWP and CVP, thus placing certain limits on SWP and CVP operations.

water year In reports on surface water supply, the period extending from October 1 through September 30 of the following calendar year. The water year refers to the September year. For example, October 1, 2010, through September 30, 2011 is the 2011 water year.

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References

2007 Working Group on California Earthquake Probabilities. 2008. *The Uniform California Earthquake Rupture Forecast, Version 2 (UCERF 2)*. U.S. Geological Survey Open-File Report 2007-1437 and California Geological Survey Special Report 203.

California Climate Change Center. 2009a (May). *Using Future Climate Projections to Support Water Resources Decision Making in California.* CEC-500-2009-052-F. Prepared by California Department of Water Resources (F. Chung, J. Anderson, S. Arora, M. Ejeta, J. Galef, T. Kadir, K. Kao, A. Olson, C. Quan, E. Reyes, M. Roos, S. Seneviratne, J. Wang, H. Yin, and N. Blomquist). Sacramento, CA.

———. 2009b (May). *The Impacts of Sea-Level Rise on the California Coast.* Final Paper. CEC-500-2009-024-F. Sacramento, CA. Prepared by the Pacific Institute, Oakland, CA.

California Department of Water Resources. 1995. *Sacramento–San Joaquin Delta Atlas.* Reprinted July 1995. Sacramento, CA.

2006 (July). *Progress on Incorporating Climate Change into Management of California's Water Resources.* Technical memorandum report. Bay-Delta Office, Sacramento, CA.

———. 2007 (April). *Delta Emergency Operations Plan Concept Paper.* Division of Flood Management. Sacramento, CA.

———. 2008 (October). *Managing an Uncertain Future: Climate Change Adaptation Strategies for California's Water.* Sacramento, CA.

———. 2009a. *California Drought, An Update: June 2009.* 2009 Mid-Year Report. Sacramento, CA.

———. 2009b. *California Water Plan Update 2009.* Volume 1—The Strategic Plan. Strategic Water Planning Branch. Sacramento, CA.

———. 2011a. Modeling Description of the Sacramento–San Joaquin Delta and Suisun Marsh Constraints on the SWP/CVP Water System. By A. Munevar. Available:

http://modeling.water.ca.gov/hydro/model/calsim-doc/Operational-Criteria/Delta/readme-delta-final.html. Accessed December 29, 2011.

———. 2011b (June). *Delta Risk Management Strategy: Phase 2 Report.* Delta Levees and Environmental Engineering Branch, FloodSAFE Environmental Stewardship and Statewide Resources Office. Sacramento, CA. Prepared by URS Corporation and Jack R. Benjamin & Associates, Inc.

California Department of Water Resources and California Department of Fish and Game. 2008 (January). *Risks and Options to Reduce Risks to Fishery and Water Supply Uses of the Sacramento/San Joaquin Delta. A Report Pursuant to Requirements of Assembly Bill 1200, Laird.* Sacramento, CA.

DWR. *See* California Department of Water Resources.

DWR and DFG. *See* California Department of Water Resources and California Department of Fish and Game.

Reclamation. *See* U.S. Bureau of Reclamation.

State Water Resources Control Board. 1995 (May). *Water Quality Control Plan for the San Francisco Bay/Sacramento–San Joaquin Estuary.* 95-1WR. Sacramento, CA.

SWRCB. *See* State Water Resources Control Board.

U.S. Bureau of Reclamation. 2009 (June 25). “Federal Perspective: Central Valley Project and Water Management in California.” Testimony by Ron Milligan, Operations Manager, Central Valley Project, before the Little Hoover Commission hearing on Water Governance, State Capitol Room 437, Sacramento, CA.

Working Group. *See* 2007 Working Group on California Earthquake Probabilities.

Appendix A

Historical SWP Delivery Tables for 2001–2010

The State Water Project (SWP) contracts define several types of SWP water available for delivery to contractors under specific circumstances: Table A water, Article 21 water, turnback pool water, and carryover water. (See the glossary for definitions of these terms; Chapter 3 describes each type of SWP water in greater detail.) Many SWP contractors frequently use Article 21, turnback pool, and carryover water to increase or decrease the amount of water available to them under SWP Table A.

The Sacramento River Index, previously referred to as the "4 River Index" or "4 Basin Index," is the sum of the unimpaired runoff of four rivers: the Sacramento River above Bend Bridge near Red Bluff, Feather River inflow to Lake Oroville Reservoir, Yuba River at Smartville, and American River inflow to Folsom Lake. The five water year types used in the Sacramento River Index are as follows:

Sacramento River Index	Water Year Type
1	Wet
2	Above Normal
3	Below Normal
4	Dry
5	Critical

Tables A-1 through A-10 list annual historical deliveries by SWP water type for each contractor for 2001 through 2010. The Sacramento River Index and water year type are presented along with the delivery results for each year. Similar delivery tables are presented for years 1999–2008 in the *State Water Project Delivery Reliability Report 2009*. SWP contractors are listed in Tables A-1 through A-10 by location, as follows:

- *Feather River Area:* Butte County, Yuba City, and Plumas County Flood Control and Water Conservation District (FCWCD)
- *North Bay Area:* Napa County FCWCD and Solano County Water Agency (WA)
- *South Bay Area:* Alameda County FCWCD, Zone 7; Alameda County Water District (WD); and Santa Clara Valley WD
- *San Joaquin Valley Area:* Dudley Ridge WD, Empire West Side Irrigation District (ID), Kern County WA, Kings County, Oak Flat WD, and Tulare Lake Basin Water Storage District (WSD)

- *Central Coastal Area:* San Luis Obispo County FCWCD and Santa Barbara County FCWCD
- *Southern California Area:* Antelope Valley–East Kern WA, Castaic Lake WA, Coachella Valley WD, Crestline–Lake Arrowhead WA, Desert Water Agency, Littlerock Creek ID, Metropolitan WD of Southern California, Mojave WA, Palmdale WD, San Bernardino Valley Municipal Water District (MWD), San Gabriel Valley MWD, San Gorgonio Pass WA, and Ventura County Watershed Protection District (WPD)

Table A-1. Historical State Water Project Deliveries, 2001
Sacramento River Index = 4, Water Year Type = Dry

Contractor Location	SWP Contractor	SWP Water Type Delivered (acre-feet)				Total SWP Deliveries (acre-feet)
		Table A*	Article 21	Carryover	Turnback	
Feather River Area	Butte County	513	–	–	–	513
	Yuba City	1,065	–	–	–	1,065
	Plumas County FCWCD	–	–	–	–	–
North Bay Area	Napa County FCWCD	4,293	996	1,723	82	7,094
	Solano County WA	17,756	2,304	1,021	–	21,081
South Bay Area	Alameda County FCWCD, Zone 7	22,307	–	5,990	308	28,605
	Alameda County WD	13,695	10	4,192	107	18,004
	Santa Clara Valley WD	35,689	–	12,233	–	47,922
San Joaquin Valley Area	Dudley Ridge WD	18,467	933	6,815	347	26,562
	Empire West Side ID	–	253	1,107	–	1,360
	Kern County WA	363,204	23,233	92,052	6,502	484,991
	Kings County	1,560	–	–	–	1,560
	Oak Flat WD	2,089	–	101	22	2,212
	Tulare Lake Basin WSD	40,830	8,755	7,889	769	58,243
Central Coastal Area	San Luis Obispo County FCWCD	4,184	–	–	99	4,283
	Santa Barbara County FCWCD	14,285	396	–	296	14,977
Southern California Area	Antelope Valley–East Kern WA	45,071	–	–	899	45,970
	Castaic Lake WA (+Rch 31A, 5 & 7)	30,471	850	–	618	31,939
	Coachella Valley WD	9,009	–	–	91	9,100
	Crestline–Lake Arrowhead WA	1,057	–	–	–	1,057
	Desert WA	14,859	–	–	151	15,010
	Littlerock Creek ID	–	–	–	–	–
	Metropolitan WD of Southern California	686,545	10,415	200,000	7,949	904,909
	Mojave WA	4,433	–	–	–	4,433
	Palmdale WD	8,170	–	2,257	–	10,427
	San Bernardino Valley MWD	26,488	–	–	–	26,488
	San Gabriel Valley MWD	6,534	–	–	–	6,534
	San Gorgonio Pass WA	–	–	–	–	–
	Ventura County WPD	1,850	–	–	–	1,850
Total SWP Deliveries		**1,374,424**	**48,145**	**335,380**	**18,240**	**1,776,189**
Total Deliveries from the Delta**		**1,372,846**	**48,145**	**335,380**	**18,240**	**1,774,611**

* Table A = State Water Project Analysis Office current-year deliveries + next year's Article 14B carryover water

** Total deliveries from the Delta = Total SWP deliveries – Feather River Service Area deliveries (Butte County, Yuba City, and Plumas County Flood Control and Water Conservation District)

Table A-2. Historical State Water Project Deliveries, 2002
Sacramento River Index = 4, Water Year Type = Dry

Contractor Location	SWP Contractor	SWP Water Type Delivered (acre-feet)				Total SWP Deliveries (acre-feet)
		Table A*	Article 21	Carryover	Turnback	
Feather River Area	Butte County	419	–	–	–	419
	Yuba City	1,181	–	–	–	1,181
	Plumas County FCWCD	–	–	–	–	–
North Bay Area	Napa County FCWCD	2,022	827	3,743	283	6,875
	Solano County WA	28,223	2,242	–	–	30,465
South Bay Area	Alameda County FCWCD, Zone 7	40,707	1,484	8,113	556	50,860
	Alameda County WD	24,250	83	2,331	862	27,526
	Santa Clara Valley WD	55,896	202	3,311	2,053	61,462
San Joaquin Valley Area	Dudley Ridge WD	38,688	1,861	1,994	1,177	43,720
	Empire West Side ID	1,278	26	101	–	1,405
	Kern County WA	670,884	21,951	15,680	20,543	729,058
	Kings County	2,800	–	–	54	2,854
	Oak Flat WD	3,841	50	134	76	4,101
	Tulare Lake Basin WSD	73,785	3,749	5,385	2,289	85,208
Central Coastal Area	San Luis Obispo County FCWCD	4,355	–	–	–	4,355
	Santa Barbara County FCWCD	24,166	436	3,455	324	28,381
Southern California Area	Antelope Valley–East Kern WA	53,907	–	3,256	1,008	58,171
	Castaic Lake WA (+Rch 31A, 5 & 7)	61,880	280	6,657	–	68,817
	Coachella Valley WD	16,170	111	–	474	16,755
	Crestline–Lake Arrowhead WA	2,189	–	–	–	2,189
	Desert WA	26,670	189	–	781	27,640
	Littlerock Creek ID	–	–	–	–	–
	Metropolitan WD of Southern California	1,273,205	9,624	97,940	14,335	1,395,104
	Mojave WA	4,346	–	–	–	4,346
	Palmdale WD	8,359	–	–	437	8,796
	San Bernardino Valley MWD	68,268	–	3,801	–	72,069
	San Gabriel Valley MWD	18,353	–	4,698		23,051
	San Gorgonio Pass WA	–	–	–	–	–
	Ventura County WPD	4,998	–	–	–	4,998
Total SWP Deliveries		**2,510,840**	**43,115**	**160,599**	**45,252**	**2,759,806**
Total Deliveries from the Delta**		**2,509,240**	**43,115**	**160,599**	**45,252**	**2,758,206**

* Table A = State Water Project Analysis Office current-year deliveries + next year's Article 14B carryover water

** Total deliveries from the Delta = Total SWP deliveries – Feather River Service Area deliveries (Butte County, Yuba City, and Plumas County Flood Control and Water Conservation District)

Table A-3. Historical State Water Project Deliveries, 2003
Sacramento River Index = 2, Water Year Type = Above Normal

Contractor Location	SWP Contractor	SWP Water Type Delivered (acre-feet)				Total SWP Deliveries (acre-feet)
		Table A*	Article 21	Carryover	Turnback	
Feather River Area	Butte County	551	–	–	–	551
	Yuba City	1,324	–	–	–	1,324
	Plumas County FCWCD	–	–	–	–	–
North Bay Area	Napa County FCWCD	6,026	376	1,055	180	7,637
	Solano County WA	25,135	2,280	1,918	–	29,333
South Bay Area	Alameda County FCWCD, Zone 7	30,695	–	13,099	656	44,450
	Alameda County WD	31,086	–	5,150	354	36,590
	Santa Clara Valley WD	90,620	936	14,104	841	106,501
San Joaquin Valley Area	Dudley Ridge WD	49,723	1,928	1,452	482	53,585
	Empire West Side ID	1,074	175	187	–	1,436
	Kern County WA	841,697	27,891	22,380	8,419	900,387
	Kings County	3,600	58	–	34	3,692
	Oak Flat WD	4,059	19	140	48	4,266
	Tulare Lake Basin WSD	94,376	6,243	4,284	938	105,841
Central Coastal Area	San Luis Obispo County FCWCD	4,417	36	–	–	4,453
	Santa Barbara County FCWCD	24,312	339	2,274	43	26,968
Southern California Area	Antelope Valley–East Kern WA	52,730	–	7,049	250	60,029
	Castaic Lake WA (+Rch 31A, 5 & 7)	49,895	991	4,760	90	55,736
	Coachella Valley WD	14,045	204	–	194	14,443
	Crestline–Lake Arrowhead WA	1,563	–	–	–	1,563
	Desert WA	23,168	330	–	321	23,819
	Littlerock Creek ID	–	–	–	–	–
	Metropolitan WD of Southern California	1,550,356	17,622	134,845	16,920	1,719,743
	Mojave WA	10,907	–	3,528	–	14,435
	Palmdale WD	9,701	–	1,846	–	11,547
	San Bernardino Valley MWD	25,371	200	1,844	–	27,415
	San Gabriel Valley MWD	13,034	200	–	–	13,234
	San Gorgonio Pass WA	116	–	–	–	116
	Ventura County WPD	5,000	–	–	–	5,000
Total SWP Deliveries		**2,964,581**	**59,828**	**219,915**	**29,770**	**3,274,094**
Total Deliveries from the Delta**		**2,962,706**	**59,828**	**219,915**	**29,770**	**3,272,219**

* Table A = State Water Project Analysis Office current-year deliveries + next year's Article 14B carryover water

** Total deliveries from the Delta = Total SWP deliveries – Feather River Service Area deliveries (Butte County, Yuba City, and Plumas County Flood Control and Water Conservation District)

Table A-4. Historical State Water Project Deliveries, 2004

Sacramento River Index = 3, Water Year Type = Below Normal

Contractor Location	SWP Contractor	SWP Water Type Delivered (acre-feet)				Total SWP Deliveries (acre-feet)
		Table A*	Article 21	Carryover	Turnback	
Feather River Area	Butte County	1,440	–	–	–	1,440
	Yuba City	1,434	–	–	–	1,434
	Plumas County FCWCD	–	–	–	–	–
North Bay Area	Napa County FCWCD	5,030	1,450	1,602	52	8,134
	Solano County WA	17,991	7,787	47	–	25,825
South Bay Area	Alameda County FCWCD, Zone 7	39,898	–	11,466	–	51,364
	Alameda County WD	20,956	–	6,714	214	27,884
	Santa Clara Valley WD	52,867	2,983	–	508	56,358
San Joaquin Valley Area	Dudley Ridge WD	36,377	7,393	2,185	291	46,246
	Empire West Side ID	1,310	626	1,626	–	3,562
	Kern County WA	640,190	86,513	40,120	5,075	771,898
	Kings County	5,850	3,157	–	46	9,053
	Oak Flat WD	4,324	–	276	29	4,629
	Tulare Lake Basin WSD	58,575	15,299	5,638	489	80,001
Central Coastal Area	San Luis Obispo County FCWCD	4,096	69	–	–	4,165
	Santa Barbara County FCWCD	29,566	–	–	122	29,688
Southern California Area	Antelope Valley–East Kern WA	50,532	–	9,199	–	59,731
	Castaic Lake WA (+Rch 31A, 5 & 7)	46,358	1,618	35,785	–	83,761
	Coachella Valley WD	8,631	–	6,745	89	15,465
	Crestline–Lake Arrowhead WA	2,006	–	–	–	2,006
	Desert WA	9,966	–	11,122	102	21,190
	Littlerock Creek ID	–	–	–	–	–
	Metropolitan WD of Southern California	1,195,807	91,601	215,000	10,223	1,512,631
	Mojave WA	11,176	–	–	–	11,176
	Palmdale WD	10,549	–	1,613	–	12,162
	San Bernardino Valley MWD	35,522	–	20,631	–	56,153
	San Gabriel Valley MWD	15,600	–	–	–	15,600
	San Gorgonio Pass WA	841	–	–	–	841
	Ventura County WPD	5,250	–	–	–	5,250
Total SWP Deliveries		**2,312,142**	**218,496**	**369,769**	**17,240**	**2,917,647**
Total Deliveries from the Delta**		**2,309,268**	**218,496**	**369,769**	**17,240**	**2,914,773**

* Table A = State Water Project Analysis Office current-year deliveries + next year's Article 14B carryover water

** Total deliveries from the Delta = Total SWP deliveries – Feather River Service Area deliveries (Butte County, Yuba City, and Plumas County Flood Control and Water Conservation District)

Table A-5. Historical State Water Project Deliveries, 2005
Sacramento River Index = 2, Water Year Type = Above Normal

Contractor Location	SWP Contractor	SWP Water Type Delivered (acre-feet)				Total SWP Deliveries (acre-feet)
		Table A*	Article 21	Carryover	Turnback	
Feather River Area	Butte County	527	–	–	–	527
	Yuba City	1,894	–	–	–	1,894
	Plumas County FCWCD	–	–	–	–	–
North Bay Area	Napa County FCWCD	5,322	606	1,741	–	7,669
	Solano County WA	24,515	10,421	83	–	35,019
South Bay Area	Alameda County FCWCD, Zone 7	38,388	–	7,849	275	46,512
	Alameda County WD	36,469	846	6,341	943	44,599
	Santa Clara Valley WD	89,476	6,298	11,899	342	108,015
San Joaquin Valley Area	Dudley Ridge WD	51,609	28,197	821	1,286	81,913
	Empire West Side ID	1,448	1,799	587	–	3,834
	Kern County WA	893,439	453,078	9,851	22,397	1,378,765
	Kings County	8,100	11,504	–	202	19,806
	Oak Flat WD	4,067	–	–	127	4,194
	Tulare Lake Basin WSD	86,604	47,267	3,973	2,158	140,002
Central Coastal Area	San Luis Obispo County FCWCD	4,006	245	–	–	4,251
	Santa Barbara County FCWCD	22,981	–	–	155	23,136
Southern California Area	Antelope Valley–East Kern WA	57,205	–	2,626	–	59,831
	Castaic Lake WA (+Rch 31A, 5 & 7)	54,303	2,451	2,702	–	59,456
	Coachella Valley WD	26,984	–	12,819	2,716	42,519
	Crestline–Lake Arrowhead WA	807	–	–	–	807
	Desert WA	33,168	–	14,799	1,122	49,089
	Littlerock Creek ID	–	–	–	–	–
	Metropolitan WD of Southern California**	1,269,291	168,300	106,032	6,530	1,550,153
	Mojave WA	10,360	–	1,201	–	11,561
	Palmdale WD	10,174	–	1,538	–	11,712
	San Bernardino Valley MWD	31,211	56	283	–	31,550
	San Gabriel Valley MWD	10,500	–	–	–	10,500
	San Gorgonio Pass WA	655	15	–	22	692
	Ventura County WPD	1,665	–	–	–	1,665
	Total SWP Deliveries	**2,775,168**	**731,083**	**185,145**	**38,275**	**3,729,671**
	Total Deliveries from the Delta* **	**2,772,747**	**731,083**	**185,145**	**38,275**	**3,727,250**

* Table A = State Water Project Analysis Office current-year deliveries + Next year's Article 14B carryover water

** Metropolitan Water District of Southern California 2005 Table A deliveries have been updated to reflect the addition of Article 14B carryover water that was previously omitted.

*** Total deliveries from the Delta = Total SWP deliveries – Feather River Service Area deliveries (Butte County, Yuba City, and Plumas County Flood Control and Water Conservation District)

Table A-6. Historical State Water Project Deliveries, 2006
Sacramento River Index = 1, Water Year Type = Wet

Contractor Location	SWP Contractor	SWP Water Type Delivered (acre-feet)				Total SWP Deliveries (acre-feet)
		Table A*	Article 21	Carryover	Turnback	
Feather River Area	Butte County	468	–	–	–	468
	Yuba City	4,148	1,194	–	–	5,342
	Plumas County FCWCD	–	–	–	–	–
North Bay Area	Napa County FCWCD	7,312	300	172	–	7,784
	Solano County WA	12,070	18,195	390	–	30,655
South Bay Area	Alameda County FCWCD, Zone 7	50,785	–	2,252	491	53,528
	Alameda County WD	–	2,375	1,331	39,373	43,079
	Santa Clara Valley WD	47,344	26,769	524	–	74,637
San Joaquin Valley Area	Dudley Ridge WD	55,343	18,515	–	1,068	74,926
	Empire West Side ID	1,500	1,124	658	–	3,282
	Kern County WA	961,882	256,634	5,418	18,610	1,242,544
	Kings County	8,991	366	–	173	9,530
	Oak Flat WD	4,118	–	17	107	4,242
	Tulare Lake Basin WSD	48,361	59,424	–	1,787	109,572
Central Coastal Area	San Luis Obispo County FCWCD	3,382	827	–	–	4,209
	Santa Barbara County FCWCD	19,255	4,020	–	–	23,275
Southern California Area	Antelope Valley–East Kern WA	76,623	–	3,761	–	80,384
	Castaic Lake WA (+Rch 31A, 5 & 7)	56,758	2,089	3,905	–	62,752
	Coachella Valley WD	121,100	–	–	–	121,100
	Crestline–Lake Arrowhead WA	257	–	–	–	257
	Desert WA	50,000	–	–	–	50,000
	Littlerock Creek ID	–	–	–	–	–
	Metropolitan WD of Southern California	1,103,538	238,478	136,424	11,638	1,490,078
	Mojave WA	32,496	–	1,518	–	34,014
	Palmdale WD	10,374	1,653	335	130	12,492
	San Bernardino Valley MWD	31,902	–	3,427	–	35,329
	San Gabriel Valley MWD	13,524	–	–	–	13,524
	San Gorgonio Pass WA	4,262	–	–	–	4,262
	Ventura County WPD	1,850	–	–	–	1,850
Total SWP Deliveries		**2,727,643**	**631,963**	**160,132**	**73,377**	**3,593,115**
Total Deliveries from the Delta**		**2,723,027**	**630,769**	**160,132**	**73,377**	**3,587,305**

* Table A = State Water Project Analysis Office current-year deliveries + next year's Article 14B carryover water

** Total deliveries from the Delta = Total SWP deliveries – Feather River Service Area deliveries (Butte County, Yuba City, and Plumas County Flood Control and Water Conservation District)

Table A-7. Historical State Water Project Deliveries, 2007
Sacramento River Index = 4, Water Year Type = Dry

Contractor Location	SWP Contractor	SWP Water Type Delivered (acre-feet)				Total SWP Deliveries (acre-feet)
		Table A*	Article 21	Carryover	Turnback	
Feather River Area	Butte County	956	–	–	–	956
	Yuba City	2,327	–	–	–	2,327
	Plumas County FCWCD	–	–	–	–	–
North Bay Area	Napa County FCWCD	6,362	3,597	998	–	10,957
	Solano County WA	14,892	8,217	1,822	–	24,931
South Bay Area	Alameda County FCWCD, Zone 7	32,972	912	2,895	378	37,157
	Alameda County WD	16,541	550	2,103	197	19,391
	Santa Clara Valley WD	38,812	4,840	8,161	469	52,282
San Joaquin Valley Area	Dudley Ridge WD	28,457	8,953	2,000	269	39,679
	Empire West Side ID	397	1,172	515	–	2,084
	Kern County WA	592,423	99,861	19,645	4,683	716,612
	Kings County	4,924	474	–	43	5,441
	Oak Flat WD	3,430	41	69	27	3,567
	Tulare Lake Basin WSD	57,272	12,902	16,459	450	87,083
Central Coastal Area	San Luis Obispo County FCWCD	3,752	24	–	–	3,776
	Santa Barbara County FCWCD	24,760	1,070	1,390	–	27,220
Southern California Area	Antelope Valley–East Kern WA	74,459	–	4,364	–	78,823
	Castaic Lake WA (+Rch 31A, 5 & 7)	44,974	–	4,216	–	49,190
	Coachella Valley WD	72,660	–	–	568	73,228
	Crestline–Lake Arrowhead WA	1,768	–	–	–	1,768
	Desert WA	30,000	–	–	234	30,234
	Littlerock Creek ID	1,380	–	–	–	1,380
	Metropolitan WD of Southern California	1,146,900	166,517	28,098	8,962	1,350,477
	Mojave WA	45,372	–	737	–	46,109
	Palmdale WD	12,780	843	985	100	14,708
	San Bernardino Valley MWD	57,116	–	–	–	57,116
	San Gabriel Valley MWD	10,000	–	–	–	10,000
	San Gorgonio Pass WA	4,009	–	–	–	4,009
	Ventura County WPD	3,000	–	–	–	3,000
Total SWP Deliveries		**2,332,695**	**309,973**	**94,457**	**16,380**	**2,753,505**
Total Deliveries from the Delta**		**2,329,412**	**309,973**	**94,457**	**16,380**	**2,750,222**

* Table A = State Water Project Analysis Office current-year deliveries + next year's Article 14B carryover water

** Total deliveries from the Delta = Total SWP deliveries – Feather River Service Area deliveries (Butte County, Yuba City, and Plumas County Flood Control and Water Conservation District)

Table A-8. Historical State Water Project Deliveries, 2008
Sacramento River Index = 5, Water Year Type = Critical

Contractor Location	SWP Contractor	SWP Water Type Delivered (acre-feet)				Total SWP Deliveries (acre-feet)
		Table A*	Article 21	Carryover	Turnback	
Feather River Area	Butte County	9,436	–	–	–	9,436
	Yuba City	1,923	–	–	–	1,923
	Plumas County FCWCD	243	–	–	–	243
North Bay Area	Napa County FCWCD	3,636	1,219	7,363	21	12,239
	Solano County WA	10,436	1,510	12,389	–	24,335
South Bay Area	Alameda County FCWCD, Zone 7	13,633	–	15,400	–	29,033
	Alameda County WD	4,206	–	8,659	37	12,902
	Santa Clara Valley WD	11,133	–	21,188	88	32,409
San Joaquin Valley Area	Dudley Ridge WD	12,260	–	5,949	51	18,260
	Empire West Side ID		–	915	–	915
	Kern County WA	271,636	–	6,815	883	279,334
	Kings County	3,187	–	–	8	3,195
	Oak Flat WD	1,929	–	–	5	1,934
	Tulare Lake Basin WSD	32,302	–	281	85	32,668
Central Coastal Area	San Luis Obispo County FCWCD	8,512	–	–	–	8,512
	Santa Barbara County FCWCD	11,311	–	2,532	40	13,883
Southern California Area	Antelope Valley–East Kern WA	31,082	–	10,381	125	41,588
	Castaic Lake WA (+Rch 31A, 5 & 7)	18,710	–	12,146	–	30,856
	Coachella Valley WD	42,385	–	–	107	42,492
	Crestline–Lake Arrowhead WA	1,159	–	689	–	1,848
	Desert WA	17,500	–	–	44	17,544
	Littlerock Creek ID	805	–	–	–	805
	Metropolitan WD of Southern California	654,304	–	–	1,689	655,993
	Mojave WA	26,288	–	108	–	26,396
	Palmdale WD	4,226	–	–	19	4,245
	San Bernardino Valley MWD	30,562	–	4,444	–	35,006
	San Gabriel Valley MWD	10,080	–	–	–	10,080
	San Gorgonio Pass WA	5,419	–	300	–	5,719
	Ventura County WPD	3,798	–	–	–	3,798
	Total SWP Deliveries	**1,242,101**	**2,729**	**109,559**	**3,202**	**1,357,591**
	Total Deliveries from the Delta**	**1,230,499**	**2,729**	**109,559**	**3,202**	**1,345,989**

* Table A = State Water Project Analysis Office current-year deliveries + next year's Article 14B carryover water

** Total deliveries from the Delta = Total SWP deliveries – Feather River Service Area deliveries (Butte County, Yuba City, and Plumas County Flood Control and Water Conservation District)

Table A-9. Historical State Water Project Deliveries, 2009
Sacramento River Index = 4, Water Year Type = Dry

Contractor Location	SWP Contractor	SWP Water Type Delivered (acre-feet)				Total SWP Deliveries (acre-feet)
		Table A*	Article 21	Carryover	Turnback	
Feather River Area	Butte County	581	–	–	–	581
	Yuba City	2,114	–	–	–	2,114
	Plumas County FCWCD	200	–	–	–	200
North Bay Area	Napa County FCWCD	2,723	1,588	4,475	13	8,799
	Solano County WA	8,618	4,444	3,123	–	16,185
South Bay Area	Alameda County FCWCD, Zone 7	12,093	–	14,584	–	26,677
	Alameda County WD	5,911	–	10,494	8	16,413
	Santa Clara Valley WD	9,188	–	23,867	54	33,109
San Joaquin Valley Area	Dudley Ridge WD	13,185	–	7,810	32	21,027
	Empire West Side ID	1,034	–	–	–	1,034
	Kern County WA	226,631	–	56,367	544	283,542
	Kings County	3,153	–	70	5	3,228
	Oak Flat WD	1,825	–	66	1	1,892
	Tulare Lake Basin WSD	35,160	–	1,271	52	36,483
Central Coastal Area	San Luis Obispo County FCWCD	3,799	–	–	–	3,799
	Santa Barbara County FCWCD	12,746	–	4,523	25	17,294
Southern California Area	Antelope Valley–East Kern WA	14,419	–	18,408	77	32,904
	Castaic Lake WA (+Rch 31A, 5 & 7)	14,858	–	9,529	52	24,439
	Coachella Valley WD	40,845	–	–	66	40,911
	Crestline–Lake Arrowhead WA	–	–	893	–	893
	Desert WA	16,865	–	–	27	16,892
	Littlerock Creek ID	–	–	–	–	–
	Metropolitan WD of Southern California	544,304	–	10,721	1,042	556,067
	Mojave WA	21,312	–	242	–	21,554
	Palmdale WD	12,095	–	3,229	–	15,324
	San Bernardino Valley MWD	26,785	–	9,348	–	36,133
	San Gabriel Valley MWD	11,516	–	–	–	11,516
	San Gorgonio Pass WA	5,612	–	480	–	6,092
	Ventura County WPD	3,890	–	–	–	3,890
Total SWP Deliveries		**1,051,462**	**6,032**	**179,500**	**1,998**	**1,238,992**
Total Deliveries from the Delta**		**1,048,567**	**6,032**	**179,500**	**1,998**	**1,236,097**

* Table A = State Water Project Analysis Office current-year deliveries + next year's Article 14B carryover water

** Total deliveries from the Delta = Total SWP deliveries – Feather River Service Area deliveries (Butte County, Yuba City, and Plumas County Flood Control and Water Conservation District)

Table A-10. Historical State Water Project Deliveries, 2010
Sacramento River Index = 3, Water Year Type = Below Normal

Contractor Location	SWP Contractor	SWP Water Type Delivered (acre-feet)				Total SWP Deliveries (acre-feet)
		Table A*	Article 21	Carryover	Turnback	
Feather River Area	Butte County	807	–	–	–	807
	Yuba City	2,331	–	–	–	2,331
	Plumas County FCWCD	243	–	–	–	243
North Bay Area	Napa County FCWCD	7,275	2,207	2,845	90	12,417
	Solano County WA	16,793	5,298	3,661	–	25,752
South Bay Area	Alameda County FCWCD, Zone 7	28,694	–	12,756	249	41,699
	Alameda County WD	11,668	–	10,889	14	22,571
	Santa Clara Valley WD	6,068	–	10,741	34	16,843
San Joaquin Valley Area	Dudley Ridge WD	15,833	–	9,752	156	25,741
	Empire West Side ID	380	–	–	–	380
	Kern County WA	375,426	–	55,419	3,044	433,889
	Kings County	4,094	–	522	29	4,645
	Oak Flat WD	2,412	–	455	18	2,885
	Tulare Lake Basin WSD	35,985	–	3,199	275	39,459
Central Coastal Area	San Luis Obispo County FCWCD	3,480	–	277	–	3,757
	Santa Barbara County FCWCD	8,640	–	7,134	140	15,914
Southern California Area	Antelope Valley–East Kern WA	36,462	–	20,813	438	57,713
	Castaic Lake WA (+Rch 31A, 5 & 7)	37,054	–	14,501	295	51,850
	Coachella Valley WD	69,175	–	7,595	429	77,199
	Crestline–Lake Arrowhead WA	357	–	–	–	357
	Desert WA	27,875	–	3,135	173	31,183
	Littlerock Creek ID		–	–	–	–
	Metropolitan WD of Southern California	817,765	–	67,783	5,922	891,470
	Mojave WA	35,241	–	20	–	35,261
	Palmdale WD	5,585	–	5,325	59	10,969
	San Bernardino Valley MWD	37,733	–	11,273	–	49,006
	San Gabriel Valley MWD	19,180	–	–	–	19,180
	San Gorgonio Pass WA	6,626	–	–	6	6,632
	Ventura County WPD	4,075	–	–	–	4,075
	Total SWP Deliveries	**1,617,257**	**7,505**	**248,095**	**11,371**	**1,884,228**
	Total Deliveries from the Delta**	**1,613,876**	**7,505**	**248,095**	**11,371**	**1,880,847**

* Table A = State Water Project Analysis Office current-year deliveries + next year's Article 14B carryover water

** Total deliveries from the Delta = Total SWP deliveries – Feather River Service Area deliveries (Butte County, Yuba City, and Plumas County Flood Control and Water Conservation District)

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Appendix B

Comment Letters on the Draft Report and the Department's Responses

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THE METROPOLITAN WATER DISTRICT
OF SOUTHERN CALIFORNIA

Office of the General Manager

March 12, 2012

Ms. Cynthia Pierson
California Department of Water Resources
SWP Delivery Reliability Report – Attn: Cynthia Pierson
P.O. Box 942836
Sacramento, CA 94236-0001

Dear Ms. Pierson:

State Water Project Delivery Reliability Report 2011 – January 2012 Draft

The Metropolitan Water District of Southern California (Metropolitan) has reviewed the Department of Water Resources (Department) January 2012 draft of the State Water Project (SWP) Delivery Reliability Report 2011 (DRR) and offers the following comments and observations.

Metropolitan understands the Department's desire to produce a public outreach document with the intent to educate Californians about the SWP and its operations. However, we do not agree that this should be the purpose of the DRR. The preparation of this report should be to satisfy the obligation set forth in the 2003 Monterey Settlement (Settlement) between DWR, the State Water Contractors (SWC) and the Monterey Amendment Plaintiffs. The Settlement requires a report on the delivery capability of the SWP facilities to be distributed biannually to all SWP contractors, city and county planning departments, and regional and metropolitan planning departments in the SWP's service area. Metropolitan suggests that the Department refocus the report to provide a summary of the technical analysis including the assumptions used in the analysis and a description of the results. Similar to previous versions of the DRR, the report should focus on the technical needs of the SWC and regional planning agencies for information on the reliability of the SWP. This report should not be used as a larger public outreach document.

Metropolitan believes that an education can be provided to readers of the DRR while remaining true to its original intent. To that end, we encourage the Department to reconsider the use of the term "Delta exports", which may mislead the reader. This term is used throughout the report in a fashion that promotes the notion that we are exporting a native supply out of the Delta. Rather, these supplies were developed through SWP Conservation Facilities and SWP water rights and represent a small percentage of the total flows passing through the Delta. We would like to see the report be clear on the fact that the water diverted is a SWP developed supply.

700 N. Alameda Street, Los Angeles, California 90012 • Mailing Address: Box 54153, Los Angeles, California 90054-0153 • Telephone (213) 217-6000

Metropolitan acknowledges the difficulties in preparing a report of this magnitude particularly with the variability in hydrology, regulatory restrictions and climate change uncertainties. Metropolitan continues to offer its assistance with the development of this report. We encourage the Department to engage not only Metropolitan but other SWP contractors early in the preparation of the document. We believe a more collaborative process will facilitate feedback from the end users resulting in an improved document.

Very truly yours,

Deven N. Upadhyay
Manager, Water Resource Management

DJP:jc
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Mr. Mark Cowin
Director, California Department of Water Resources
P.O. Box 942836, Room 1115-1
Sacramento, CA 94236-0001

Ms. Katherine Kelly
Chief, Bay-Delta Office
California Department of Water Resources
1416, 9th Street, Room 215-37
Sacramento, CA 95814

Mr. Terry Erlewine
General Manager
State Water Contractors
1121 L Street, Suite 1050
Sacramento, CA 95814

STATE OF CALIFORNIA – CALIFORNIA NATURAL RESOURCES AGENCY

EDMUND G. BROWN JR., *Governor*

DEPARTMENT OF WATER RESOURCES
1416 NINTH STREET, P.O. BOX 942836
SACRAMENTO, CA 94236-0001
(916) 653-5791

June 25, 2012

Mr. Deven N. Upadhyay
Manager, Water Resources Management
The Metropolitan Water District of Southern California
PO Box 54153
Los Angeles, California 90054-0153

Dear Mr. Upadhyay:

This letter responds to your letter dated March 12, 2012 commenting on the draft State Water Project Delivery Reliability Report (2011). We appreciate your review and subsequent comments to the draft report.

Your first comment is regarding the format of the report. Metropolitan would like the Department of Water Resources to focus on the technical needs of the State Water Contractors and regional planning agencies for information on the reliability of the State Water Project (SWP) and not plan to use the report as a larger public outreach document.

The reformatting of the Delivery Reliability Report is intended to make the information more understandable to the public. The Monterey Settlement (2003) requires a report covering this subject to be published every two years and that the information contained in the report be readily understandable by the public. The previous versions of the report focus on estimated amounts for Table A deliveries and other categories of deliveries defined in the SWP water delivery contracts. We agree that this is valuable information for our contractors and planning entities within the SWP service area however, it is not readily understandable to the public. Our intent in reformatting the report is to meet the needs of both audiences. The main report is intended for the public audience and the accompanying technical addendum intended for State Water Contractors and regional planning agencies. The technical addendum includes descriptions of the analyses, the results, and the breakdown of the information for each contractor.

Your second comment is regarding the use of the term “Delta exports” for the water pumped from the Delta by the SWP. Your observation is that the term is used in a manner that may mislead the reader by promoting the notion that the SWP exports a “native supply” from the Delta rather than one developed through the SWP conservation facilities and water rights. The term “Delta exports” is one that is commonly used in Department reports. It refers to the water that is released from Oroville Reservoir and transferred across the Delta as well as other flows that enter the Delta and are available to the SWP while meeting the relevant water rights’ requirements and other export regulations. Chapters 2 through 4 are intended to inform the reader about the history, facilities and requirements for operation of the SWP. It is our hope that this information will help to avoid any potential misinterpretation by the reader regarding what is meant by the term “Delta exports”.

The final 2011 State Water Project Delivery Reliability Report is nearing completion and is expected to be available next month. If you would like to discuss your concerns further, please contact me at (916) 653-1099 or kkelly@water.ca.gov.

Sincerely,

Katherine Kelly

Katherine F. Kelly, Chief
Bay-Delta Office

Mojave Water Agency

13846 Conference Center Drive ♦ Apple Valley, California 92307
Phone (760) 946-7000 ♦ Fax (760) 240-2642 ♦ www.mojavewater.org

VIA ELECTRONIC MAIL

March 12, 2012

California Department of Water Resources
SWP Delivery Reliability Report- Attn: Cynthia Pierson
P.O. Box 942836
Sacramento, CA 94236-0001

RE: Comments on the State Water Project Draft Delivery Reliability Report 2011

Dear Ms. Pierson:

The Mojave Water Agency has reviewed the SWP Draft Delivery Reliability Report 2011 ("2011 DRR") and offers these comments. In general, we appreciated the format and information included in the 2009 DRR and would like to see the same level of detail and information presented in the 2011 DRR. Please consider the following comments:

1. Individual Contractor Modeling Results: We appreciate the inclusion of individual contractor modeling outputs in the Technical Addendum.
2. Reliability Numbers: In addition to the charts in the 2011 DRR (figures 6-5 thru 6-9), the body of the report should include SWP reliability percentages, either in the text or in tables, as was done in the 2009 DRR. This should be done for current and future conditions for the long-term average, drought cycles, and wet cycles (example: Tables 6.1 thru 6.4 in the 2009 DRR). Average-year and dry-year numbers are critical information for urban water suppliers to include in their Urban Water Management Plans, which are used to demonstrate water supply sufficiency for their service areas.
3. Effects of Climate Change: We appreciate the inclusion of modeling results comparing future SWP deliveries with and without the effects of climate change; this will be of great help to agencies preparing climate change evaluations for water supply planning purposes.
4. Factors Affecting Reliability: Chapter 4 describes a number of factors that have reduced or have the potential to reduce future water supply reliability. The chapter should also "disclose" that some future actions may actually increase future reliability:
    a. The recent court decisions overturning Federal Biological Opinions (BO's) were mentioned; but it should be mentioned that implementation of future BO's may result in less restriction on delta exports.
    b. The Bay Delta Conservation Plan (BDCP) was described briefly, but it should also indicate that the conveyance piece of the BDCP will likely result in increased reliability.

Thank you for your consideration of our comments.

Sincerely,

Kirby Brill
General Manager

STATE OF CALIFORNIA – CALIFORNIA NATURAL RESOURCES AGENCY **EDMUND G. BROWN JR.**, *Governor*

DEPARTMENT OF WATER RESOURCES
1416 NINTH STREET, P.O. BOX 942836
SACRAMENTO, CA 94236-0001
(916) 653-5791

May 23, 2012

Kirby Brill
General Manager
Mojave Water Agency
13846 Conference Center Drive
Apple Valley, California 92307

Dear Mr. Brill,

This letter is in response to your letter dated March 12, 2012 providing the comments of the Mojave Water Agency for the Draft 2011 SWP Delivery Reliability Report. Our responses to your four comments are attached.

I appreciate you and your staff's comments. If you or your staff wish to discuss this report further, please contact me at (916) 653-1099 or kkelly@water.ca.gov. For specific questions regarding the analyses used for the report, please contact Francis Chung at (916) 653-5924.

Sincerely,

Katherine Kelly

Katherine F. Kelly, Chief
Bay-Delta Office

Attachment:

Attachment

The following responses are to the comments provided in the March 12, 2012 letter from the Mojave Water Agency. The comments are shown in italics.

1. *Individual Contractor Modeling Results: We appreciate the inclusion of individual contractor modeling outputs in the Technical Addendum.*

   Thank you. We strive to make the Delivery Reliability Report as informative and useful as possible.

2. *Reliability Numbers: In addition to the charts in the 2011 DRR (figures 6-5 thru 6-9), the body of the report should include SWP reliability percentages, either in the text or in tables, as was done in the 2009 DRR. This should be done for current and future conditions for the long-term average, drought cycles, and wet cycles (example: Tables 6.1 thru 6.4 in the 2009 DRR). Average-year and dry-year numbers are critical information for urban water suppliers to include in their Urban Water Management Plans, which are used to demonstrate water supply sufficiency for their service areas.*

   Tables 6-3, 6-4, 7-2, and 7-3 have been added to the report to include this information.

3. *Effects of Climate Change: We appreciate the inclusion of modeling results comparing future SWP deliveries with and without the effects of climate change; this will be of great help to agencies preparing climate change evaluations for water supply planning purposes.*

   Thank you. We are glad you found this information beneficial.

4. *Factors Affecting Reliability: Chapter 4 describes a number of factors that have reduced or have the potential to reduce future water supply reliability. The chapter should also "disclose" that some future actions may actually increase future reliability:*
   a. *The recent court decision overturning Federal Biological Opinions (BO's) were mentioned; but it should be mentioned that implementation of future BO's may result in less restriction on Delta exports.*
   b. *The Bay Delta Conservation Plan (BDCP) was described briefly, but it should also indicate that the conveyance piece of the BDCP will likely result in increased reliability.*

   We appreciate your suggestion. However, we feel it is premature to discuss the effects of potential future BOs or BDCP alternatives. This is something that we can keep in mind and discuss further as we begin to develop the 2013 SWP Delivery Reliability Report.

STATE WATER CONTRACTORS
SWC
Served by the State Water Project
FOUNDED IN 1982

DIRECTORS

Curtis Creel
President
Kern County Water Agency

Joan Maher
Vice President
Santa Clara Valley Water District

David Okita
Secretary-Treasurer
Solano County Water Agency

Stephen Arakawa
Metropolitan Water District of Southern California

Dan Flory
Antelope Valley-East Kern Water Agency

Mark Gilkey
Tulare Lake Basin Water Storage District

Dan Masnada
Castaic Lake Water Agency

Steven Robbins
Coachella Valley Water District

Ray Stokes
Central Coast Water Authority

General Manager
Terry Erlewine

March 12, 2012

California Department of Water Resources
SWP Delivery Reliability Report-Attn: Cynthia Pierson
P.O. Box 942836
Sacramento, CA 94236-0001

Comments on 2011 SWP Draft Delivery Reliability Report

Dear Ms. Pierson:

The State Water Contractors (SWC) has reviewed the 2011 SWP Draft Delivery Reliability Report and offers these comments. The SWC are generally concerned about the level of detail in the presentation. Additionally, the SWC has also identified numerous specific editorial changes for your consideration.

The SWC are interested in discussing our concerns with DWR, primarily in relation to the forthcoming 2013 SWP Reliability Report. If you have any questions about our concerns or specific comments, please contact me at (916) 447-7357.

Sincerely,

Terry L. Erlewine
General Manager

Attachment

State Water Contractors
Specific Comments on DWR's 2011 State Water Project Delivery Reliability Report

Figure 2-2. This figure shows only inflows and outflows to the Delta, and does not provide information on the magnitude of total flows in the watershed or total outflow. A graph similar to that prepared for the Delta Vision that places the total disposition of water supply into context would be helpful.

Page 13. Discussion of how operations are coordinated with the CVP should reference the Coordinated Operations Agreement, which is the basis for that coordination.

Page 23. There is discussion of how individual SWP contractors manage their water supplies annually on the basis of available water supply. That kind of annual information is not the data that is contained in the Delivery Reliability Report and is provided separately by DWR's Operations Control Office. The discussion here reads as though the Delivery Reliability Report provides that information.

Page 27. The discussion of the status of the 2008 and 2009 Biological Opinions is not very informative. This discussion should expand briefly on Judge Wanger's opinion that the current BOs are BOs are "arbitrary, capricious and unlawful" and are currently being redone. The discussion should also note that a preliminary injunction was issued enjoining implementation of the Fall X2 action of the 2008 Delta Smelt Biological Opinion. Additionally, DWR and other plaintiffs in the case have the option to file actions challenging provisions of the Biological Opinions on a continuing basis until new BOs are developed.

Chapter 5. The SWC question that there is any need for this chapter in this report as this goes beyond the issue of delivery reliability. If DWR wants to report on the topic of exports separately, it should do so in a separate report to meet whatever purpose is identified. If DWR insists of having a chapter on exports, it should be moved to later in the report, after Chapters 6 and 7, which identify the basis for the studies reported on in the export chapter.

Page 37. The statement is made that Delta exports are the only SWP water supply source for 24 of the 29 SWP contractors. In fact, local runoff occasionally provides significant quantities of water supply in some wet years.

Page 38. The reference to "Upper Feather River Area contractors" should drop the term "Upper" and refer simply to the "Feather River contractors." The City of Yuba City is located on the lower Feather River.

Page 38. The discussion of water types is incomplete and confusing. It should either be expanded or dropped. Additionally, the word "surplus" should not be used in relation to Article 21 Water. Surplus water has a distinct meaning under the SWP Water Supply Contracts that is different than Article 21 Water

Figure 5-2. This graph would be better presented as a line graph than as a bar graph.

Page 41. The discussion presents results on existing and future conditions, without describing those conditions. This discussion would be enhanced if the entire Chapter 5 was included after Chapters 6 & 7, which are where the existing and future conditions are described.

Page 44. There is discussion of differences between the 2009 and 2011 Delivery Reliability Report that are not really meaningful and are totally within the margin of error for the modeling analysis. Rather than show repeated figures portraying these meaningless differences between the two reports, it would be preferable to abbreviate the text and figures and include a high level statement that the two reports are essentially identical.

Page 48. The discussion of the basis for local demands changing highlights water conservation as the only specific example of those changes. A much more important factor would be local management (i.e., local storage) within the service area.

Page 48. There is a reference to Kern Wet Year as the basis for variations in Article 21 Water demands, but no explanation of why that would be a factor. It would be useful to state that Kern River inflows are a major local water supply variable in Kern County Water Agency, which is the second largest SWP contractor and possesses significant local groundwater recharge potential.

Pages 51-53. As pointed out earlier, there is extensive discussion and numerous figures are presented to show the differences between the 2009 and 2011 Delivery Reliability Reports, which are essentially not meaningful and within the margin of error of the studies. Rather than included repetitive slides showing the same information, this section should be substantially reduced. In fact, the summary of results presented on Page 57 would suffice for all the presentation starting on page 51 and continuing to Page 57.

Page 57. In discussing the Dry year deliveries of Article 21 Water, there is no indication of the location of those deliveries. Given regulatory restrictions in place, it is likely that all the Article 21 Water Deliveries are made to the SWP contractors located north of the Delta. If so, that should be stated. Otherwise, the reader is left with the impression that Article 21 Water might be available for South of the Delta contractors.

Page 61. There is a reference to 4,133 taf/year as the "maximum Delta SWP Table A." The term Delta should be dropped and the reference should be only to "maximum SWP Table A."

Pages 62-68. Same comment as for Chapter 6. The discussion of differences between essentially identical modeling results is too long and should be truncated. The summary of results starting at page 68 could suffice for this entire discussion.

STATE OF CALIFORNIA – CALIFORNIA NATURAL RESOURCES AGENCY **EDMUND G. BROWN JR.**, *Governor*

DEPARTMENT OF WATER RESOURCES
1416 NINTH STREET, P.O. BOX 942836
SACRAMENTO, CA 94236-0001
(916) 653-5791

May 25, 2012

Terry L. Erlewine
General Manager
State Water Contractors
1121 L Street, Suite 1050
Sacramento, California 95814-3944

Dear Mr. Erlewine,

This letter is in response to your letter dated March 12, 2012 providing the comments of the State Water Contractors. I appreciate you and your members taking the time to review the Draft 2011 SWP Delivery Reliability Report and providing feedback. Our responses to your comments are attached.

If you or your staff wish to discuss this report further, please contact me at (916) 653-1099 or kkelly@water.ca.gov. For specific questions regarding the analyses used for the report, please contact Francis Chung at (916) 653-5924.

Sincerely,

Katherine Kelly

Katherine F. Kelly, Chief
Bay-Delta Office

Attachment:

The following responses are to the comments provided in the March 12, 2012 letter from the State Water Contractors. The comments are shown in italics.

Figure 2-2. This figure shows only inflows and outflows to the Delta, and does not provide information on the magnitude of total flows in the watershed or total outflow. A graph similar to that prepared for the Delta Vision that places the total disposition of water supply into context would be helpful.

> We have updated this figure to include a more thorough mass balance of the Delta.

Page 13. Discussion of how operations are coordinated with the CVP should reference the Coordinated Operation Agreement, which is the basis for that coordination.

> We have updated the text on page 13 to mention the Coordinated Operation Agreement with language similar to that used in the sidebar on page 14 of the report.

Page 23. There is discussion of how individual SWP contractors manage their water supplies annually on the basis of available water supply. That kind of annual information is not the data that is contained in the Delivery Reliability Report and is provided separately by DWR's Operations Control Office. The discussion here reads as though the Delivery Reliability Report provides that information.

> We have updated the language on page 23 to clarify the type of information that can be found in the SWP Delivery Reliability Report.

Page 27. The discussion of the status of the 2008 and 2009 Biological Opinions is not very informative. This discussion should expand briefly on Judge Wanger's opinion that the current BOs are "arbitrary, capricious and unlawful" and are currently being redone. The discussion should also note that a preliminary injunction was issued enjoining implementation of Fall X2 action of the 2008 Delta Smelt Biological Opinion. Additionally, DWR and other plaintiffs in the case have option to file actions challenging provisions of the Biological Opinions on a continuing basis until new BOs are developed.

> Staff from the Bay-Delta Office coordinated with DWR's Office of the Chief Counsel on this section and they felt that this section should be a factual summary of the assumptions and criteria used to operate the projects. As a result, discussion of the related litigation is kept to a minimum.

Chapter 5. The SWC question that there is any need for this chapter in this report as this goes beyond the issue of delivery reliability. If DWR wants to report on the topic of exports separately, it should do so in a separate report to meet whatever purpose is identified. If DWR insists of having a chapter on exports, it should be moved to later in the report, after Chapters 6 and 7, which identify the basis for the studies reported on in the export chapter.

> We have placed the "Exports" chapter before the "Deliveries" chapters simply because the exports precede deliveries in operations. Reordering chapters would cause significant rewriting to maintain document flow. We prefer to leave the content intact for the current report but we also want to consider the points you have brought up regarding exports as we start to formulate ideas for content to be included in the 2013 SWP Delivery Reliability Report.

Page 37. The statement is made that Delta exports are the only SWP water supply source for 24 of the 29 SWP contractors. In fact, local runoff occasionally provides significant quantities of water supply in some wet years.

> The language on page 37 has been modified to clarify that Delta exports are not the only source of SWP water for the contractors.

Page 38. The reference to "Upper Feather River Area contractors" should drop the term "Upper" and refer simply to the "Feather River contractors." The City of Yuba City is located on the lower Feather River.

> We agree completely and have removed the term "upper" from the Feather River description throughout the report and technical addendum.

Page 38. The discussion of water types is incomplete and confusing. It should either be expanded or dropped. Additionally, the word "surplus" should not be used in relation to Article 21 Water. Surplus water has a distinct meaning under the SWP Water Supply Contracts that is different than Article 21 Water.

> We have made some modifications to the discussion of water types so it will, hopefully, be more clear now. We have also taken out the word "surplus" when describing Article 21 deliveries, per your suggestion.

Figure 5-2. This graph would be better presented as a line graph than as a bar graph.

> We feel that the current graph format is aesthetically more consistent with the report layout.

Page 41. The discussion presents results on existing and future conditions, without describing those conditions. This discussion would be enhanced if the entire Chapter 5 was included after Chapters 6 & 7, which are where the existing and future conditions are described.

> We have added text to this section to direct the reader to chapters 6 and 7 for more information regarding the assumptions for modeling existing and future conditions.

Page 44. There is discussion of differences between the 2009 and 2011 Delivery Reliability Report that are not really meaningful and are totally within the margin of error for the modeling analysis. Rather than show repeated figures portraying these meaningless differences between the two reports, it would be preferable to abbreviate the text and figures and include a high level statement that the two reports are essentially identical.

We have condensed the discussion of differences between the 2009 and 2011 report and removed some figures. Here is a list of changes for Chapter 5:

- The discussion in *Average, Maximum, and Minimum Annual Delta Exports* on page 41 of the Draft has been reduced
- Figure 5-3 has been replaced with the new Table 5-1
- Percent changes in Table 5-3 (formerly Table 5-2) have been removed and the discussion of existing exports by water year type has been reduced
- Percent changes in Table 5-4 (formerly Table 5-3) have been removed and the discussion of future exports by water year type has been reduced
- Figures 5-5, 5-6 and 5-7 have been removed
- The discussion in *Likelihood of SWP Exports—Existing and Future Conditions* section has been reduced

Page 48. The discussion of the basis for local demands changing highlights water conservation as the only specific example of those changes. A much more important factor would be local management (i.e., local storage) within the service area.

> We have updated this section per your suggestion.

Page 48. There is a reference to Kern Wet Year as the basis for variation in Article 21 Water demands, but no explanation of why that would be a factor. It would be useful to state that Kern River inflows are a major local water supply variable in Kern County Water Agency, which is the second largest SWP contractor and possesses significant local groundwater recharge potential.

> We have updated this section per your suggestion.

Page 51-53. As pointed out earlier, there is extensive discussion and numerous figures are presented to show the differences between the 2009 and 2011 Delivery Reliability Reports, which are essentially not meaningful and within the margin of error of the studies. Rather than included repetitive slides showing the same information, this section should be substantially reduced. In fact, the summary of results presented on Page 57 would suffice for all the presentation starting on page 51 and continuing to Page 57.

We have condensed the discussion of differences between the 2009 and 2011 report and removed some figures. Here is a list of changes for Chapter 6:

- Figure 6-1 has been replaced with new Table 6-1
- Figure 6-5 has been replaced with new Table 6-2 and the discussion in the *SWP Table A Water Deliveries* section has been reduced.
- Figure 6-7 has been removed
- Figures 6-8 and 6-9 have been replaced with new Tables 6-3 and 6-4 and the discussion of Dry-Year and Wet-Year Table A deliveries has been reduced on Draft page 53
- The discussion of *SWP Article 21 Water Deliveries* on Draft page 55 has been reduced
- The discussion of Dry-Year and Wet-Year Article 21 deliveries has been reduced on Draft page 57 and Figures 6-12 and 6-13 have been replaced with new Tables 6-5 and 6-6
- The Summary of Results for existing conditions have been worked into the main chapter text

Page 57. In discussion the Dry year deliveries of Article 21 Water, there is no indication of the location of those deliveries. Given regulatory restrictions in place, it is likely that all the Article 21 Water Deliveries are made to the SWP contractors located north of the Delta. If so, that should be stated. Otherwise, the reader is left with the impression that Article 21 Water might be available for South of Delta contractors.

Most of the Article 21 deliveries shown in the report for Dry years are for contractors south of the Delta. It happens during a few months under these conditions:

1. There is a low allocation
2. San Luis is full
3. Banks has capacity for pumping
4. Delta is in surplus conditions

Page 61. There is a reference to 4,133 taf/year as the "maximum Delta SWP Table A." The term Delta should be dropped and the reference should be only to "maximum SWP Table A."

This is meant to clarify that the results being presented are specific to those contractors that rely on delivery of water from the Delta. If we used "maximum SWP Table A" the value would be 4,172 taf/year.

Page 62-68. Same comment as for Chapter 6. The discussion of differences between essentially identical modeling results is too long and should be truncated. The summary of results starting at page 68 could suffice for this entire discussion.

We have condensed the discussion of differences between the 2009 and 2011 report and removed some figures. Here is a list of changes for Chapter 7:

- Figure 7-1 has been replaced with new Table 7-1
- The discussion in *Future Deliveries of SWP Table A Water* on Draft page 62 has been reduced
- Figure 7-3 has been removed
- Figures 7-4 and 7-9 have been replaced with new Tables 7-2 and 7-3 and the discussion of Dry-Year and Wet-Year Table A deliveries has been reduced on Draft page 64
- The discussion of *SWP Article 21 Water Deliveries* starting on Draft page 64 has been reduced
- The discussion of Dry-Year and Wet-Year Article 21 deliveries starting on Draft page 66 has been reduced and Figures 7-8 and 7-9 have been replaced with new Tables 7-4 and 7-5

Exhibit B

to Comments on the Department of Water Resources Draft Environmental Impact Report for the Water Supply Contract Extension Project

The Delta Plan

Ensuring a reliable water supply for California, a healthy Delta ecosystem, and a place of enduring value

2013

DELTA STEWARDSHIP COUNCIL

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STATE OF CALIFORNIA

Edmund G. Brown, Jr., Governor

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Executive Summary

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Executive Summary

The Sacramento-San Joaquin River Delta is the grand confluence of California's waters, the place where the state's largest rivers merge in a web of channels—and in a maze of controversy. The Delta is a zone where the wants of a modern society come into collision with each other and with the stubborn limitations of a natural system. In 2009, seeking an end to decades of conflict over water, the Legislature established the Delta Stewardship Council with a mandate to resolve long-standing issues. The first step toward that resolution is the document you have before you, the Delta Plan.

Though more than 50 miles inland from the Golden Gate, Delta waters rise and fall with ocean tides. The Delta is in fact the upstream, mostly freshwater portion of the San Francisco Estuary, the largest estuarine system on the West Coast of the Americas, and one of California's prime natural assets. It is a major stop on the Pacific Flyway and the portal through which important fish species, including anadromous Chinook salmon, pass on their way to and from their spawning grounds in the interior.

The system of waters in which the Delta is so central has changed dramatically since California became a state. Rivers have been dammed and aqueducts built. Natural flows and fluxes have been disrupted to support cities and make the Central Valley the fruit basket and salad bowl of the nation. Approximately half of the water that historically flowed into and through the Delta is now diverted for human use, never reaching the sea. Much of this diversion occurs at points upstream, before the rivers come down to the Delta; but the last and largest draws take place in the Delta itself. On the southeast edge of the region, near Byron, two sets of mighty pumps extract water for shipment as far south as San Diego. Two-thirds of California's people and 4.5 million acres of farmland receive some part of their water from the Delta.

The Delta landscape we know is itself the result of a great transformation, from a primeval wetland complex to an archipelago of diked islands, where soils that once grew vast thickets of tules now yield bountiful corn, alfalfa, tomatoes, and many other crops. The Delta is home to about 12,000 people on farms and in small historic communities, and to about half a million in the larger cities that are

pressing into the region from the fringe. More millions come to it for boating, fishing, hunting, bird watching, even windsurfing on its 700 miles of channels. Steeped in history, combining notes of the American heartland and of Holland, the Delta looks and feels like no other place in California. This is a land that people love.

It is not doing so well.

The very shape of the modern Delta is in danger. Farming of peat-rich ground like this always leads to oxidation, the literal vanishing of soil, and thus to subsidence. Many Delta islands now lie 15 feet or more below sea level and depend on aging dikes to prevent the water in adjacent channels from pouring in. Higher river flows in winter or spring, predicted results of climate change, will add to the pressure, and a great earthquake, sooner or later, will shake the region like a paint can on a mixer. Encroaching urbanization, meanwhile, puts more people and property on dangerous ground.

After years of slow decline, the condition of the Delta's watery ecosystem, as measured especially by the population of wild salmon and other native fishes, has gone critical. The list of causes begins, but does not end, with all those water withdrawals, a kind of tax that leaves the system in a condition of chronic drought. The specific, peculiar manner in which the last large gulps of water are withdrawn adds to the ecological cost. The continual introduction of alien aquatic species from around the world is altering the web of life, often at the expense of native and other valued species. Pollution from the vast and busy watershed does its share of harm.

Today, all those who depend on or value the Delta are, in a word, afraid. Delta residents face the possibility of floods from the east when the rivers flow strongly and of salinity intrusion from the west if they flow too feebly. Fishermen, both commercial and recreational, fret about the future of salmon and other species. Water suppliers that receive water from the Delta find those supplies insecure, subject to interruption by weather vagaries, levee failures, or pumping restrictions imposed in the desperate attempt to stem the decline of fish.

> ***Steeped in history, combining notes of the American heartland and of Holland, the Delta looks and feels like no other place in California. This is a land that people love.***
>
> ***It is not doing so well.***

The Coequal Goals, the Delta Stewardship Council, and the Delta Plan

Since the middle 1980s, California has been looking for ways to secure the natural and human values of the Delta while maintaining its place in the state's water plumbing. These efforts have generally started in hope and ended in impasse. In recent years environmentalists turned to the courts, using the blunt tool of the federal Endangered Species Act to force curtailment of water exports at certain times. In reaction, water suppliers south of the Delta have complained of "regulatory drought."

In 2009 the Legislature made its latest, most determined bid to find solutions, passing the Delta Reform Act and associated bills. First and foremost, it declared that State policy toward the Delta must henceforth serve two "coequal goals":

- Providing a more reliable water supply for California, and
- Protecting, restoring, and enhancing the Delta ecosystem.

These goals, the Legislature added, must be met in a manner that:

- Protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place.

By affirming the equal status of ecosystem health and water supply reliability, the Legislature changed the terms of the conversation. It changed them further with the following pronouncement: "The policy of the state of California is to reduce reliance on the Delta in meeting California's future water supply needs." Here was recognition that, for the sake of the water system and the Delta both, a partial weaning of the one from the other is required.

The Delta Stewardship Council is the body entrusted with giving practical meaning to these directives. Publication of this Delta Plan completes its first assignment. The product of eight drafts, almost 100 public meetings, and nearly 10,000 comments, the Delta Plan pulls together in one place the steps that need to be taken to meet the coequal goals—measures that, in one way or another, could affect almost everyone in California. The Plan is to be revised every 5 years, or sooner as circumstances change.

The Delta Plan contains 87 provisions, some broad and some narrowly technical, some novel, some commonsensically familiar. What, in essence, does the Plan propose be done differently? At the risk of oversimplification, we can say that it asks California and Californians to do six large things:

- In order to improve and secure our water supply, while taking pressure off the Delta, we must use water more efficiently in cities and on farms, and develop alternative, usually local, sources.
- We must also get much better at capturing and storing the surplus water that nature provides in the wettest years, building reserves that can be drawn on in dry ones.
- To revitalize the Delta ecosystem, we must provide adequate seaward flows in Delta channels, on a schedule more closely mirroring historical rhythms: what the Plan calls natural, functional flows.
- We must also bring back generous wetlands and riparian zones in the Delta for the benefit of fish and birds.
- To preserve the Delta as a place, we must restrict new urban development to those peripheral areas already definitely earmarked for such growth, while supporting farming and recreation in the Delta's core.
- And we must floodproof the Delta, as far as feasible, mainly by improving levees and by providing more overflow zones where swollen rivers can spread without doing harm.

What about today's headline issue concerning the Delta—the proposed construction of tunnels to improve the way water destined for export southwards reaches the pump intakes near Byron? This initiative is part of what is called the Bay Delta Conservation Plan (BDCP). The BDCP is a different and more narrowly focused undertaking than the Delta Plan, into which, if certain conditions are met, it will be fused (see section, A Better System: Delta Conveyance).

The Delta Plan is *California's* plan for the Delta, prepared in consultation with, and to be carried out by, all agencies in the field: the State Water Resources Control Board, ultimate arbiter of water rights and water quality; the California Department of Water Resources, the state's water planner and also operator of the great State Water Project; the California Department of Fish and Wildlife, responsible for the welfare of the living system of the Delta; the Delta Protection Commission, which oversees land use and development on low-lying Delta islands; and many more agencies, State and local. Add to the list federal players like the Bureau of Reclamation, which runs the Central Valley Project; the U.S. Fish and Wildlife Service; the National Marine Fisheries Service; and the U.S. Army Corps of Engineers. Their cooperation has been promised, and it is vital.

The working parts of the Plan are 73 *Recommendations* and 14 *Policies*. *Recommendations* call attention to tasks being done or to be done by others. *Policies* are legal requirements that anyone undertaking a significant project in the Delta must meet. See the sidebar, From Plan to Reality, for more on the mechanics of realizing the Plan and pages ES-15 to ES-35 for a survey of all 87 provisions.

Where Is the Money?

The Legislature sees "adequate and secure funding" as a need "inherent in the coequal goals." In order to know what this entails, we need to form a clearer picture of the costs of the work now proposed for the Delta or on its behalf and how those costs might be met. This first edition of the Delta Plan proposes research toward that clarity.

FROM PLAN TO REALITY

The Legislature instructed the Delta Stewardship Council to "direct efforts across state agencies." This "direction" has three distinct aspects.

First of all, the Council is to **coordinate**. It will chair a high-powered committee dedicated to implementing the Plan. The heads of key State and local agencies will be at that table, together with federal representatives. This body will meet for the first time in fall 2013. Agency staffs will work with that of the Council daily.

Second, the Council is to **keep track of progress**. Using specific performance metrics contained in the Plan, and guided by the Delta Science Program (see sidebar, Science at the Center), it will monitor what is actually being done toward Plan goals, and what changes of course may be indicated. The results will be widely publicized.

Third, in certain key areas, the Council can be called upon to **block damaging actions**. The Plan provisions that can trigger this authority are called Policies. To avoid premature encroachment on the work of other agencies, the Legislature devised an indirect path leading to Council intervention.

Actions subject to these Policies are called "covered actions," but the Council itself cannot declare an action to be covered. It is the proposing agency that makes this determination. Legal standards apply, however, and if an action is questionably deemed not to be covered, the Council or any other party can take the agency to court.

Once an action is determined to be covered, the proposing agency must make sure it is in line with the Policies of the Delta Plan, filing a Certification of Consistency with contents specified in Delta Plan **Governance Policy 1**. If the agency says the action is consistent but another party or citizen thinks it is not, the opponent can then appeal to the Delta Stewardship Council. A Council member or the Council's Executive Officer may initiate the appeal.

SCIENCE AT THE CENTER

The Delta Reform Act mandates that the Delta Plan be based on the best available scientific knowledge of our day. It must, moreover, be open to change as knowledge changes—and as paper proposals meet the test of reality. The results of every action are to be closely tracked, so that corrections can be made in a timely way—a process, much discussed but not sufficiently practiced, known as adaptive management.

To be more than a buzzword, adaptive management must bring two things to bear: new information, and a readiness to let new information disrupt old plans. Both, in the past, have been in scant supply.

Though Delta knowledge has expanded hugely in recent years, it is often a challenge to pull that data together and draw conclusions from it. Studies are done by different agencies for specific purposes and in narrow contexts; findings can be hard to integrate. The Delta Science Program, a function of the Council, will seek to overcome these gaps, linking the whole community of scientists at work. Guided by a top-flight Delta Independent Science Board, it will prepare, by December 31, 2013, a companion to the Delta Plan called the Delta Science Plan (**Governance Recommendation 1**).

The Delta Science Plan will propose a collaborative structure for doing science in the Delta. It will suggest ways of improving communication, resolving conflicting results, and accommodating uncertainty. It will offer priorities: how to apportion attention between immediate practical questions, on the one hand, and research aimed at increasing long-term understanding, on the other. It will sketch a more integrated approach to monitoring, so that results from different settings can be compared, and consider how computer modeling of the intricate Delta system might be improved.

Once a year, the Council will bring scientists together to assess what has been learned and what changes in ongoing plans and projects the new knowledge may suggest. Another conference? Yes, but with a difference: These findings will feed directly into ongoing refinement of the Delta Plan.

First step is an inventory: How much is now actually being spent, by all the agencies involved, that can be chalked up to furthering the coequal goals? Second comes an assessment of costs: How much will it take to carry out the projects and programs described in the Delta Plan, and what might the sources of support be for each one? The third step must be a comparison of resources and needs, and a reckoning of gaps: What key elements lack probable funding, and what might be done to fill these holes? (**Funding Principles Recommendations 1 through 3**.)

Providing a More Reliable Water Supply for California...

The Delta's contribution to the overall statewide water supply is smaller than many people think. The proportion drawn directly from the Delta, mostly through the pumps near Byron, is only about 8 percent of the total. The bulk of California's water comes from more local sources, and always has.

Nevertheless, the Delta supply is important to many regions. Southern California imports about 25 percent of its water via the Byron pumps. The Tulare Lake Basin, the southern end of the Great Central Valley, gets 27 percent of its water by that route. Even the San Francisco Bay Area takes 16 percent of its supply from Delta pumps. On a more local scale, several water suppliers rely entirely on the Delta, and others have become dependent on this one overtaxed source to a risky degree.

In addition to water pulled directly from the Delta, a great deal is drawn from the Delta's tributary streams before they come down to sea level. San Francisco Bay Area cities reach far inland to tap the Tuolumne and Mokelumne Rivers in the Sierra Nevada, taking 27 percent of their water needs from these sources. Parts of the Central Valley tributary to the Delta get all of their water from that watershed by definition, as do the people and farms of the Delta itself. (See also sidebar, The Problem with Numbers.)

> ***California water planning is full of good intentions. If the laws and policies that are now on the books were consistently carried out, the state's water system—including that part that is tied to the Delta—would work much better.***

The Delta Plan addresses water supply on three scales: California-wide, on the Delta watershed level, and in the areas that receive water from the Delta pumps. (See Figure ES-1, The Delta Watershed and Areas Receiving Delta Water.)

California water planning is full of good intentions. If the laws and policies that are now on the books were consistently carried out, the state's water system—including that part that is tied to the Delta—would work much better. The Delta Plan calls on *all* water suppliers to obey the many laws and guidelines that exist, and on the State's regulatory agencies to insist on compliance (**Water Resources Recommendation 1**).

THE PROBLEM WITH NUMBERS

In talking of California water, we put trust in numbers: flows, usages, capacities, trends. But some seemingly solid and much-quoted figures are little more than guesses. By and large, we do not truly know how much water we are using or how much we are saving through conservation efforts. We know less than we should about Delta inflows and outflows. We know little about groundwater except that water tables in too many places are dropping. What information is available is often packaged in inscrutable ways. The Delta Plan asks all the agencies and water suppliers involved to provide or demand better information, and to communicate it better (**Water Resources Policy 2, WR Recommendations 16 through 19**).

Whatever the outcome of some current debates, California's next large increment of water supply will not come from major new engineering but from water conservation, recycling, local stormwater capture, and reasonable use of aquifers (see section, A Better System: Storing Floods to Ride Out Droughts). These measures can yield an amount of water larger than the total that is drawn from the Delta today. State agencies in charge of water matters should systematically promote these practices, and *all* State agencies should model them in their own water usage. (**Water Resources Recommendations 6, 8, and 14**.)

Zooming in a bit from the statewide picture, the Delta Plan calls for all water users linked to the Delta—whether they take water from it directly, or tap the watershed—to reduce their draws. The State Water Resources Control Board should give special scrutiny to water use applications that could boost demand on the watershed. Urban and agricultural water suppliers are already required to write water management plans; these now should include "water supply reliability elements," discussing, among other things, how to deal with the cascading effects if Delta pumping were halted for as long as 3 years. (**Water Resources Recommendations 3, 4, 5, and 7**.)

The Delta Watershed and Areas Receiving Delta Water

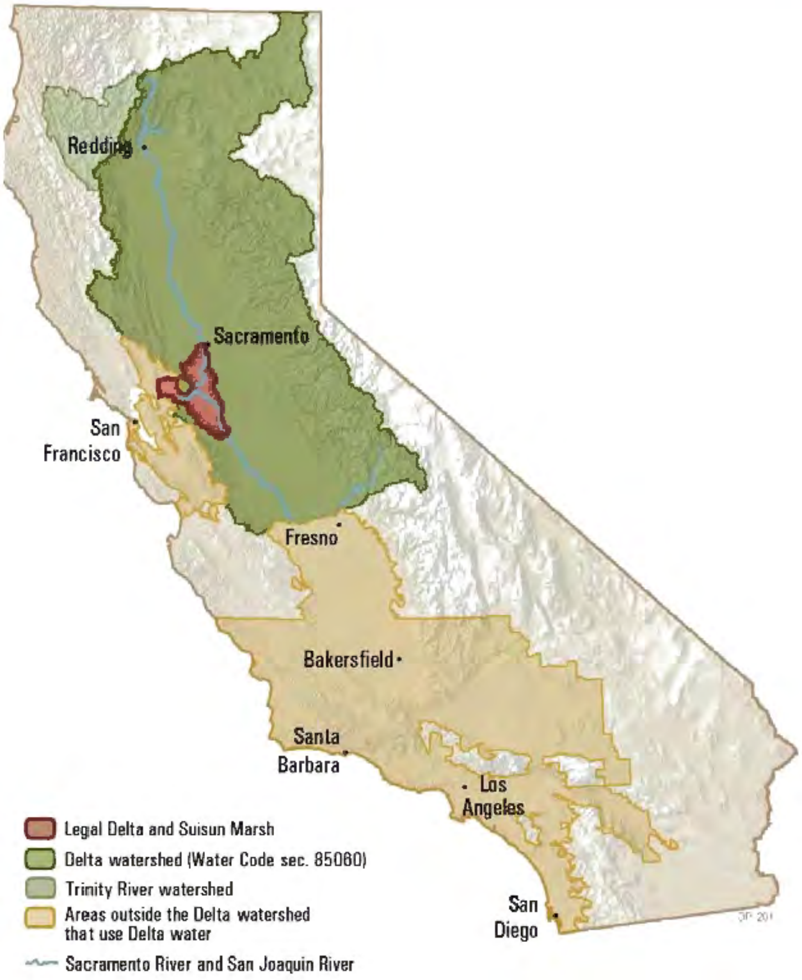
Redding
Sacramento
San Francisco
Fresno
Bakersfield
Santa Barbara
Los Angeles
San Diego
🟥 Legal Delta and Suisun Marsh
🟩 Delta watershed (Water Code sec. 85060)
🟩 Trinity River watershed
🟨 Areas outside the Delta watershed that use Delta water
〰 Sacramento River and San Joaquin River

Figure ES-1

The Plan speaks most directly to those suppliers that serve water within the Delta or pump water out of the region—including the State Water Project, the Central Valley Project, and by extension the many agricultural and urban water purveyors that are the customers of these giants. Any organization that receives water from the projects must do its share to reduce reliance on the Delta, setting specific reduction targets and actually putting measures in place. The State Water Project is called on to write the corresponding provisions into contracts with its clients when these agreements are renewed or revised (**Water Resources Policies 1 and 2, WR Recommendation 2**).

A Better System: Storing Floods to Ride Out Droughts (and Give the Delta a Break)

The measures so far mentioned will take pressure off the Delta while actually increasing California's developed water supply. The further key to both goals is to harvest and store the water that is available from Central Valley rivers in the wettest years, at the least environmental cost. The need is heightened by the fact of climate change, which stands to make rainy years all the wetter, and droughts all the more severe.

There are few opportunities left in California to build large new dams (or to raise the height of old dams), and the options that exist are dauntingly expensive. The California Department of Water Resources and the Bureau of Reclamation have been studying the possibilities. The Delta Plan urges the agencies to wrap up these studies, so that the State can decide the fate of these proposals once and for all (**Water Resources Recommendations 13 and 14**).

Much more water storage space exists right under our feet: in groundwater basins, or aquifers.

California began its history with a vast supply of water stored naturally in underground gravel fields and free for the taking via wells. In parts of the state, including most of the southern Central Valley, this endowment has been squandered, and groundwater levels have dropped, sometimes by hundreds of feet. One of the rationales for sending water south from the Delta has been to recharge aquifers, but not enough recharging has occurred. And the State's last comprehensive assessment of its groundwater situation was published in 1980—a third of a century ago.

The Delta Plan calls for a rededication to the conservative idea of using aquifers like bank accounts: to be filled up in wet times, in order that they may be drawn from in dry. It calls on the State to do the indispensable groundwater update, on local suppliers to write plans for sustainable groundwater management, and on the State Water Resources Control Board to stand ready to intervene in seriously overdrafted areas, if good local plans are not forthcoming, leading perhaps to the court procedure called groundwater adjudication. (**Water Resources Recommendations 9, 10, 11, and 14**.)

The Delta Plan calls for a rededication to the conservative idea of using aquifers like bank accounts: to be filled up in wet times, in order that they may be drawn from in dry.

There is another tool for making the supply stretch further: the sale or trade of water between suppliers, especially in times of shortage. Existing rules governing such transfers are found cumbersome by some and insufficiently protective of water rights and the environment by others. The State Water Resources Control Board should reformulate the guidelines by mid-2016 (**Water Resources Recommendations 14 and 15**).

A Better System: Delta Conveyance

As noted, many of the state's water suppliers take their water from rivers at points upstream of the Delta. The two biggest, however—the State Water Project and the Central Valley Project—are different. Though most of the water they transport has its origin to the north, in the Sacramento River, their withdrawal points are deep in the Delta and well to the south, on the channel called Old River. Unlike most other water withdrawals, these affect the region not only by removing water but also by distorting flows.

The pumps at Byron have so much power that they essentially give the Delta a second mouth. In many channels, water runs backward at times, toward the pump intakes, not toward the sea. This situation is bad for salmon, Delta smelt, and other sensitive and legally protected species. Under the Bay Delta Conservation Plan, the Department of Water Resources and the federal Bureau of Reclamation are planning a kind of arterial bypass, segregating the water meant for the pumps at a new northern intake on the Sacramento River. The water corralled at this point would be sent to the pumps via a pair of tunnels. This arrangement is intended to alleviate the backward flows that harm fish; in conjunction with major habitat improvements and other measures, it is supposed to bring endangered species far enough back from the brink to satisfy protective laws. Many Delta residents and environmentalists, though, fear that the new system will simply allow more water to be shipped south, doing, on balance, more harm than good.

The Delta Stewardship Council is not the author of the BDCP. Its role for now is to advise and to urge timely completion (**Water Resources Recommendation 12**). Later on, though, the Council may have a decisive say. Once the proposal is complete, the Department of Fish and Wildlife must declare that it meets the standards of the Delta Reform Act, and this declaration can in turn be appealed to the Council. If the Council does not concur, certain aspects of the BDCP will lose access to State funding. If all hurdles have been cleared, on the other hand, the BDCP will take its place as a component of the Delta Plan.

...and Protecting, Restoring, and Enhancing the Delta Ecosystem...

The effort to improve the fortunes of the Delta ecosystem has two components that are vital: guaranteeing adequate flows from the rivers feeding into and through Delta channels, and creating new wetlands and other habitats in partial replacement for what has been lost. Three other components are merely very important: combating harmful exotic species, improving the management of salmon hatcheries, and protecting and improving water quality.

Toward "Natural Functional Flows"

Humans have not only reduced the total quantity of runoff through the Delta toward the ocean but also have changed its timing, decreasing the historical torrents of spring and increasing the formerly feeble flows of autumn. In a natural system that evolved with wide variation, this shift toward a steady state is itself a source of harm.

Humans have not only reduced the total quantity of runoff through the Delta toward the ocean but also have changed its timing, decreasing the historical torrents of spring and increasing the formerly feeble flows of autumn.

The minimum seaward flows to be maintained in Delta channels are set by the State Water Resources Control Board, according to season and year type (wet, above normal, below normal, dry, or critical). These required flows help fish; they also prevent saltwater intrusion. As a not-incidental side effect, the rules limit the amount of water that can be exported through the pumps.

The Water Board is now preparing to revise this flow regime, last updated in 2006. As a later step, the Water Board is to issue comparable flow standards for the major tributary rivers of the Delta. The Delta Plan recommends deadlines for these processes (mid-2014 and mid-2018). The adopted regulations will become elements of the Plan. The Delta Stewardship Council can be called upon to review any project that could affect Delta flows in the light of adopted flow criteria (**Ecosystem Restoration Policy 1, ER Recommendation 1**).

Habitat Restoration

In its primeval state, the Delta was no uniform sea of reeds but a vast mesh of habitats including tule marsh threaded with rivers and sloughs, perched lakes filled by floods and very high tides, natural levees with big trees on them, and seasonal overflow basins behind the levees. Most of this mosaic has disappeared, converted to fifty large and many small leveed islands. Evidence of what was remains in agricultural soils of uncommon quality (and fragility).

The old scene will never return, but careful habitat restoration projects can help to reverse the region's ecological decline. Biologists have spent years locating the likeliest areas for such revival. The Delta Plan incorporates the latest thinking, essentially the Conservation Strategy drafted in 2011 by the Department of Fish and Wildlife (formerly the Department of Fish and Game).

Since the heart of the Delta is now well below sea level, due to subsidence, the suitable restoration sites are mostly found near Delta margins, where the soil surface is still high enough to permit marsh plants and riparian vegetation to take root. The Plan outlines six such zones: the Yolo Bypass, the floodplain west of Sacramento into which the Sacramento River spills in wet years; the Cache Slough Complex, where the Bypass rejoins the body of the Delta; a nexus in the eastern Delta, where the Mokelumne River and the Cosumnes River add their strands to the Delta's web; a zone in the southern Delta along the San Joaquin River; a collection of small tracts at the western apex of the Delta, where it narrows to meet Suisun Bay; and finally the Suisun Marsh, fringing that bay to the north. This fresh-to-brackish water marsh, the largest wetland in California, is mostly managed by hunting clubs for seasonal waterfowl ponds, but sizeable areas should be restored to full tidal action. The existing plan for Suisun Marsh, written by the San Francisco Bay Conservation and Development Commission, is 36 years old and does not take into account, for example, probable sea level rise.

The Delta Plan calls for the habitat restorations in the Conservation Strategy to be carried out by the Department of Fish and Wildlife and by the Delta Conservancy, a body established for such purposes in 2009; and it calls for a plan update for Suisun Marsh. The Delta Stewardship Council can be appealed to, if necessary, to block development or any other intrusion that might interfere with a restoration site. (**Ecosystem Restoration Policies 2 and 3, ER Recommendations 2, 3, and 5**.)

Much of the remaining good habitat in the Delta is found in strips along the water side of levees, and the Delta Plan looks to protect and widen these green margins. When levees are rebuilt or altered, the possibility of shifting them farther away from the water should always be explored. The growth of trees along the waterline should be encouraged. However, authority over many levees lies with the U.S. Army Corps of Engineers, and the Corps requires removal of trees and shrubs, on the theory that root systems have a weakening effect. (The matter is debated.) Given the value of tall vegetation for habitat, the Delta Plan asks the Corps to exempt Delta levees from this rule, where appropriate. (**Ecosystem Restoration Policy 4 and ER Recommendation 4**.)

Exotic Species

One of the less-visible forces to buffet the Delta ecosystem is the proliferation of nonnative aquatic species—fish, crustaceans, plants, and even the microscopic floating animals of zooplankton. Some were introduced deliberately; others arrived by random routes including the discharge of bilgewater from oceangoing ships and the dumping of goldfish bowls.

New arrivals keep appearing. Some of these intruders affect the system little, but other species, notably certain aquatic plants and filter-feeding clams, transform the web of life profoundly. The Delta Plan prohibits actions that could bring in new exotics or improve conditions for exotics that are here, and endorses the measures the Department of Fish and Wildlife is already planning to take against them. (**Ecosystem Restoration Policy 5, ER Recommendation 7**.)

Among the exotics are game species introduced in the nineteenth century and well-loved by fishermen: striped, largemouth, and smallmouth bass. It has become apparent that these voracious game fish are helping to deplete salmon, Delta smelt, and other species in trouble. The Delta Plan asks the Department of Fish and Wildlife to change angling rules to permit heavier fishing and somewhat suppress the bass population (**Ecosystem Restoration Recommendation 6**).

Management of Hatchery Fish

When dams on many rivers cut off spawning grounds for salmon and steelhead trout, hatcheries were built to compensate. Now there is worry that hatchery-raised salmon, less genetically diverse than their wild cousins, may mix with and reduce the fitness of the wild strains. Various solutions are proposed, including capturing wild fish to add their eggs to hatchery stock. The Delta Plan asks the Department of Fish and Wildlife and the U.S. Fish and Wildlife Service to put these ideas and recommendations into effect (**Ecosystem Restoration Recommendations 8 and 9**).

Water Quality

Pollution from the watershed is bad for the Delta ecosystem and for water users. The Delta Plan urges the responsible agencies—the State Water Resources Control Board, the Central Valley Regional Water Quality Control Board, and the San Francisco Bay Regional Water Quality Control Board—to protect "beneficial uses" of water in the Delta and Suisun Bay. Various ongoing projects of planning, rulemaking, and construction should be brought to conclusion. All agencies should look at water quality when weighing actions covered under the Delta Plan. Special attention should be paid to pollution that might degrade habitat restoration sites. (**Water Quality Recommendations 1 through 12**.)

...In a Way that Protects and Enhances the Values of the Delta as an Evolving Place

Because of its role in greater systems—the San Francisco Estuary, the state water plumbing—the Delta is a subject of statewide debate. The conversation can seem to take place over the heads of the people who actually live in the region; and it can seem to overlook the lasting values of the place that is: its thriving agriculture, the beauty of its countryside, its cultural heritage, and its recreational bounty. The Delta Plan strives to redress this balance without promising what is probably impossible: the retention of the landscape exactly as it is today.

Honorific labels do not protect valuable assets, but they can help us recognize them. The Delta Plan asks that the Delta be declared a National Heritage Area by Congress and that Highway 160, its north-south artery, be designated a National Scenic Byway by the U.S. Department of Transportation (**Delta-as-Place Recommendations 1 and 2**).

Many Delta people fear that their concerns will be brushed aside as new water facilities and habitat restorations get under way. While deference cannot be guaranteed, the Delta Plan calls on the agencies to respect local plans in siting such projects, to minimize conflict when possible, and to buy land from willing sellers when they can (**Delta-as-Place Policy 2, DP Recommendation 4**).

The distinctive Delta landscape has been much altered by urban encroachment, often entailing higher flood risk. The Delta Protection Commission, created in 1992 and strengthened by the Delta Reform Act of 2009, oversees development in the core area called the Primary Zone: Local decisions affecting this zone can be appealed to the Commission and overturned by it. However, this authority does not extend to the peripheral Secondary Zone, where the development pressure is strongest. The Delta Plan tightens control further, steering new development to the 26,000 acres in the Peripheral Zone that are already earmarked for urbanization in local plans. Small housing developments that may occur outside these limits must meet high flood control standards (**Delta-as-Place Policy 1, Risk Reduction Policy 2**). (See Figure ES-2, Delta Communities.)

A little more bustle might actually benefit 11 historic small towns or settlements within the Delta, known as the legacy communities. Most are spaced along the Sacramento River: Freeport, Clarksburg, Hood, Courtland, Locke, Walnut Grove, Ryde, Isleton, and Rio Vista. Knightsen and Bethel Island are near the lower channel of the San Joaquin River. Planners at all levels should respect the character, and promote the vitality, of these places (**Delta-as-Place Recommendation 3**).

The Delta Protection Commission has written an Economic Sustainability Plan containing numerous ideas for the support of the region's farm economy, parks and recreation, and roads and infrastructure. The Delta Plan adapts many of these as **Delta-as-Place Recommendations 5 through 19**.

Flood Risk Reduction

In its primeval state, most of the Delta was wetland and slightly above sea level. Since levees created the modern islands and cultivation began, soils have subsided deeply. Many Delta tracts are strikingly below the level of the water in adjacent channels; rising sea level will make the differential worse. While the occasional levee break is part of Delta lore, multiple failures could bring disaster to the Delta landscape, economy, and ecosystem.

The Delta Plan urges all agencies in the Delta to plan for emergencies and to join forces in a regional response consortium, as proposed by the Delta Multi-Hazard Coordination Task Force. Every responsible party, public and private, should allocate money for flood prevention and reaction. Utilities should plan to minimize interruptions of service. The Department of Water Resources should expand its stockpiles of stone and earth for the use of all when breaches require rapid plugging. Higher levels of private flood insurance should be required, and the State should gain immunity from lawsuits related to flooding beyond its power to prevent. (**Risk Reduction Recommendations 1, 9, and 10**.)

> ***It is estimated that only about half the Delta's acreage is adequately protected. There is not enough money for all the desirable improvements, nor is there a mechanism for sharing costs among all who benefit.***

Delta Communities

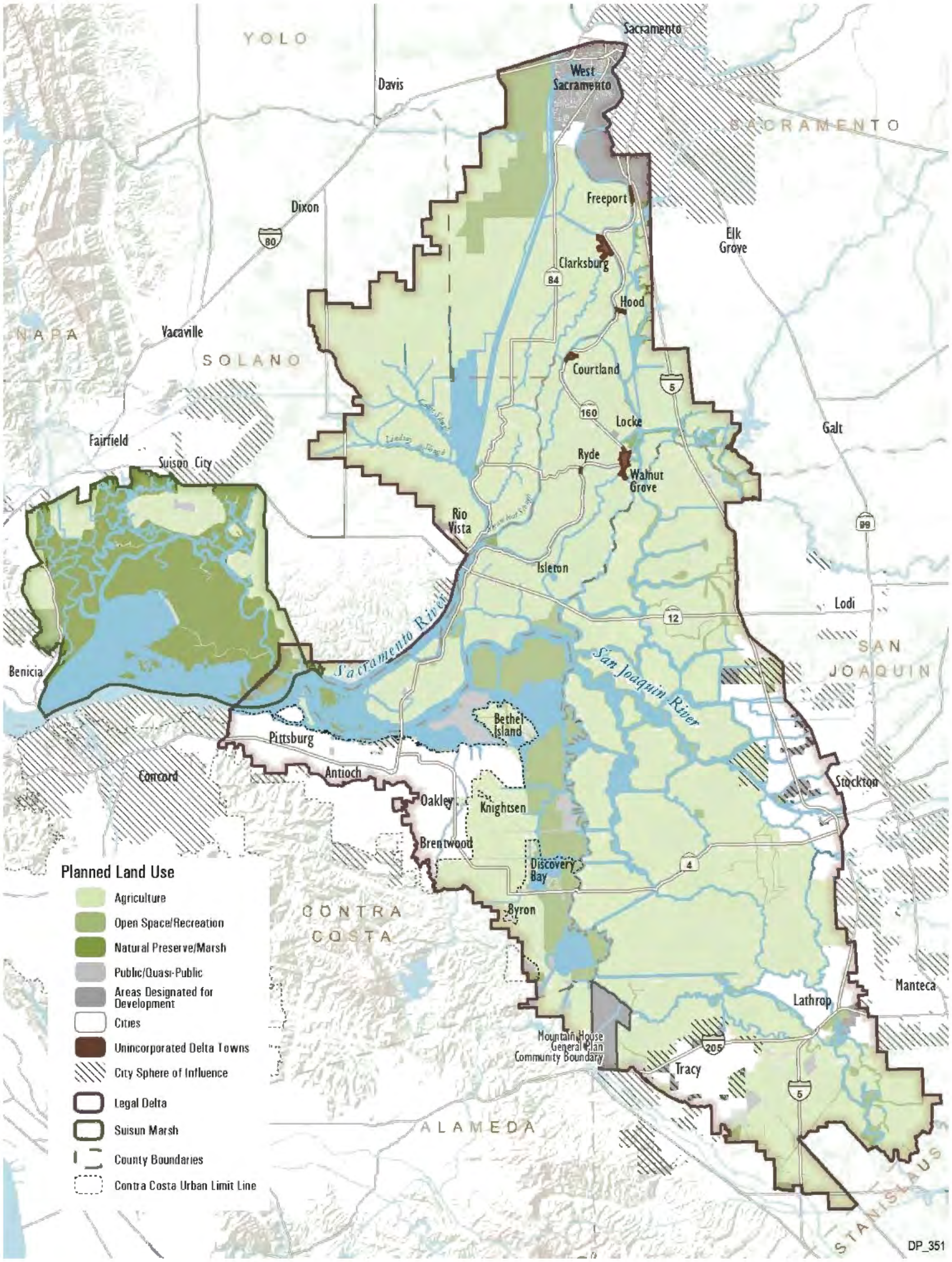

Figure ES-2 *Sources: City of Benicia 2003, Contra Costa County 2008, Contra Costa County 2010, City of Fairfield 2008, City of Lathrop 2012, City of Manteca 2012, Mountain House Community Services District 2008, City of Rio Vista 2001, SACOG 2009, City of Sacramento 2008, Sacramento County 2011, Sacramento County 2012, Sacramento County 2013, San Joaquin County 2008a, San Joaquin County 2008b, Solano County 2008a, Solano County 2008b, City of Stockton 2011a, City of Stockton 2011b, City of Suisun City 2011, City of Tracy 2011a, City of Tracy 2011b, City of West Sacramento 2010, Yolo County 2010a, Yolo County 2010b.*

There are more than 1,000 miles of Delta levees. The State is directly responsible for about one-third of the system; nearly 70 local Reclamation Districts are in charge of the rest. It is estimated that only about half the Delta's acreage is adequately protected. There is not enough money for all the desirable improvements, nor is there a mechanism for sharing costs among all who benefit. The Delta Plan calls on the Legislature to establish a locally based Delta Flood Risk Management Assessment District to raise money for combined defenses. Public and private utilities, too, should invest in defense of their facilities and lines. (**Risk Reduction Recommendations 2 and 3**.)

The State contributes massively to levee costs throughout the Delta, but on a not very systematic basis. The Legislature directed the Delta Stewardship Council to set priorities for these investments. **Risk Reduction Policy 1** offers broad principles. Urban areas come first; special attention must be paid to levees guarding roads and energy facilities. The channels through which water flows toward export pumps require protection, as does the pipeline that brings Sierra water across the Delta for the East Bay Municipal Utility District. Levees on the western islands, whose failure could bring salinity deep into the Delta, are also of high concern.

A more detailed study is to follow. Building on work being done by the Department of Water Resources, the Council will assess, island by island, the state of levees, the degree of subsidence, the extent and value of assets to be protected, and the cost of long-term defense. The result, due at the end of 2014, will be a tiered priority list for the expenditure of State levee funds (**Risk Reduction Recommendation 4**).

To take pressure off the levee system, floodwaters need room to move and to spread without causing harm (and often to the benefit of plants, birds, and fish). Two such safety valves already exist at the Yolo Bypass and the Cosumnes-Mokelumne floodplain; a third such zone is proposed for the lower San Joaquin River at Paradise Cut. The Delta Plan urges expansion of the flood relief system, and requires that present or potential overflow areas be kept free of encroachments. Levee setbacks are also encouraged. (**Risk Reduction Policies 3 and 4, RR Recommendations 5 through 8**.)

Given time, land subsidence can actually be reversed. Experimental plots show that soils can be deepened by growing tules in shallowly flooded fields, at a rate of a little over an inch a year. The tule plots also fix a lot of atmospheric carbon and thus do their bit toward slowing climate change. The Delta Plan encourages expansion of this work (**Delta-as-Place Recommendation 7**).

Finding the Way Through

When the first Spanish explorers took their boats into the Sacramento-San Joaquin River Delta, they were feeling their way. They could see the channel they were in, as far as the next bend or junction of sloughs. They had a general idea of where they were going. Between the near and the far, though, were mysteries. Which waterways connected to others, which petered out in the marshes? Where was the real way through?

> ***Tangible marks of progress may at first be as subtle as shifting shoreline features seen from a Delta boat.***

This first edition of the Delta Plan is a little like such an exploration. A short reach of channel is visible; another stretch can be assessed from local information. After that, the route is a matter of educated guesswork.

The Delta Plan can be fairly specific about steps to be taken in the next 5 years. The Delta Science Plan is already under way. The in-depth study of levees will begin by fall 2013. The Interagency Implementation Committee will meet by the end of the year. Just around the next bend, the State Water Resources Control Board will adopt its momentous new flow rules; a final decision on Delta conveyance (the Bay Delta Conservation Plan) looms beyond that.

It will not have escaped the reader how many of these measures seem rather abstract, involving studies, rule-making, the gathering of information, the refining of procedures, the testing of powers—not so much doing as planning, and even planning how to plan. This is simply the phase we are in. Tangible marks of progress may at first be as subtle as shifting shoreline features seen from a Delta boat. Here, though, are some markers to look for. We will be doing well if, in a few years' time:

- Many urban and rural water suppliers that draw on the Delta have taken real steps to reduce that reliance, with measured, reported results.
- Flows in Delta channels, controlled under new State Water Resources Control Board rules, are looking a good deal more like the historical ones.
- Several new habitat restoration projects in the Delta have moved from the planning to the construction stage.
- Subsidence reversal planting has expanded from the small pilot projects seen today.
- Measurably less acreage of Delta waters is dominated by nonnative water plants.
- Stocks of endangered fish are showing a rebound.
- Key levees have been strengthened, especially in the environs of Stockton and Sacramento.
- No further rural farmland has been lost to urbanization.

The next edition of the Delta Plan, due in 2018 or sooner, will be a little longer on specifics and a little shorter on question marks. A few more miles of the channel ahead will have come into view. New uncertainties, no doubt, will have replaced old. The captains will continue to disagree. But, just as it was in the old days, the route through the Delta will be the one way forward.

Beyond all local debates and confusions, the destination is clear. We want a Delta landscape that remains essentially itself while adapting gradually and gracefully to a future marked by climate change and sea level rise. We want a Delta ecosystem that works markedly better than today's, reflected partly in a resurgence of native fish. And we want an end to the endless wrangling about Delta flows and plumbing—a truce that can only be achieved if the entire California water system undergoes a measure of reform.

> ***In solving the "Delta problem," we will not only be doing right by a treasured land- and waterscape. We will be putting the entire state of California on a sounder development path.***

Driven by cost, environmental concern, and sheer practicality, the water world is already shifting away from reliance on distant dams and aqueducts and toward trust in conservation, local sources, and better use of groundwater storage. This change is reflected in the fact, startling to many, that California's total water consumption has not climbed in recent years; in fact, despite our increasing population, use has slightly dropped. The Delta Plan gives a push to trends already under way.

In solving the "Delta problem," we will not only be doing right by a treasured land- and waterscape. We will be putting the entire state of California on a sounder development path.

References

California Department of Fish and Game. 2011. *Conservation Strategy for Restoration of the Sacramento-San Joaquin Delta Ecological Management Zone and the Sacramento and San Joaquin Valley Regions*. Draft. July.

City of Benicia. 2003. General Plan land use designations within Suisun Marsh. Digitized into GIS format by AECOM from City of Benicia Land Use map in 2012.

City of Fairfield. 2008. General Plan land use designations within Suisun Marsh. Received from the City of Fairfield in 2012.

City of Lathrop. 2012. General Plan Land Use map for the City of Lathrop. October. Site accessed March 14, 2013. http://www.ci.lathrop.ca.us/cdd/documents/.

City of Manteca. 2012. General Plan land use designations in GIS format. Received by Eryn Pimentel, AECOM, from Jeffrey Davis, City of Manteca, on September 4.

City of Rio Vista. 2001. General Plan land use designations in electronic non-GIS format. Site accessed 2009. http://www.riovistacity.com/images/Documents/chapter_04.pdf.

City of Sacramento. 2008. General Plan land use designations in electronic GIS format. Site accessed 2009. http://www.cityofsacramento.org/gis/data.html.

City of Stockton. 2011a. GIS layers for city spheres of influence and General Plan land use designations. Site accessed April 14, 2011. http://www.stocktongov.com/services/gis/mapdatDat.html.

City of Stockton. 2011b. General Plan land use designations in GIS format and General Plan land use designations within Suisun Marsh (digitized into GIS format by AECOM from Land Use map in 2012). Site accessed April 14, 2011. http://www.stocktongov.com/services/gis/mapdatDat.html.

City of Suisun City. 2011. General Plan land use designations within Suisun Marsh. Digitized into GIS format by AECOM from Land Use map in 2012.

City of Tracy. 2011a. General Plan land use designations provided in GIS format. Delivered via file transfer protocol from Victoria Lombardo, Senior Planner, City of Tracy, to Jessica Law, Urban and Environmental Planner, AECOM, on March 10, 2011.

City of Tracy. 2011b. City of Tracy. 2011. City of Tracy Sphere of Influence provided in GIS format. Delivered via file transfer protocol from Victoria Lombardo, Senior Planner, City of Tracy, to Jessica Law, Urban and Environmental Planner, AECOM, on March 10, 2011.

City of West Sacramento. 2010. General Plan land use designations in GIS format. Site accessed December 28, 2010. http://www.cityofwestsacramento.org/services/gis/downloads.cfm.

Contra Costa County. 2008. GIS layer for Urban Limit Line for Contra Costa County. October. Site accessed June 27, 2011. http://ccmap.us/Details/asp?Product=134490.

Contra Costa County. 2010. GIS layer for City Spheres of Influence in Contra Costa County. January. Site accessed January 28, 2011. https://www.ccmap.us/catalog.asp?UserChoice=2&Layercntrl=0000000000000000000000.

Mountain House Community Services District. 2008. Mountain House Zoning map. September 18, 2008. Site accessed July 27, 2011. http://www.ci.mountainhouse.ca.us/master-plan.asp.

SACOG (Sacramento Area Council of Governments). 2009. GIS layer for Spheres of Influence in SACOG region. December. Site accessed January 28, 2011. http://sacog.org/mapping/clearinghouse/Mapping Center.

Sacramento County. 2011. General Plan land use designations in GIS format. Site accessed 2012. http://www.sacgis.org/GISDataPub/Data/.

Sacramento County. 2012. Letter from Sacramento County to the Delta Stewardship Council, Re: Revised Maps of the Unincorporated Delta Communities. November 20.

Sacramento County. 2013. Sacramento County Online Map, Sacramento County, California. Site accessed March 10, 2013. http://generalmap.gis.saccounty.net/JSViewer/county_portal.aspx

San Joaquin County. 2008a. City of Lathrop SOI map. March 4. Site accessed February 3, 2011. http://www.sjgov.org/lafco/SOI%20Maps/Lathrop_Sphere_new%202008.pdf.

San Joaquin County. 2008b. City of Manteca SOI map. October 29. Site accessed February 3, 2011. http://www.co.san-joaquin.ca.us/lafco/Manteca%20MSR/Manteca_Sphere.pdf.

Solano County. 2008a. GIS layer for City Spheres of Influence in Solano County. May. Site accessed August 10, 2011. http://regis.solanocounty.com/data.html.

Solano County. 2008b. General Plan land use designations provided in GIS format. Obtained 2009.

Yolo County. 2010a. General Plan land use designations in GIS format. Site accessed 2010. http://www.yolocounty.org/Index.aspx?page=823.

Yolo County. 2010b. Yolo County General Plan 2030 layer provided in GIS format. Delivered via file transfer protocol from Marcus Neuvert, GIS Specialist, Yolo County DITT, to Dillon Cowan, Staff Engineer, CH2M HILL, Inc., on July 1.

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Chapter divider *(clockwise from top left)***:** California Department of Water Resources, Chris Austin, L.A. Yarbrough, California Department of Water Resources

Delta Plan Policies and Recommendations

The Delta Plan contains a set of regulatory policies that will be enforced by the Delta Stewardship Council's appellate authority and oversight. The Delta Plan also contains priority recommendations, which are nonregulatory but call out actions essential to achieving the coequal goals.

POLICY OR RECOMMENDATION NUMBER	SHORT TITLE	POLICY/RECOMMENDATION LANGUAGE
Chapter 2		
G P1 (23 CCR section 5002)	Detailed Findings to Establish Consistency with the Delta Plan	*(a) This policy specifies what must be addressed in a certification of consistency filed by a State or local public agency with regard to a covered action. This policy only applies after a "proposed action" has been determined by a State or local public agency to be a covered action because it is covered by one or more of the regulatory policies contained in Article 3. Inconsistency with this policy may be the basis for an appeal.* *(b) Certifications of consistency must include detailed findings that address each of the following requirements:* *(1) Covered actions, in order to be consistent with the Delta Plan, must be consistent with this regulatory policy and with each of the regulatory policies contained in Article 3 implicated by the covered action. The Delta Stewardship Council acknowledges that in some cases, based upon the nature of the covered action, full consistency with all relevant regulatory policies may not be feasible. In those cases, the agency that files the certification of consistency may nevertheless determine that the covered action is consistent with the Delta Plan because, on whole, that action is consistent with the coequal goals. That determination must include a clear identification of areas where consistency with relevant regulatory policies is not feasible, an explanation of the reasons why it is not feasible, and an explanation of how the covered action nevertheless, on whole, is consistent with the coequal goals. That determination is subject to review by the Delta Stewardship Council on appeal;* *(2) Covered actions not exempt from CEQA must include applicable feasible mitigation measures identified in the Delta Plan's Program EIR (unless the measure(s) are within the exclusive jurisdiction of an agency other than the agency that files the certification of consistency), or substitute mitigation measures that the agency that files the certification of consistency finds are equally or more effective;* *(3) As relevant to the purpose and nature of the project, all covered actions must document use of best available science;* *(4) Ecosystem restoration and water management covered actions must include adequate provisions, appropriate to the scope of the covered action, to assure continued implementation of adaptive management. This requirement shall be satisfied through both of the following:* *(A) An adaptive management plan that describes the approach to be taken consistent with the adaptive management framework in Appendix 1B, and* *(B) Documentation of access to adequate resources and delineated authority by the entity responsible for the implementation of the proposed adaptive management process.*

POLICY OR RECOMMENDATION NUMBER	SHORT TITLE	POLICY/RECOMMENDATION LANGUAGE
		(c) A conservation measure proposed to be implemented pursuant to a natural community conservation plan or a habitat conservation plan that was: *(1) Developed by a local government in the Delta; and* *(2) Approved and permitted by the California Department of Fish and Wildlife prior to May 16, 2013* *is deemed to be consistent with sections 5005 through 5009 of this Chapter if the certification of consistency filed with regard to the conservation measure includes a statement confirming the nature of the conservation measure from the California Department of Fish and Wildlife.*
G R1	Development of a Delta Science Plan	*The Delta Stewardship Council's Delta Science Program should develop a Delta Science Plan by December 31, 2013. The Delta Science Program should work with the Interagency Ecological Program, Bay Delta Conservation Plan, California Department of Fish and Wildlife, and other agencies to develop the Delta Science Plan. To ensure that best science is used to develop the Delta Science Plan, the Delta Independent Science Board should review the draft Delta Science Plan.* *The Delta Science Plan should address the following:* ▪ *A collaborative institutional and organizational structure for conducting science in the Delta* ▪ *Data management, synthesis, scientific exchange, and communication strategies to support adaptive management and improve the accessibility of information* ▪ *Strategies for addressing uncertainty and conflicting scientific information* ▪ *The prioritization of research and balancing of the short-term immediate science needs with science that enhances comprehensive understanding of the Delta system over the long term* ▪ *Identification of existing and future needs for refining and developing numerical and simulation models along with enhancing existing Delta conceptual models (e.g., the Interagency Ecological Program (IEP) Pelagic Organism Decline (POD) and the Delta Regional Ecosystem Restoration Implementation Plan (DRERIP) models)* ▪ *An integrated approach for monitoring that incorporates existing and future monitoring efforts* ▪ *An assessment of financial needs and funding sources to support science*
Chapter 3		
WR P1 (23 CCR section 5003)	Reduce Reliance on the Delta through Improved Regional Water Self-Reliance	*(a) Water shall not be exported from, transferred through, or used in the Delta if all of the following apply:* *(1) One or more water suppliers that would receive water as a result of the export, transfer, or use have failed to adequately contribute to reduced reliance on the Delta and improved regional self-reliance consistent with all of the requirements listed in paragraph (1) of subsection (c);* *(2) That failure has significantly caused the need for the export, transfer, or use; and* *(3) The export, transfer, or use would have a significant adverse environmental impact in the Delta.*

POLICY OR RECOMMENDATION NUMBER	SHORT TITLE	POLICY/RECOMMENDATION LANGUAGE
		(b) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers a proposed action to export water from, transfer water through, or use water in the Delta, but does not cover any such action unless one or more water suppliers would receive water as a result of the proposed action. *(c) (1) Water suppliers that have done all of the following are contributing to reduced reliance on the Delta and improved regional self-reliance and are therefore consistent with this policy:* *(A) Completed a current Urban or Agricultural Water Management Plan (Plan) which has been reviewed by the California Department of Water Resources for compliance with the applicable requirements of Water Code Division 6, Parts 2.55, 2.6, and 2.8;* *(B) Identified, evaluated, and commenced implementation, consistent with the implementation schedule set forth in the Plan, of all programs and projects included in the Plan that are locally cost effective and technically feasible which reduce reliance on the Delta; and* *(C) Included in the Plan, commencing in 2015, the expected outcome for measurable reduction in Delta reliance and improvement in regional self-reliance. The expected outcome for measurable reduction in Delta reliance and improvement in regional self-reliance shall be reported in the Plan as the reduction in the amount of water used, or in the percentage of water used, from the Delta watershed. For the purposes of reporting, water efficiency is considered a new source of water supply, consistent with Water Code section 1011(a).* *(2) Programs and projects that reduce reliance could include, but are not limited to, improvements in water use efficiency, water recycling, stormwater capture and use, advanced water technologies, conjunctive use projects, local and regional water supply and storage projects, and improved regional coordination of local and regional water supply efforts.*
WR R1	Implement Water Efficiency and Water Management Planning Laws	*All water suppliers should fully implement applicable water efficiency and water management laws, including urban water management plans (Water Code section 10610 et seq.); the 20 percent reduction in statewide urban per capita water usage by 2020 (Water Code section 10608 et seq.); agricultural water management plans (Water Code section 10608 et seq. and 10800 et seq.); and other applicable water laws, regulations, or rules.*
WR R2	Require SWP Contractors to Implement Water Efficiency and Water Management Laws	*The California Department of Water Resources should include a provision in all State Water Project contracts, contract amendments, contract renewals, and water transfer agreements that requires the implementation of all State water efficiency and water management laws, goals, and regulations, including compliance with Water Code section 85021.*
WR R3	Compliance with Reasonable and Beneficial Use	*The State Water Resources Control Board should evaluate all applications and petitions for a new water right or a new or changed point of diversion, place of use, or purpose of use that would result in new or increased long-term average use of water from the Delta watershed for consistency with the constitutional principle of reasonable and beneficial use. The State Water Resources Control Board should conduct its evaluation consistent with Water Code sections 85021, 85023, 85031, and other provisions of California law. An applicant or*

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		petitioner should submit to the State Water Resources Control Board sufficient information to support findings of consistency, including, as applicable, its urban water management plan, agricultural water management plan, and environmental documents prepared pursuant to the California Environmental Quality Act.
WR R4	Expanded Water Supply Reliability Element	*Water suppliers that receive water from the Delta watershed should include an expanded water supply reliability element, starting in 2015, as part of the update of an urban water management plan, agricultural water management plan, integrated water management plan, or other plan that provides equivalent information about the supplier's planned investments in water conservation and water supply development. The expanded water supply reliability element should detail how water suppliers are reducing reliance on the Delta and improving regional self-reliance consistent with Water Code section 85201 through investments in local and regional programs and projects, and should document the expected outcome for a measurable reduction in reliance on the Delta and improvement in regional self-reliance. At a minimum, these plans should include a plan for possible interruption of water supplies for up to 36 months due to catastrophic events impacting the Delta, evaluation of the regional water balance, a climate change vulnerability assessment, and an evaluation of the extent to which the supplier's rate structure promotes and sustains efficient water use.*
WR R5	Develop Water Supply Reliability Element Guidelines	*The California Department of Water Resources, in consultation with the Delta Stewardship Council, the State Water Resources Control Board, and others, should develop and approve, by December 31, 2014, guidelines for the preparation of a water supply reliability element so that water suppliers can begin implementation of WR R4 by 2015.*
WR R6	Update Water Efficiency Goals	*The California Department of Water Resources and the State Water Resources Control Board should establish an advisory group with other State agencies and stakeholders to identify and implement measures to reduce impediments to achievement of statewide water conservation, recycled water, and stormwater goals by 2014. This group should evaluate and recommend updated goals for additional water efficiency and water resource development by 2018. Issues such as water distribution system leakage should be addressed. Evaluation should include an assessment of how regions are achieving their proportional share of these goals.*
WR R7	Revise State Grant and Loan Priorities	*The California Department of Water Resources, the State Water Resources Control Board, the California Department of Public Health, and other agencies, in consultation with the Delta Stewardship Council, should revise State grant and loan ranking criteria by December 31, 2013, to be consistent with Water Code section 85021 and to provide a priority for water suppliers that includes an expanded water supply reliability element in their adopted urban water management plans, agricultural water management plans, and/or integrated regional water management plans.*
WR R8	Demonstrate State Leadership	*All State agencies should take a leadership role in designing new and retrofitted State-owned and -leased facilities, including buildings and California Department of Transportation facilities, to increase water efficiency, use recycled water, and incorporate stormwater runoff capture and low-impact development strategies.*

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WR R9	Update Bulletin 118, California's Groundwater Plan	*The California Department of Water Resources, in consultation with the Bureau of Reclamation, U.S. Geological Survey, the State Water Resources Control Board, and other agencies and stakeholders should update Bulletin 118 information using field data, California Statewide Groundwater Elevation Monitoring (CASGEM), groundwater agency reports, satellite imagery, and other best available science by December 31, 2014, so that this information can be included in the next California Water Plan Update and be available for inclusion in 2015 urban water management plans and agricultural water management plans. The Bulletin 118 update should include a systematic evaluation of major groundwater basins to determine sustainable yield and overdraft status; a projection of California's groundwater resources in 20 years if current groundwater management trends remain unchanged; anticipated impacts of climate change on surface water and groundwater resources; and recommendations for State, federal, and local actions to improve groundwater management. In addition, the Bulletin 118 update should identify groundwater basins that are in a critical condition of overdraft.*
WR R10	Implement Groundwater Management Plans in Areas that Receive Water from the Delta Watershed	*Water suppliers that receive water from the Delta watershed and that obtain a significant percentage of their long-term average water supplies from groundwater sources should develop and implement sustainable groundwater management plans that are consistent with both the required and recommended components of local groundwater management plans identified by the California Department of Water Resources Bulletin 118 (Update 2003) by December 31, 2014.*
WR R11	Recover and Manage Critically Overdrafted Groundwater Basins	*Local and regional agencies in groundwater basins that have been identified by the California Department of Water Resources as being in a critical condition of overdraft should develop and implement a sustainable groundwater management plan, consistent with both the required and recommended components of local groundwater management plans identified by the California Department of Water Resources Bulletin 118 (Update 2003), by December 31, 2014. If local or regional agencies fail to develop and implement these plans, the State Water Resources Control Board should take action to determine if the continued overuse of a groundwater basin constitutes a violation of the State's Constitution Article X, Section 2, prohibition on unreasonable use of water and whether a groundwater adjudication is necessary to prevent the destruction of or irreparable injury to the quality of the groundwater, consistent with Water Code sections 2100 and 2101.*
WR R12	Complete Bay Delta Conservation Plan	*The relevant federal, State, and local agencies should complete the Bay Delta Conservation Plan, consistent with the provisions of the Delta Reform Act, and receive required incidental take permits by December 31, 2014.*
WR R13	Complete Surface Water Storage Studies	*The California Department of Water Resources should complete surface water storage investigations of proposed off-stream surface storage projects by December 31, 2012, including an evaluation of potential additional benefits of integrating operations of new storage with proposed Delta conveyance improvements, and recommend the critical projects that need to be implemented to expand the state's surface storage.*
WR R14	Identify Near-term Opportunities for Storage, Use, and Water Transfer Projects	*The California Department of Water Resources, in coordination with the California Water Commission, Bureau of Reclamation, State Water Resources Control Board, California Department of Public Health, the Delta Stewardship Council, and other agencies and stakeholders, should conduct a survey to identify projects throughout California that could be implemented within the next 5 to 10 years to expand existing surface and groundwater storage facilities, create new storage, improve operation of existing Delta conveyance*

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		facilities, and enhance opportunities for conjunctive use programs and water transfers in furtherance of the coequal goals. The California Water Commission should hold hearings and provide recommendations to the California Department of Water Resources on priority projects and funding.
WR R15	Improve Water Transfer Procedures	*The California Department of Water Resources and the State Water Resources Control Board should work with stakeholders to identify and recommend measures to reduce procedural and administrative impediments to water transfers and protect water rights and environmental resources by December 31, 2016. These recommendations should include measures to address potential issues with recurring transfers of up to 1 year in duration and improved public notification for proposed water transfers.*
WR P2 (23 CCR section 5004)	Transparency in Water Contracting	*(a) The contracting process for water from the State Water Project and/or the Central Valley Project must be done in a publicly transparent manner consistent with applicable policies of the California Department of Water Resources and the Bureau of Reclamation referenced below.* *(b) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers the following:* *(1) With regard to water from the State Water Project, a proposed action to enter into or amend a water supply or water transfer contract subject to California Department of Water Resources Guidelines 03-09 and/or 03-10 (each dated July 3, 2003), which are attached as Appendix 2A; and* *(2) With regard to water from the Central Valley Project, a proposed action to enter into or amend a water supply or water transfer contract subject to section 226 of P.L. 97-293, as amended or section 3405(a)(2)(B) of the Central Valley Project Improvement Act, Title XXXIV of Public Law 102-575, as amended, which are attached as Appendix 2B, and Rules and Regulations promulgated by the Secretary of the Interior to implement these laws.*
WR R16	Supplemental Water Use Reporting	*The State Water Resources Control Board should require water rights holders submitting supplemental statements of water diversion and use or progress reports under their permits or licenses to report on the development and implementation of all water efficiency and water supply projects and on their net (consumptive) use.*
WR R17	Integrated Statewide System for Water Use Reporting	*The California Department of Water Resources, in coordination with the State Water Resources Control Board, California Department of Public Health, California Public Utilities Commission, California Energy Commission, Bureau of Reclamation, California Urban Water Conservation Council, and other stakeholders, should develop a coordinated statewide system for water use reporting. This system should incorporate recommendations for inclusion of data needed to better manage California's water resources. The system should be designed to simplify reporting; reduce the number of required reports where possible; be made available to the public online; and be integrated with the reporting requirements for the urban water management plans, agricultural water management plans, and integrated regional water management plans. Water suppliers that export water from, transfer water through, or use water in the Delta watershed should be full participants in the data base.*

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WR R18	California Water Plan	*The California Department of Water Resources, in consultation with the State Water Resources Control Board, and other agencies and stakeholders, should evaluate and include in the next and all future California Water Plan updates information needed to track water supply reliability performance measures identified in the Delta Plan, including an assessment of water efficiency and new water supply development, regional water balances, improvements in regional self-reliance, reduced regional reliance on the Delta, and reliability of Delta exports, and an overall assessment of progress in achieving the coequal goals.*
WR R19	Financial Needs Assessment	*As part of the California Water Plan Update, the California Department of Water Resources should prepare an assessment of the state's water infrastructure. This should include the costs of rehabilitating/replacing existing infrastructure, an assessment of the costs of new infrastructure, and an assessment of needed resources for monitoring and adaptive management for these projects. The California Department of Water Resources should also consider a survey of agencies that may be planning small-scale projects (such as storage or conveyance) that improve water supply reliability.*
Chapter 4		
ER P1 (23 CCR section 5005)	Delta Flow Objectives	*(a) The State Water Resources Control Board's Bay Delta Water Quality Control Plan flow objectives shall be used to determine consistency with the Delta Plan. If and when the flow objectives are revised by the State Water Resources Control Board, the revised flow objectives shall be used to determine consistency with the Delta Plan.* *(b) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, the policy set forth in subsection (a) covers a proposed action that could significantly affect flow in the Delta.*
ER R1	Update Delta Flow Objectives	*Development, implementation, and enforcement of new and updated flow objectives for the Delta and high-priority tributaries are key to the achievement of the coequal goals. The State Water Resources Control Board should update the Bay Delta Water Quality Control Plan objectives as follows:* *(a) By June 2, 2014, adopt and implement updated flow objectives for the Delta that are necessary to achieve the coequal goals.* *(b) By June 2, 2018, adopt, and as soon as reasonably possible, implement flow objectives for high-priority tributaries in the Delta watershed that are necessary to achieve the coequal goals.*[1] *Flow objectives could be implemented through several mechanisms including negotiation and settlement, Federal Energy Regulatory Commission relicensing, or adjudicative proceeding.*[2] *Prior to the establishment of revised flow objectives identified above, the existing Bay Delta Water Quality Control Plan objectives shall be used to determine consistency with the Delta Plan. After the flow objectives are revised, the revised objectives shall be used to determine consistency with the Delta Plan.*

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[1] SWRCB staff should work with the Council and DFW to determine priority streams. As an illustrative example, priority streams could include the Merced River, Tuolumne River, Stanislaus River, Lower San Joaquin River, Deer Creek (tributary to Sacramento River), Lower Butte Creek, Mill Creek (tributary to Sacramento River), Cosumnes River, and American River. Implementation through hearings is expected to take longer than the deadline shown here.

[2] Implementation through adjudicative proceedings or FERC relicensing is expected to take longer than the deadline shown here.

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ER P2 (23 CCR section 5006)	Restore Habitats at Appropriate Elevations	*(a) Habitat restoration must be carried out consistent with Appendix 3, which is Section II of the Draft Conservation Strategy for Restoration of the Sacramento-San Joaquin Delta Ecological Management Zone and the Sacramento and San Joaquin Valley Regions (California Department of Fish and Wildlife 2011). The elevation map attached as Appendix 4 should be used as a guide for determining appropriate habitat restoration actions based on an area's elevation. If a proposed habitat restoration action is not consistent with Appendix 4, the proposal shall provide rationale for the deviation based on best available science.* *(b) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers a proposed action that includes habitat restoration.*
ER P3 (23 CCR section 5007)	Protect Opportunities to Restore Habitat	*(a) Within the priority habitat restoration areas depicted in Appendix 5, significant adverse impacts to the opportunity to restore habitat as described in section 5006, must be avoided or mitigated.* *(b) Impacts referenced in subsection (a) will be deemed to be avoided or mitigated if the project is designed and implemented so that it will not preclude or otherwise interfere with the ability to restore habitat as described in section 5006.* *(c) Impacts referenced in subsection (a) shall be mitigated to a point where the impacts have no significant effect on the opportunity to restore habitat as described in section 5006. Mitigation shall be determined, in consultation with the California Department of Fish and Wildlife, considering the size of the area impacted by the covered action and the type and value of habitat that could be restored on that area, taking into account existing and proposed restoration plans, landscape attributes, the elevation map shown in Appendix 4, and other relevant information about habitat restoration opportunities of the area.* *(d) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers proposed actions in the priority habitat restoration areas depicted in Appendix 5. It does not cover proposed actions outside those areas.*
ER P4 (23 CCR section 5008)	Expand Floodplains and Riparian Habitats in Levee Projects	*(a) Levee projects must evaluate and where feasible incorporate alternatives, including the use of setback levees, to increase floodplains and riparian habitats. Evaluation of setback levees in the Delta shall be required only in the following areas (shown in Appendix 8): (1) The Sacramento River between Freeport and Walnut Grove, the San Joaquin River from the Delta boundary to Mossdale, Paradise Cut, Steamboat Slough, Sutter Slough; and the North and South Forks of the Mokelumne River, and (2) Urban levee improvement projects in the cities of West Sacramento and Sacramento.* *(b) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers a proposed action to construct new levees or substantially rehabilitate or reconstruct existing levees.*
ER R2	Prioritize and Implement Projects that Restore Delta Habitat	*Bay Delta Conservation Plan implementers, California Department of Fish and Wildlife, California Department of Water Resources, and the Delta Conservancy should prioritize and implement habitat restoration projects in the areas shown on Figure 4-8. Habitat restoration projects should ensure connections between areas being restored and existing habitat areas and other elements of the landscape needed for the full life cycle of the species that will benefit from the restoration project.*

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		Where possible, restoration projects should also emphasize the potential for improving water quality. Restoration project proponents should consult the California Department of Public Health's Best Management Practices for Mosquito Control in California*.* ■ ***Yolo Bypass.*** *Enhance the ability of the Yolo Bypass to flood more frequently to provide more opportunities for migrating fish, especially Chinook salmon, to use this system as a migration corridor that is rich in cover and food.* ■ ***Cache Slough Complex.*** *Create broad nontidal, freshwater, emergent-plant-dominated wetlands that grade into tidal freshwater wetlands, and shallow subtidal and deep open-water habitats. Also, return a significant portion of the region to uplands with vernal pools and grasslands.* ■ ***Cosumnes River–Mokelumne River confluence.*** *Allow these unregulated and minimally regulated rivers to flood over their banks during winter and spring frequently and regularly to create seasonal floodplains and riparian habitats that grade into tidal marsh and shallow subtidal habitats.* ■ ***Lower San Joaquin River floodplain.*** *Reconnect the floodplain and restore more natural flows to stimulate food webs that support native species. Integrate habitat restoration with flood management actions, when feasible.* ■ ***Suisun Marsh.*** *Restore significant portions of Suisun Marsh to brackish marsh with land-water interactions to support productive, complex food webs to which native species are adapted and to provide space to adapt to rising sea level action. Use information from adaptive management processes during the Suisun Marsh Habitat Management, Preservation, and Restoration Plan's implementation to guide future habitat restoration projects and to inform future tidal marsh management.* ■ ***Western Delta/Eastern Contra Costa County.*** *Restore tidal marsh and channel margin habitat at Dutch Slough and western islands to support food webs and provide habitat for native species.*
ER R3	Complete and Implement Delta Conservancy Strategic Plan	*As part of its Strategic Plan and subsequent Implementation Plan or annual work plans, the Delta Conservancy should:* ■ *Develop and adopt criteria for prioritization and integration of large-scale ecosystem restoration in the Delta and Suisun Marsh, with sustainability and use of best available science as foundational principles.* ■ *Develop and adopt processes for ownership and long-term operations and management of land in the Delta and Suisun Marsh acquired for conservation or restoration.* ■ *Develop and adopt a formal mutual agreement with the California Department of Water Resources, California Department of Fish and Wildlife, federal interests, and other State and local agencies on implementation of ecosystem restoration in the Delta and Suisun Marsh.* ■ *Develop, in conjunction with the Wildlife Conservation Board, the California Department of Water Resources, California Department of Fish and Wildlife, Bay Delta Conservation Plan implementers, and other State and local agencies, a plan and protocol for acquiring the land necessary to achieve ecosystem restoration consistent with the coequal goals and the Ecosystem Restoration Program Conservation Strategy.*

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		▪ *Lead an effort, working with State and federal fish agencies, to investigate how to better use habitat credit agreements to provide credit for each of these steps: (1) acquisition for future restoration; (2) preservation, management, and enhancement of existing habitat; (3) restoration of habitat; and (4) monitoring and evaluation of habitat restoration projects.* ▪ *Work with the California Department of Fish and Wildlife and the U.S. Fish and Wildlife Service to develop rules for voluntary safe harbor agreements with property owners in the Delta whose actions contribute to the recovery of listed threatened or endangered species.*
ER R4	Exempt Delta Levees from the U.S. Army Corps of Engineers' Vegetation Policy	*Considering the ecosystem value of remaining riparian and shaded riverine aquatic habitat along Delta levees, the U.S. Army Corps of Engineers should agree with the California Department of Fish and Wildlife and the California Department of Water Resources on a variance that exempts Delta levees from the U.S. Army Corps of Engineers' levee vegetation policy where appropriate.*
ER R5	Update the Suisun Marsh Protection Plan	*The San Francisco Bay Conservation and Development Commission should update the Suisun Marsh Protection Plan and relevant components of the Suisun Marsh Local Protection Program to adapt to sea level rise and ensure consistency with the Suisun Marsh Preservation Act, the Delta Reform Act, and the Delta Plan.*
ER P5 (23 CCR section 5009)	Avoid Introductions of and Habitat Improvements for Invasive Nonnative Species	*(a) The potential for new introductions of or improved habitat conditions for nonnative invasive species, striped bass, or bass must be fully considered and avoided or mitigated in a way that appropriately protects the ecosystem.* *(b) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers a proposed action that has the reasonable probability of introducing or improving habitat conditions for nonnative invasive species.*
ER R6	Regulate Angling for Nonnative Sport Fish to Protect Native Fish	*The California Department of Fish and Wildlife should develop, for consideration by the Fish and Game Commission, proposals for new or revised fishing regulations designed to increase populations of listed fish species through reduced predation by introduced sport fish. The proposals should be based on sound science that demonstrates these management actions are likely to achieve their intended outcome and include the development of performance measures and a monitoring plan to support adaptive management.*
ER R7	Prioritize and Implement Actions to Control Nonnative Invasive Species	*The California Department of Fish and Wildlife and other appropriate agencies should prioritize and fully implement the list of "Stage 2 Actions for Nonnative Invasive Species" and accompanying text shown in Appendix J taken from the* Conservation Strategy for Restoration of the Sacramento–San Joaquin Delta Ecological Management Zone and the Sacramento and San Joaquin Valley Regions *(DFG 2011). Implementation of the Stage 2 actions should include the development of performance measures and monitoring plans to support adaptive management.*
ER R8	Manage Hatcheries to Reduce Genetic Risk	*As required by the National Marine Fisheries Service, all hatcheries providing listed fish for release into the wild should continue to develop and implement scientifically sound Hatchery and Genetic Management Plans (HGMPs) to reduce risks to those species. The California Department of Fish and Wildlife should provide annual updates to the Delta Stewardship Council on the status of HGMPs within its jurisdiction.*

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ER R9	Implement Marking and Tagging Program	*By December 2014, the California Department of Fish and Wildlife, in cooperation with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service, should revise and begin implementing its program for marking and tagging hatchery salmon and steelhead to improve management of hatchery and wild stocks based on recommendations of the California Hatchery Scientific Review Group, which considered mass marking, reducing hatchery programs, and mark selective fisheries in developing its recommendations.*
Chapter 5		
DP R1	Designate the Delta as a National Heritage Area	*The Delta Protection Commission should complete its application for designation of the Delta and Suisun Marsh as a National Heritage Area, and the federal government should complete the process in a timely manner.*
DP R2	Designate State Route 160 as a National Scenic Byway	*The California Department of Transportation should seek designation of State Route 160 as a National Scenic Byway, and prepare and implement a scenic byway plan for it.*
DP P1 (23 CCR section 5010)	Locate New Urban Development Wisely	*(a) New residential, commercial, and industrial development must be limited to the following areas, as shown in Appendix 6 and Appendix 7:* *(1) Areas that city or county general plans as of May 16, 2013, designate for residential, commercial, and industrial development in cities or their spheres of influence;* *(2) Areas within Contra Costa County's 2006 voter-approved urban limit line, except no new residential, commercial, and industrial development may occur on Bethel Island unless it is consistent with the Contra Costa County general plan effective as of May 16, 2013;* *(3) Areas within the Mountain House General Plan Community Boundary in San Joaquin County; or* *(4) The unincorporated Delta towns of Clarksburg, Courtland, Hood, Locke, Ryde, and Walnut Grove.* *(b) Notwithstanding subsection (a), new residential, commercial, and industrial development is permitted outside the areas described in subsection (a) if it is consistent with the land uses designated in county general plans as of May 16, 2013, and is otherwise consistent with this Chapter.* *(c) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers proposed actions that involve new residential, commercial, and industrial development that is not located within the areas described in subsection (a). In addition, this policy covers any such action on Bethel Island that is inconsistent with the Contra Costa County general plan effective as of May 16, 2013. This policy does not cover commercial recreational visitor-serving uses or facilities for processing of local crops or that provide essential services to local farms, which are otherwise consistent with this Chapter.* *(d) This policy is not intended in any way to alter the concurrent authority of the Delta Protection Commission to separately regulate development in the Delta's Primary Zone.*

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DP P2 (23 CCR section 5011)	Respect Local Land Use When Siting Water or Flood Facilities or Restoring Habitats	*(a) Water management facilities, ecosystem restoration, and flood management infrastructure must be sited to avoid or reduce conflicts with existing uses or those uses described or depicted in city and county general plans for their jurisdictions or spheres of influence when feasible, considering comments from local agencies and the Delta Protection Commission. Plans for ecosystem restoration must consider sites on existing public lands, when feasible and consistent with a project's purpose, before privately owned sites are purchased. Measures to mitigate conflicts with adjacent uses may include, but are not limited to, buffers to prevent adverse effects on adjacent farmland.* *(b) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers proposed actions that involve the siting of water management facilities, ecosystem restoration, and flood management infrastructure.*
DP R3	Plan for the Vitality and Preservation of Legacy Communities	*Local governments, in cooperation with the Delta Protection Commission and Delta Conservancy, should prepare plans for each community that emphasize its distinctive character, encourage historic preservation, identify opportunities to encourage tourism, serve surrounding lands, or develop other appropriate uses, and reduce flood risks.*
DP R4	Buy Rights of Way from Willing Sellers When Feasible	*Agencies acquiring land for water management facilities, ecosystem restoration, and flood management infrastructure should purchase from willing sellers, when feasible, including consideration of whether lands suitable for proposed projects are available at fair prices.*
DP R5	Provide Adequate Infrastructure	*The California Department of Transportation, local agencies, and utilities should plan infrastructure, such as roads and highways, to meet needs of development consistent with sustainable community strategies, local plans, the Delta Protection Commission's* Land Use and Resource Management Plan for the Primary Zone of the Delta*, and the Delta Plan.*
DP R6	Plan for State Highways	*The Delta Stewardship Council, as part of the prioritization of State levee investments called for in Water Code section 85306, should consult with the California Department of Transportation as provided in Water Code section 85307(c) to consider the effects of flood hazards and sea level rise on State highways in the Delta.*
DP R7	Subsidence Reduction and Reversal	*The following actions should be considered by the appropriate State agencies to address subsidence reversal:* ▪ *State agencies should not renew or enter into agricultural leases on Delta or Suisun Marsh islands if the actions of the lessee promote or contribute to subsidence on the leased land, unless the lessee participates in subsidence reversal or reduction programs.* ▪ *State agencies currently conducting subsidence reversal projects in the Delta on State-owned lands should investigate options for scaling up these projects if they have been deemed successful. The California Department of Water Resources should develop a plan, including funding needs, for increasing the extent of their subsidence reversal and carbon sequestration projects to 5,000 acres by January 1, 2017.* ▪ *The Delta Stewardship Council, in conjunction with the California Air Resources Board (CARB) and the Delta Conservancy, should investigate the opportunity for the development of a carbon market whereby Delta farmers could receive credit for carbon sequestration by reducing subsidence and growing native marsh and wetland plants. This investigation should include the potential for developing offset protocols applicable to these types of plants for subsequent adoption by the CARB.*

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DP R8	Promote Value-added Crop Processing	*Local governments and economic development organizations, in cooperation with the Delta Protection Commission and the Delta Conservancy, should encourage value-added processing of Delta crops in appropriate locations.*
DP R9	Encourage Agritourism	*Local governments and economic development organizations, in cooperation with the Delta Protection Commission and the Delta Conservancy, should support growth in agritourism, particularly in and around legacy communities. Local plans should support agritourism where appropriate.*
DP R10	Encourage Wildlife-friendly Farming	*The California Department of Fish and Wildlife, the Delta Conservancy, and other ecosystem restoration agencies should encourage habitat enhancement and wildlife-friendly farming systems on agricultural lands to benefit both the environment and agriculture.*
DP R11	Provide New and Protect Existing Recreation Opportunities	*Water management and ecosystem restoration agencies should provide recreation opportunities, including visitor-serving business opportunities, at new facilities and habitat areas whenever feasible; and existing recreation facilities should be protected, using California State Parks’* Recreation Proposal for the Sacramento-San Joaquin Delta and Suisun Marsh *and Delta Protection Commission’s* Economic Sustainability Plan for the Sacramento-San Joaquin Delta *as guides.*
DP R12	Encourage Partnerships to Support Recreation and Tourism	*The Delta Protection Commission and Delta Conservancy should encourage partnerships between other State and local agencies, and local landowners and business people to expand recreation, including boating, promote tourism, and minimize adverse impacts to nonrecreational landowners.*
DP R13	Expand State Recreation Areas	*California State Parks should add or improve recreation facilities in the Delta in cooperation with other agencies. As funds become available, it should fully reopen Brannan Island State Recreation Area, complete the park at Delta Meadows-Locke Boarding House, and consider adding new State parks at Barker Slough, Elkhorn Basin, the Wright-Elmwood Tract, and south Delta.*
DP R14	Enhance Nature-based Recreation	*The California Department of Fish and Wildlife, in cooperation with other public agencies, should collaborate with nonprofits, private landowners, and business partners to expand wildlife viewing, angling, and hunting opportunities.*
DP R15	Promote Boating Safety	*The California Department of Boating and Waterways should coordinate with the U.S. Coast Guard and State and local agencies on an updated marine patrol strategy for the region.*
DP R16	Encourage Recreation on Public Lands	*Public agencies owning land should increase opportunities, where feasible, for bank fishing, hunting, levee-top trails, and environmental education.*
DP R17	Enhance Opportunities for Visitor-serving Businesses	*Cities, counties, and other local and State agencies should work together to protect and enhance visitor-serving businesses by planning for recreation uses and facilities in the Delta, providing infrastructure to support recreation and tourism, and identifying settings for private visitor-serving development and services.*
DP R18	Support the Ports of Stockton and West Sacramento	*The ports of Stockton and West Sacramento should encourage maintenance and carefully designed and sited development of port facilities.*

POLICY OR RECOMMENDATION NUMBER	SHORT TITLE	POLICY/RECOMMENDATION LANGUAGE
DP R19	Plan for Delta Energy Facilities	*The California Energy Commission and California Public Utilities Commission should cooperate with the Delta Stewardship Council as described in Water Code section 85307(d) to identify actions that should be incorporated in the Delta Plan by 2017 to address the needs of Delta energy development, storage, and distribution.*
Chapter 6		
WQ R1	Protect Beneficial Uses	*Water quality in the Delta should be maintained at a level that supports, enhances, and protects beneficial uses identified in the applicable State Water Resources Control Board or regional water quality control board water quality control plans.*
WQ R2	Identify Covered Action Impacts	*Covered actions should identify any significant impacts to water quality.*
WQ R3	Special Water Quality Protections for the Delta	*The State Water Resources Control Board or regional water quality control board should evaluate and, if appropriate, propose special water quality protections for priority habitat restoration areas identified in recommendation ER R2 or other areas of the Delta where new or increased discharges of pollutants could adversely impact beneficial uses.*
WQ R4	Complete Central Valley Drinking Water Policy	*The Central Valley Regional Water Quality Control Board should complete the Central Valley Drinking Water Policy by July 2013.*
WQ R5	Complete North Bay Aqueduct Alternative Intake Project	*The California Department of Water Resources should complete the North Bay Aqueduct Alternate Intake Project Environmental Impact Report by December 31, 2012, and begin construction as soon as possible thereafter.*
WQ R6	Protect Groundwater Beneficial Uses	*The State Water Resources Control Board should complete development of a Strategic Workplan for protection of groundwater beneficial uses, including groundwater use for drinking water, by December 31, 2012.*
WQ R7	Participation in CV-SALTS	*The State Water Resources Control Board and Central Valley Regional Water Quality Control Board should consider requiring participation by all relevant water users that are supplied water from the Delta or the Delta watershed or discharge wastewater to the Delta or the Delta watershed to participate in the Central Valley Salinity Alternatives for Long-Term Sustainability Program.*
WQ R8	Completion of Regulatory Processes, Research, and Monitoring for Water Quality Improvement	*The State Water Resources Control Board and the San Francisco Bay and Central Valley Regional Water Quality Control Boards are currently engaged in regulatory processes, research, and monitoring essential to improving water quality in the Delta. In order to achieve the coequal goals, it is essential that these ongoing efforts be completed and, if possible, accelerated, and that the Legislature and Governor devote sufficient funding to make this possible. The Delta Stewardship Council specifically recommends that:* ▪ *The State Water Resources Control Board should complete development of the proposed policy for nutrients for inland surface waters of the State of California by January 1, 2014.* ▪ *The State Water Resources Control Board and the San Francisco Bay and Central Valley Regional Water Quality Control Boards should prepare and begin implementation of a study plan for the development of objectives for nutrients in the Delta and Suisun Marsh by January 1, 2014. Studies needed for development of Delta and Suisun Marsh nutrient objectives should be completed by January 1, 2016. The water boards should*

POLICY OR RECOMMENDATION NUMBER	SHORT TITLE	POLICY/RECOMMENDATION LANGUAGE
		adopt and begin implementation of nutrient objectives, either narrative or numeric, where appropriate, for the Delta and Suisun Marsh by January 1, 2018. ▪ *The State Water Resources Control Board and the Central Valley Regional Water Quality Control Board should complete the Central Valley Pesticide Total Maximum Daily Load and Basin Plan Amendment for diazinon and chlorpyrifos by January 1, 2013.* ▪ *The State Water Resources Control Board and the Central Valley Regional Water Quality Control Board should prioritize and accelerate the completion of the Central Valley Pesticide Total Maximum Daily Load and Basin Plan Amendment for pyrethroids by January 1, 2016.* ▪ *The State Water Resources Control Board and the San Francisco Bay and Central Valley Regional Water Quality Control Boards have completed Total Maximum Daily Load and Basin Plan Amendments for methylmercury, and efforts to support their implementation should be coordinated. Parties identified as responsible for current methylmercury loads or proponents of projects that may increase methylmercury loading in the Delta or Suisun Marsh should participate in control studies or implement site-specific study plans that evaluate practices to minimize methylmercury discharges. The Central Valley Regional Water Quality Control Board should review these control studies by December 31, 2018, and determine control measures for implementation starting in 2020.*
WQ R9	Implement Delta Regional Monitoring Program	*The State Water Resources Control Board and Regional Water Quality Control Boards should work collaboratively with the California Department of Water Resources, California Department of Fish and Wildlife, and other agencies and entities that monitor water quality in the Delta to develop and implement a Delta Regional Monitoring Program that will be responsible for coordinating monitoring efforts so Delta conditions can be efficiently assessed and reported on a regular basis.*
WQ R10	Evaluate Wastewater Recycling, Reuse, or Treatment	*The Central Valley Regional Water Quality Control Board, consistent with existing water quality control plan policies and water rights law, should require responsible entities that discharge wastewater treatment plant effluent or urban runoff to Delta waters to evaluate whether all or a portion of the discharge can be recycled, otherwise used, or treated in order to reduce contaminant loads to the Delta by January 1, 2014.*
WQ R11	Manage Dissolved Oxygen in Stockton Ship Channel	*The State Water Resources Control Board and the Central Valley Regional Water Quality Control Board should complete Phase 2 of the Total Maximum Daily Load and Basin Plan Amendment for dissolved oxygen in the Stockton Deep Water Ship Channel by January 1, 2015.*
WQ R12	Manage Dissolved Oxygen in Suisun Marsh	*The State Water Resources Control Board and the San Francisco Bay Regional Water Quality Control Board should complete the Total Maximum Daily Load and Basin Plan Amendment for dissolved oxygen in Suisun Marsh wetlands by January 1, 2014.*

POLICY OR RECOMMENDATION NUMBER	SHORT TITLE	POLICY/RECOMMENDATION LANGUAGE
Chapter 7		
RR R1	Implement Emergency Preparedness and Response	*The following actions should be taken by January 1, 2014, to promote effective emergency preparedness and response in the Delta:* ▪ *Responsible local, State, and federal agencies with emergency response authority should consider and implement the recommendations of the Sacramento-San Joaquin Delta Multi-Hazard Coordination Task Force (Water Code section 12994.5). Such actions should support the development of a regional response system for the Delta.* ▪ *In consultation with local agencies, the California Department of Water Resources should expand its emergency stockpiles to make them regional in nature and usable by a larger number of agencies in accordance with California Department of Water Resources' plans and procedures. The California Department of Water Resources, as a part of this plan, should evaluate the potential of creating stored material sites by "over-reinforcing" west Delta levees.* ▪ *Local levee-maintaining agencies should consider developing their own emergency action plans, and stockpiling rock and flood-fighting materials.* ▪ *State and local agencies and regulated utilities that own and/or operate infrastructure in the Delta should prepare coordinated emergency response plans to protect the infrastructure from long-term outages resulting from failures of the Delta levees. The emergency procedures should consider methods that also would protect Delta land use and ecosystem.*
RR R2	Finance Local Flood Management Activities	*The Legislature should create a Delta Flood Risk Management Assessment District with fee assessment authority (including over State infrastructure) to provide adequate flood control protection and emergency response for the regional benefit of all beneficiaries, including landowners, infrastructure owners, and other entities that benefit from the maintenance and improvement of Delta levees, such as water users who rely on the levees to protect water quality.* *This district should be authorized to:* ▪ *Identify and assess all beneficiaries of Delta flood protection facilities.* ▪ *Develop, fund, and implement a regional plan of flood management for both project and nonproject levees of the Delta, including the maintenance and improvement of levees, in cooperation with the existing reclamation districts, cities, counties, and owners of infrastructure and other interests protected by the levees.* ▪ *Require local levee-maintaining agencies to conduct annual levee inspections per the California Department of Water Resources subventions program guidelines, and update levee improvement plans every 5 years.* ▪ *Participate in the collection of data and information necessary for the prioritization of State investments in Delta levees consistent with RR P1.* ▪ *Notify residents and landowners of flood risk, personal safety information, and available systems for obtaining emergency information before and during a disaster on an annual basis.* ▪ *Potentially implement the recommendations of the Sacramento-San Joaquin Delta Multi-Hazard Coordination Task Force (Water Code section 12994.5) in conjunction with local, State, and federal agencies, and maintain the resulting regional response system*

POLICY OR RECOMMENDATION NUMBER	SHORT TITLE	POLICY/RECOMMENDATION LANGUAGE
		and components and procedures on behalf of SEMS jurisdictions (reclamation district, city, county, and State) that would jointly implement the regional system in response to a disaster event. ▪ *Identify and assess critical water supply corridor levee operations, maintenance, and improvements.*
RR R3	Fund Actions to Protect Infrastructure from Flooding and Other Natural Disasters	▪ *The California Public Utilities Commission should immediately commence formal hearings to impose a reasonable fee for flood and disaster prevention on regulated privately owned utilities with facilities located in the Delta. Publicly owned utilities should also be encouraged to develop similar fees. The California Public Utilities Commission, in consultation with the Delta Stewardship Council, the California Department of Water Resources, and the Delta Protection Commission, should allocate these funds among State and local emergency response and flood protection entities in the Delta. If a new regional flood management agency is established by law, a portion of the local share would be allocated to that agency.* ▪ *The California Public Utilities Commission should direct all regulated public utilities in their jurisdiction to immediately take steps to protect their facilities in the Delta from the consequences of a catastrophic failure of levees in the Delta, to minimize the impact on the State's economy.* ▪ *The Governor, by Executive Order, should direct State agencies with projects or infrastructure in the Delta to set aside a reasonable amount of funding to pay for flood protection and disaster prevention. The local share of these funds should be allocated as described above.*
RR P1 (23 CCR section 5012)	Prioritization of State Investments in Delta Levees and Risk Reduction	*(a) Prior to the completion and adoption of the updated priorities developed pursuant to Water Code section 85306, the interim priorities listed below shall, where applicable and to the extent permitted by law, guide discretionary State investments in Delta flood risk management. Key priorities for interim funding include emergency preparedness, response, and recovery as described in paragraph (1), as well as Delta levees funding as described in paragraph (2).* *(1) Delta Emergency Preparedness, Response, and Recovery: Develop and implement appropriate emergency preparedness, response, and recovery strategies, including those developed by the Delta Multi-Hazard Task Force pursuant to Water Code section 12994.5.* *(2) Delta Levees Funding: The priorities shown in the following table are meant to guide budget and funding allocation strategies for levee improvements. The goals for funding priorities are all important, and it is expected that over time, the California Department of Water Resources must balance achievement of those goals. Except on islands planned for ecosystem restoration, improvement of nonproject Delta levees to the Hazard Mitigation Plan (HMP) standard may be funded without justification of the benefits. Improvements to a standard above HMP, such as that set by the U.S. Army Corps of Engineers under Public Law 84-99, may be funded as befits the benefits to be provided, consistent with the California Department of Water Resources' current practices and any future adopted investment strategy.*

<table>
<tr><th>POLICY OR RECOMMENDATION NUMBER</th><th>SHORT TITLE</th><th>POLICY/RECOMMENDATION LANGUAGE</th></tr>
<tr><td></td><td></td><td>
Priorities for State Investment in Delta Integrated Flood Management
<i>Categories of Benefit Analysis</i>
<table>
<tr><th>Goals</th><th>Localized Flood Protection</th><th>Levee Network</th><th>Ecosystem Conservation</th></tr>
<tr><td>1</td><td>Protect existing urban and adjacent urbanizing areas by providing 200-year flood protection.</td><td>Protect water quality and water supply conveyance in the Delta, especially levees that protect freshwater aqueducts and the primary channels that carry fresh water through the Delta.</td><td>Protect existing and provide for a net increase in channel-margin habitat.</td></tr>
<tr><td>2</td><td>Protect small communities and critical infrastructure of statewide importance (located outside of urban areas).</td><td>Protect floodwater conveyance in and through the Delta to a level consistent with the State Plan of Flood Control for project levees.</td><td>Protect existing and provide for net enhancement of floodplain habitat.</td></tr>
<tr><td>3</td><td>Protect agriculture and local working landscapes.</td><td>Protect cultural, historic, aesthetic, and recreational resources (Delta as Place).</td><td>Protect existing and provide for net enhancement of wetlands.</td></tr>
</table>
<i>(b) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers a proposed action that involves discretionary State investments in Delta flood risk management, including levee operations, maintenance, and improvements. Nothing in this policy establishes or otherwise changes existing levee standards.</i>
</td></tr>
<tr><td>RR R4</td><td>Actions for the Prioritization of State Investments in Delta Levees</td><td><i>The Delta Stewardship Council, in consultation with the California Department of Water Resources, the Central Valley Flood Protection Board, the Delta Protection Commission, local agencies, and the California Water Commission, should develop funding priorities for State investments in Delta levees by January 1, 2015. These priorities shall be consistent with the provisions of the Delta Reform Act in promoting effective, prioritized strategic State investments in levee operations, maintenance, and improvements in the Delta for both levees that are a part of the State Plan of Flood Control and nonproject levees. Upon completion, these priorities shall be considered for incorporation into the Delta Plan.</i>
<i>The priorities should identify guiding principles, constraints, recommended cost share allocations, and strategic considerations to guide Delta flood risk reduction investments,</i></td></tr>
</table>

POLICY OR RECOMMENDATION NUMBER	SHORT TITLE	POLICY/RECOMMENDATION LANGUAGE

		supported by, at a minimum, the following actions to be conducted by the California Department of Water Resources, consistent with available funding:
		▪ *An assessment of existing Delta levee conditions. This should include the development of a Delta levee conditions map based on sound data inputs, including, but not limited to:*
		  ▪ *Geometric levee assessment*
		  ▪ *Flow and updated stage-frequency analysis*
		▪ *An island-by-island economics-based risk analysis. This analysis should consider, but not be limited to, values related to protecting:*
		  ▪ *Island residents/life safety*
		  ▪ *Property*
		  ▪ *Value of Delta islands' economic output, including agriculture*
		  ▪ *State water supply*
		  ▪ *Critical local, State, federal, and private infrastructure, including aqueducts, state highways, electricity transmission lines, gas/petroleum pipelines, gas fields, railroads, and deep water shipping channels*
		  ▪ *Delta water quality*
		  ▪ *Existing ecosystem values and ecosystem restoration opportunities*
		  ▪ *Recreation*
		  ▪ *Systemwide integrity*
		▪ *An ongoing assessment of Delta levee conditions. This should include a process for updating Delta levee assessment information on a routine basis.*
		This methodology should provide the basis for the prioritization of State investments in Delta levees. It should include, but not be limited to, the public reporting of the following items:
		▪ *Tiered ranking of Delta islands, based on economics-based risk analysis values*
		▪ *Delta levee conditions status report, including a levee conditions map*
		▪ *Inventory of Delta infrastructure assets*

RR P2
(23 CCR section 5013)
	Require Flood Protection for Residential Development in Rural Areas	*(a) New residential development of five or more parcels shall be protected through flood-proofing to a level 12 inches above the 100-year base flood elevation, plus sufficient additional elevation to protect against a 55-inch rise in sea level at the Golden Gate, unless the development is located within:*
		  (1) Areas that city or county general plans, as of May 16, 2013, designate for development in cities or their spheres of influence;
		  (2) Areas within Contra Costa County's 2006 voter-approved urban limit line, except Bethel Island;
		  (3) Areas within the Mountain House General Plan Community Boundary in San Joaquin County; or
		  (4) The unincorporated Delta towns of Clarksburg, Courtland, Hood, Locke, Ryde, and Walnut Grove, as shown in Appendix 7.
		(b) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers a proposed action that involves new residential development of five or more parcels that is not located within the areas described in subsection (a).

POLICY OR RECOMMENDATION NUMBER	SHORT TITLE	POLICY/RECOMMENDATION LANGUAGE
RR P3 (23 CCR section 5014)	Protect Floodways	*(a) No encroachment shall be allowed or constructed in a floodway, unless it can be demonstrated by appropriate analysis that the encroachment will not unduly impede the free flow of water in the floodway or jeopardize public safety.* *(b) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers a proposed action that would encroach in a floodway that is not either a designated floodway or regulated stream.*
RR P4 (23 CCR section 5015)	Floodplain Protection	*(a) No encroachment shall be allowed or constructed in any of the following floodplains unless it can be demonstrated by appropriate analysis that the encroachment will not have a significant adverse impact on floodplain values and functions:* *(1) The Yolo Bypass within the Delta;* *(2) The Cosumnes River-Mokelumne River Confluence, as defined by the North Delta Flood Control and Ecosystem Restoration Project (McCormack-Williamson), or as modified in the future by the California Department of Water Resources or the U.S. Army Corps of Engineers (California Department of Water Resources 2010); and* *(3) The Lower San Joaquin River Floodplain Bypass area, located on the Lower San Joaquin River upstream of Stockton immediately southwest of Paradise Cut on lands both upstream and downstream of the Interstate 5 crossing. This area is described in the Lower San Joaquin River Floodplain Bypass Proposal, submitted to the California Department of Water Resources by the partnership of the South Delta Water Agency, the River Islands Development Company, Reclamation District 2062, San Joaquin Resource Conservation District, American Rivers, the American Lands Conservancy, and the Natural Resources Defense Council, March 2011. This area may be modified in the future through the completion of this project.* *(b) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers a proposed action that would encroach in any of the floodplain areas described in subsection (a).* *(c) This policy is not intended to exempt any activities in any of the areas described in subsection (a) from applicable regulations and requirements of the Central Valley Flood Protection Board.*
RR R5	Fund and Implement San Joaquin River Flood Bypass	*The Legislature should fund the California Department of Water Resources and the Central Valley Flood Protection Board to evaluate and implement a bypass and floodway on the San Joaquin River near Paradise Cut that would reduce flood stage on the mainstem San Joaquin River adjacent to the urban and urbanizing communities of Stockton, Lathrop, and Manteca in accordance with Water Code section 9613(c).*
RR R6	Continue Delta Dredging Studies	*The current efforts to maintain navigable waters in the Sacramento River Deep Water Ship Channel and Stockton Deep Water Ship Channel, led by the U.S. Army Corps of Engineers and described in the Delta Dredged Sediment Long-Term Management Strategy (USACE 2007, Appendix K), should be continued in a manner that supports the Delta Plan and the coequal goals. Appropriate dredging throughout other areas in the Delta for maintenance purposes, or that would increase flood conveyance and provide potential material for levee maintenance or subsidence reversal should be implemented in a manner that supports the Delta Plan and coequal goals. Coordinated use of dredged material in levee improvement, subsidence reversal, or wetland restoration is encouraged.*

POLICY OR RECOMMENDATION NUMBER	SHORT TITLE	POLICY/RECOMMENDATION LANGUAGE
RR R7	Designate Additional Floodways	*The Central Valley Flood Protection Board should evaluate whether additional areas both within and upstream of the Delta should be designated as floodways. These efforts should consider the anticipated effects of climate change in its evaluation of these areas.*
RR R8	Develop Setback Levee Criteria	*The California Department of Water Resources, in conjunction with the Central Valley Flood Protection Board, the California Department of Fish and Wildlife, and the Delta Conservancy, should develop criteria to define locations for future setback levees in the Delta and Delta watershed.*
RR R9	Require Flood Insurance	*The Legislature should require an adequate level of flood insurance for residences, businesses, and industries in floodprone areas.*
RR R10	Limit State Liability	*The Legislature should consider statutory and/or constitutional changes that would address the State's potential flood liability, including giving State agencies the same level of immunity with regard to flood liability as federal agencies have under federal law.*
Chapter 8		
FP R1	Conduct Current Spending Inventory	*An inventory of current State and federal spending on programs and projects that do or may achieve the coequal goals will be conducted. Data sources to be used include the CALFED cross-cut budget, State bond balance reports, and the annual State budget, among others. Consideration will be given to selecting an independent agency (which could include a non governmental organization) to conduct the inventory.*
FP R2	Develop Delta Plan Cost Assessment	*Costs will be assigned to the projects and programs proposed in the Delta Plan (Chapters 2 through 7) and sources of funding will be identified.*
FP R3	Identify Funding Gaps	*Current State and federal funding gaps will be identified that are determined to hinder progress toward meeting the coequal goals.*

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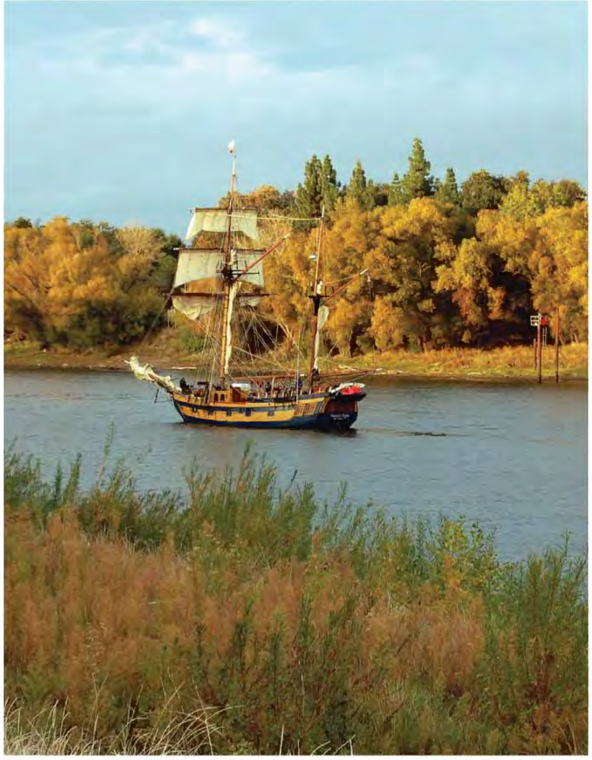
CHAPTER 1

Introduction



ABOUT THIS CHAPTER

This chapter offers historical and current contextual information about the uses and conflicts that besiege the Sacramento-San Joaquin Delta (Delta). The reader will come to understand how and why the West Coast's largest estuary has evolved from a huge tidal marsh to the maze of islands and channels it is today – shaped over more than a century and a half by the effects of hydraulic mining, flood control, agricultural and urban development, and its placement as the "hub" of California's major water systems.

The chapter then delves into the realities of decades of stand-offs among the key interests in the Delta and resulting years of relative inaction, leading finally to the bipartisan movement that created the Sacramento-San Joaquin Delta Reform Act of 2009 (Delta Reform Act or Act) and its mandate to develop a long-term sustainable management plan for the Delta. The chapter concludes with an overarching explanation of how this Delta Plan (or Plan) will bring about a fundamental and positive sustainability and reformation of this immense natural resource.

CHAPTER 1

Introduction

Throughout the past 160 years, the delta formed by California's two largest rivers, the Sacramento and the San Joaquin, has been a gateway to many of the state's collective hopes and dreams. Once the pathway to the Gold Country, it is today a critical component of the state's water supply infrastructure, a source of sustenance for farmers and fishermen, and home to half a million people and a vast array of fish, birds, and wildlife.

The Sacramento-San Joaquin Delta and Suisun Marsh are referred to throughout this Plan collectively as "the Delta," unless otherwise specified (see Figure 1-1).[1] Once a great marsh, the Delta now is a network of channels and sunken "islands" that cover—together with Suisun Marsh—about 1,300 square miles. Laid over those islands and channels is the infrastructure of a twenty-first century economy: water supply conduits; major arteries of the state's electrical grid; natural gas fields, storage facilities, and pipelines; highways and railways; and shipping channels, all surrounded by an increasingly urban landscape. Water from the vast Delta watershed, spanning over 45,000 square miles (30 million acres), fuels both local economies and those in export areas hundreds of miles away (see Figure 1-2).

Today the Delta is many things to many people, and is universally regarded in "crisis" because people have not yet been able to find balance in the tradeoffs among competing demands for the Delta's resources. Tradeoffs and integration define the Delta dilemma: water conveyance facilities that built strong urban and agricultural economies threaten ecosystem health. Water that is beneficial for fish is alive with plankton and organic material, but sources of drinking water are best in as pure a form as possible. The pollutants of upstream urban and agricultural uses cause problems for downstream fish and water diverters alike. The same ocean-going ships that opened the Central Valley to world trade also introduced nonnative species that alter the Delta ecosystem. High water flows that historically improved habitat and a diverse food web come with the threat of lost homes, flooded farmland, and disaster for Delta residents and the California economy.

Conceived decades ago, a series of water projects has engineered the Delta estuary over time to perform as a water conveyance system, moving water stored upstream to users throughout the state who hold State of California (State) or federal water contracts. This system relies on dredged channels, which at times run counter to natural flow directions as the result of export pumping that occurs in the south Delta. For a number of years, and currently at the publishing time of this Plan, State and federal agencies are exploring options to reconfigure the manner in which the Delta is used to convey water in a way that lessens ecosystem impacts and improves water supply reliability. At this time, the Delta Plan does not make recommendations regarding Delta conveyance (see Appendix A).

As a result of imperfect tradeoffs, key species are endangered or threatened, the amount of water that can be exported from the Delta is determined not just by the state's variable precipitation and storage but also by court order to protect endangered species, and geologists and engineers continue to worry that the Delta itself is one of the greatest flood risks in the West.

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[1] The Sacramento-San Joaquin Delta is defined in Water Code section 12220, and Suisun Marsh means the area defined in Public Resources Code section 29101 and protected by Division 19 (commencing with section 29000).

The evolution of the Delta has come in fits and starts, driven by individual initiative, governmental incentive, and crisis. John Hart, writing for *Bay-Nature*, puts it this way:

> *The History of the modern Delta belies the image of the region as a static landscape. Reclamation was a battle with many setbacks, almost given up for lost in the 1870s. In the 1880s the 'crisis' was the clogging of channels by hydraulic mining debris. In the 1920s, salinity was on the march. A brief calm at midcentury gave way to the ever-spiraling tension over water exports and ecosystem decline. The Delta seems always to have been in crisis, under intensive study, and at the intersection of hostile interests.*

Governmental institutions have reacted to each crisis predictably, often treating individual problems rather than taking a systemwide approach. Over the years, dozens of agencies, task forces, and working groups have been created in a series of sometimes overlapping efforts to find the right combination of leadership and collaboration—incentives and regulation—to provide clean, reliable water; protect our environment; and reduce the risk of flooding.

After decades of conflict and unsuccessful efforts to comprehensively address the many problems and challenges of the Delta, the California Legislature (or Legislature), water agencies, and environmental groups throughout the state united in an unprecedented manner in 2009 to pass a series of water-related measures, including the Delta Reform Act.

The Delta Reform Act created the Delta Stewardship Council (Council) with a primary responsibility to develop and implement a legally enforceable, long-term management plan for the Delta. The Legislature required the Delta Plan to advance the coequal goals of protecting and enhancing the Delta ecosystem and providing for a more reliable water supply for California, and to do so in a manner that protects and enhances the Delta as an evolving place.

This Delta Plan is intended to be a foundational document that prioritizes actions and strategies in support of key objectives such as the State's requirement to reduce reliance on the Delta to meet future water supply needs. It also restricts actions that may cause harm; serves as a guidebook for all plans, projects, and programs that affect the Delta; and calls for further investigation and focused study of specific issues.

Successful implementation of the Delta Plan depends not only on the Council, but also on coordinated actions by other government agencies—federal, State, and local—and by the stakeholders to whom these agencies are responsible. To be effective, decision making in a dynamic context such as the Delta must be flexible and have the capacity to change policies and practices in response to what is learned over time. Through this Delta Plan, the Council details an interagency structure for decision making that fosters communication among scientists; local, State, and federal decision makers; and stakeholders. Future Plan iterations will build on successes as well as lessons learned in order to achieve the coequal goals.

The Delta and California's Water Supply

The story of California's annual water supply is one of great variability in amount, timing, and distribution, and of the human desire to impose certainty and order. Rain and snow fall mostly in the northern and eastern portions of the state, but most Californians live along the coast and in the south. Most of the state's precipitation occurs in only 5 to 15 days, and that rain and snowfall result in an annual supply that is ample in average years, too little in dry ones, and too much in wet years (see Figure 1-3).

The Sacramento-San Joaquin Delta and Suisun Marsh

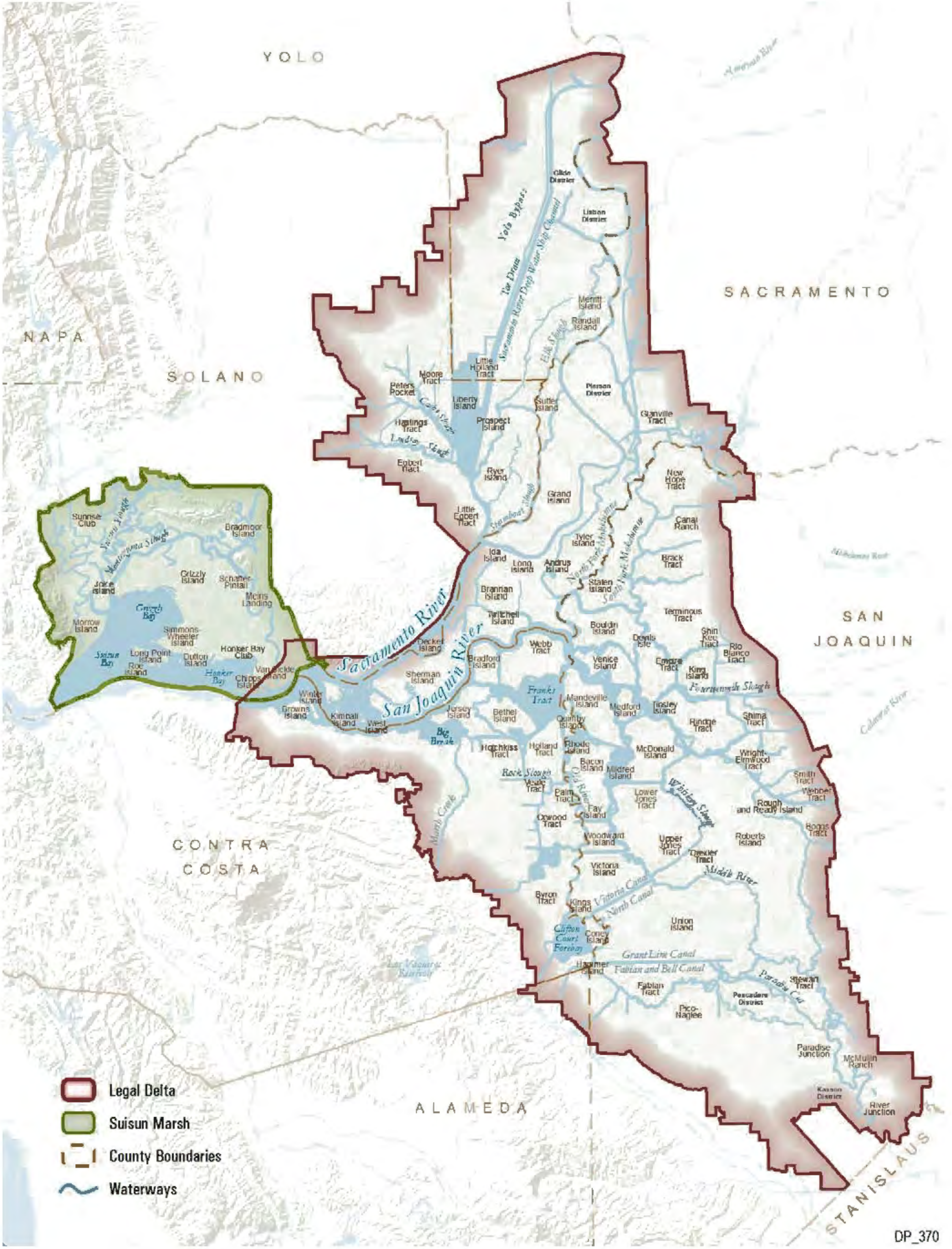

Figure 1-1

Source: DWR 2011a

The Delta Watershed and Areas Receiving Delta Water

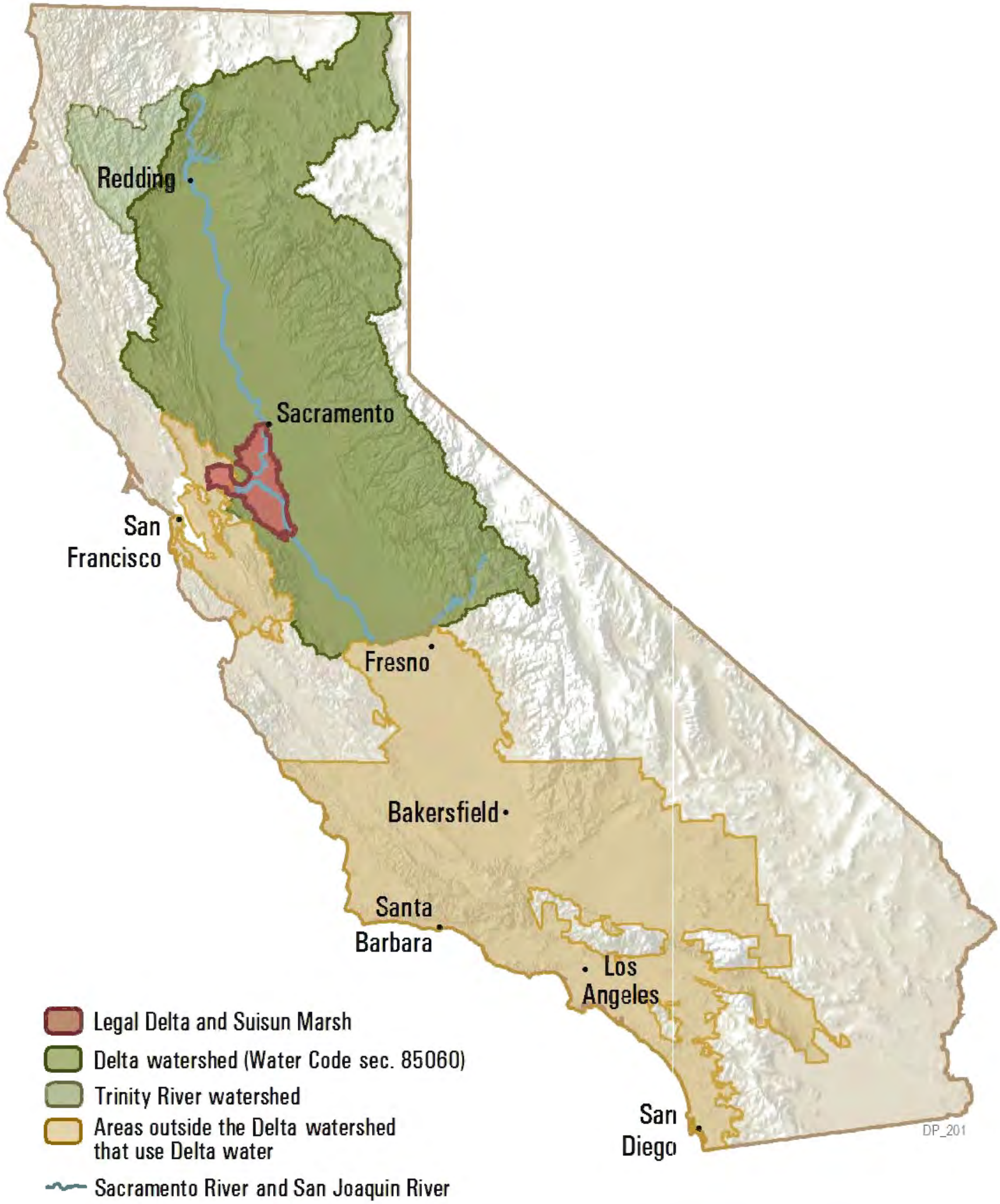
Redding
Sacramento
San Francisco
Fresno
Bakersfield
Santa Barbara
Los Angeles
San Diego
DP_201
Legal Delta and Suisun Marsh
Delta watershed (Water Code sec. 85060)
Trinity River watershed
Areas outside the Delta watershed that use Delta water
Sacramento River and San Joaquin River

Figure 1-2

To meet water demand, Californians over the past 160 years have built a vast array of reservoirs, canals, pipelines, and tunnels, all in an effort to capture water when it was available, store it for when it was not, and to move it to the people when and where they wanted it.

As residents in both Northern and Southern California feared they would outgrow their local supplies, they turned to the vast Delta watershed for relief. The river systems flowing into the Delta drain about 40 percent of the land in California and carry about half of the state's total annual runoff.

And so, at the turn of the twentieth century, San Francisco tapped the Tuolumne River, diverting water through an aqueduct that bypasses the San Joaquin River and Delta. Shortly thereafter, Oakland and the eastern San Francisco Bay Area tapped the Mokelumne River, diverting water through a pipeline across the Delta. Later, construction of the federal Central Valley Project (CVP) and the State Water Project (SWP) resulted in additional diversions directly from the Delta for the Bay Area, Central Valley, and Southern California.

California's Variable Precipitation

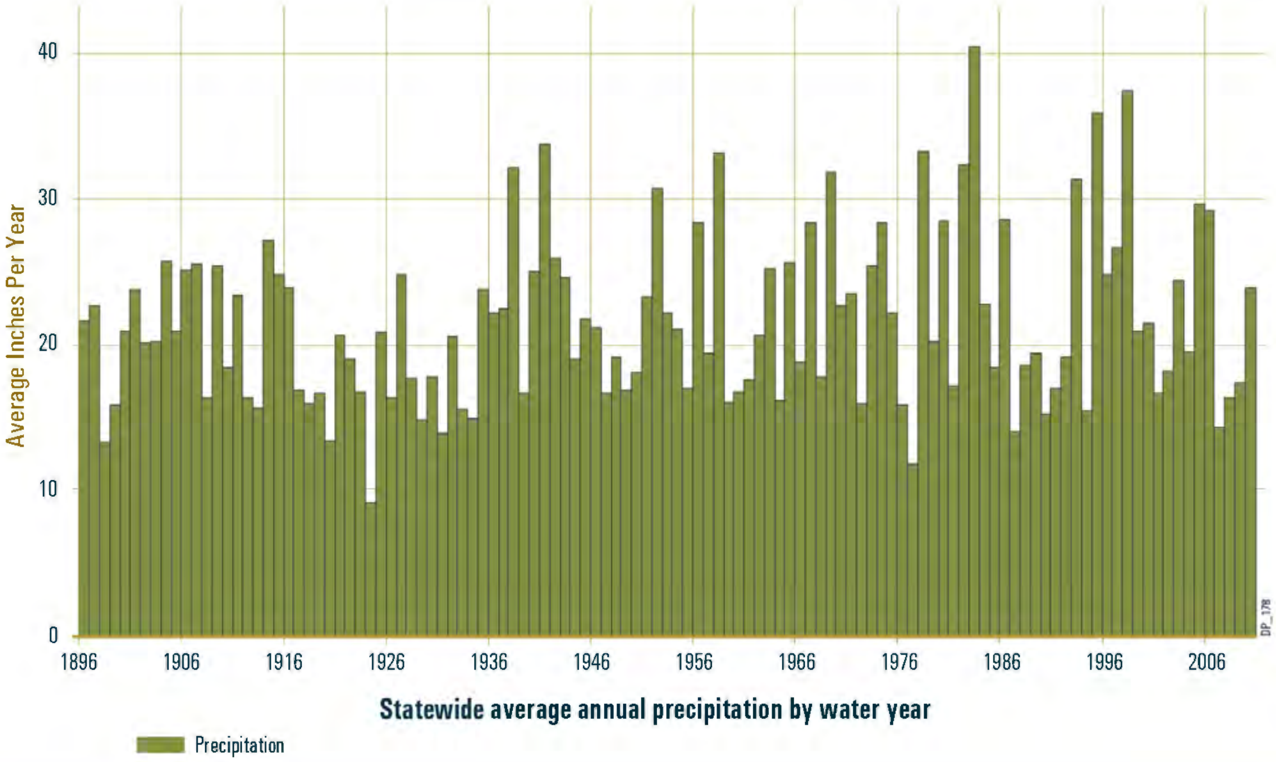

Figure 1-3 The unpredictability of the state's rainfall and its history of multiyear droughts make the management of water to reliably meet environmental and human uses extremely challenging. Yearly precipitation was calculated from the average of 95 stations located across California. Data were collected by Jim Goodridge, former State climatologist.

Source: Western Regional Climate Center 2011

Today, some two-thirds of the state's population (approximately 27 million people) depend on water from the Delta watershed for some portion of their water supply, as do more than 3 million acres of irrigated farmland that grow crops for in-state, national, and international distribution. That said, water exported through the Delta represents approximately 8 percent of the state's annual average water supply. Local and regional water resources, including surface diversions, groundwater, local and out-of-state imports, and water reuse, meet the remaining 84 percent.

Who uses all that water, how it is used, how much returns to the rivers and streams for downstream users, and in what quality, is less than certain on a statewide basis. Data for actual water use and water quality suffer from significant gaps, which may affect the ability of California's water managers to make timely and better-informed decisions. Since 1914, the State Water Resources Control Board (SWRCB) has issued permits to post-1914 appropriative-right water diverters in the Delta, but actual annual diversion amounts are not thoroughly measured or reported. Owners and operators of nearly one-third of irrigated lands in the Delta watershed do not participate in programs to meet water quality standards, and their compliance with State law is unclear.

Although groundwater and surface water are often interconnected, the SWRCB has limited authority to regulate groundwater. Groundwater is sustainably managed in some areas of the state through either adjudication or special districts, but other areas suffer from unsustainable overdraft and require improved management efforts. Attempts to correct this overdraft often put more pressure on water supplies from the Delta, demonstrating once again the interconnectedness of California's water systems.

The Delta and Its Ecosystem

Although much of the debate over the Delta has centered on events in the last 50 years, the roots of its problems run much deeper. A Delta that for millennia had been a land and waterscape of dynamic floodplain and tidal marshland, rich in flora and fauna, was changed forever by passage of the federal Swamp Land Act of 1850 and similar State legislation in 1861, which provided incentives for the "reclamation" of "nuisance" swampland to reduce threats of vector-borne disease and to gain productive land for farming. Within the Delta, seasonally and tidally flooded land impeding agricultural development led to land reclamation and channelization, and subsequent habitat loss. More than a century ago, with little or no engineering analyses and limited construction tools, Delta residents began to build an intricate levee system to channel water and dry out land, which converted hundreds of thousands of acres of seasonally and tidally flooded wetlands into fertile agricultural fields. As a result of continued land use change and urbanization, 95 percent of the historical tidal marsh in the Delta has been lost. Further detail regarding the historical Delta landscape is provided in Chapter 4.

Hydraulic gold mining, which reached its peak in the 1860s, sent tons of mercury-laden debris down toward the Delta, clogging channels and streams, and leading to devastating floods. Corrective actions—dredging and new levee construction—resulted in the loss of 90 percent of the Central Valley's riparian habitat (Katibah 1984). This massive-scale destruction has had lasting consequences for ecosystem health and, in turn, declining ecosystem health has had direct consequences for water supply operations.

The Hetch Hetchy and Mokelumne aqueducts diverted water (as they do currently) before it reached the Delta, and water use upstream increased considerably during the mid- and late 1900s. Construction of the CVP and SWP in the 1940s and 1960s, respectively, introduced new pressures on the Delta. Indeed, it is unusual to use an estuary—normally where fresh and salt water mix according to variable tidal and tributary flows—as a conveyance system for large amounts of fresh water to meet seasonal user demands.

The resulting configuration today causes river channels at times to run backward; and some fish, lacking clear migration corridors and/or migration cues, end up in dead-end channels or, worse yet, “salvaged” at the export pumps. Conflict between these competing uses was soon apparent and continues to plague water policy today.

Fish species have changed over time in response to changing habitat and flows, and from introductions both planned and accidental. Among the first introductions, in 1879, were two eastern game fish—striped bass and American shad. Today, striped bass, which are voracious predators, both support a major sport fishery and are blamed by some for the decline of smelt and salmon. Among the accidental tourists who came to stay are Asian clams, voracious eaters who can deplete the water of nutrients for native species. Of the more than 50 species of fish in the Delta today, more than half, including the most successful, are nonnative.

In addition, growing agricultural production in the Central Valley has resulted in increased runoff of pesticides and fertilizer flowing to the Delta. Runoff and wastewater discharges from increasing upstream urbanization have altered Delta water quality and, thus, its ecosystem. Increased commercial and recreational boat traffic in the Delta, as well as other causes, have introduced many nonnative species that have altered the Delta ecosystem.

The Delta as a Unique and Evolving Place

The Delta is a unique place distinguished by geography, legacy communities, a rural and agricultural setting, vibrant natural resources, and a mix of economic activities. Much has changed over the past 160 years; and although some may desire to maintain a static picture of the Delta as it is today, the past, as well as emerging science, predict constant change.

Once a marshland that was the drain of the vast Central Valley watershed, the Delta changed dramatically following the discovery of gold on the American River in 1848. Suddenly, large numbers of prospectors and service providers were beating a pathway through the Delta to the foothills and, at the peak of the rush, more than 300 steamboats plied the waters between San Francisco and Sacramento. Twenty-one years later, completion of the transcontinental railroad in 1869 freed a huge workforce, many of whom found alternative work dredging Delta channels and building levees.

Communities developed to support river traffic to and from the gold country, and later to transport agricultural products from the newly productive farmland reclaimed from the Delta marshes. The advent of the automobile resulted in a flurry of ferry construction and bridge building in the 1920s; by the 1930s, cars and trucks were replacing steamships for transportation and commercial shipping. The Stockton Deepwater Ship Channel was completed in 1933, opening a direct connection from the San Joaquin Valley to the world, and 30 years later, the Sacramento Deepwater Ship Channel did the same for the Sacramento Valley. Not coincidentally, these channels also opened the Delta to a host of exotic invasive species that hitched rides on the bottoms and in the ballast of oceangoing freighters.

Central Valley Chinook salmon have long been a critically important part of California’s fishing industry, passing through the Delta on their way from and to spawning grounds in upstream rivers and streams. Between 1900 and 1950, the fall run numbered more than a million fish returning annually to the Sacramento and San Joaquin river systems. Drought and changing Delta and ocean conditions, however, reduced those numbers to only 66,000 in 2008, resulting in a closure of the salmon fisheries off California and restrictions that lingered into 2010, devastating fishing economies (DFG 2009).

Dredging opened many of the Delta channels for sport fishing, recreational boating, and commercial enterprise. Today there are more than 100 marinas and waterside resorts, RV parks, grocery stores, and dockside restaurants; and house boating remains popular. The Delta is dotted with numerous public parks and fishing sites as well.

The Delta now is a major producer of corn, alfalfa, pasture, and tomatoes; and wine grapes are growing in prominence. Residents and visitors alike celebrate the Delta's agricultural heritage with the Asparagus Festival in Stockton and the Courtland Pear Fair.

Today, although still largely rural, the Delta is crisscrossed by interstate electric transmission lines, natural gas pipelines, and interstate roads and railroads; and it faces increasing pressure—at least on its periphery—for additional housing development. Those elements, combined with the increasing certainty of sea level rise and changing climate patterns, mean continual change for the Delta.

The Delta Problem

In California, sustainable management of the Delta is an exceedingly complex topic fraught with longstanding conflicts and challenges. The Delta and Suisun Marsh ecosystem is the largest estuary on the West Coast and a critical stopping point on the Pacific flyway. The estuary extends westward to the Golden Gate and southward to San Jose. Delta water also flushes southern San Francisco Bay. It is also the hub of the state's major water supply systems. But the Delta today is failing to balance the tradeoffs inherent in these functions, as well as to provide a place to live, work, and play for residents and visitors alike.

Today the Delta is relied upon for many services and, as a result, is not meeting the demands of farmers and urban water users who want assurances of supply and, in some cases, more water. Nor does the Delta adequately serve the needs of fish and wildlife—some threatened or endangered species' numbers remain perilously low. And the Delta itself remains inherently floodprone.

Fish Declines. In late 2004, scientists noted that several fish species in the upper San Francisco estuary (delta smelt, young striped bass, longfin smelt, and threadfin shad) had remained unusually low since 2001. Although the numbers had historically fluctuated, this steep and lasting dropoff signaled an ecological crisis. Scientists acknowledged many causes such as invasive and predatory species, upstream agricultural and urban runoff, and diminished Delta habitat. The export pumps of the SWP and CVP were culpable as well, and restrictions ensued.

Water Exports Cut. These regulatory and court-ordered restrictions on State and federal pumping, in combination with the 2007–2009 drought, significantly reduced exported water deliveries to SWP and CVP contractors. As a result, some San Joaquin Valley farmers pumped groundwater from already overtapped aquifers, fallowed fields, and, in some cases, plowed under permanent crops. The national economic recession, combined with reduced water deliveries, hit the San Joaquin Valley hard. Although the plight of farmers captured much media attention, the salmon fishery was shut down in 2008 and was restricted in 2009–2010, causing economic hardship for the commercial and recreational fishing industries. Urban water managers in the Bay Area and Southern California drew down storage and increased conservation efforts until the rains and snows of 2011 saved the day.

DELTA BY THE NUMBERS

- The 45,600-square-mile Delta watershed provides all or a portion of surface water or groundwater supplies to more than 27 million California residents.
- Approximately 8 percent of the state's water supply is exported from the Delta (DWR 2009).
- The Delta and Suisun Marsh support more than 55 fish species and more than 750 plant and wildlife species. Of these, approximately 100 wildlife species, 140 plant species, and 13 taxonomic units of fish are considered special-status species and are afforded some form of legal or regulatory protection (CNDDB 2010, USFWS 2010, CNPS 2010).
- The Delta and Suisun Marsh are home to more than one-half million residents living in dozens of communities, including portions of 12 incorporated cities such as Stockton and Sacramento, and support more than 146,000 jobs (DPC 2010).
- Approximately 57 percent of the Delta and Suisun Marsh—more than 480,000 acres of agricultural land—currently supports a highly productive agricultural industry that is valued at hundreds of millions of dollars annually (DWR 2007a, DWR 2007b, DOC 2008, DPC 2010).
- The Delta and Suisun Marsh levees and lands support interstate and state highways and railroad tracks that support intrastate and interstate traffic, more than 500 miles of major electrical transmission lines, 60 substations, and more than 400 miles of major natural gas pipelines that provide energy throughout Northern California, as well as critical pipelines that carry transportation fuels to airports and other fuel depots throughout the San Francisco Bay Area and Sacramento (DPC 2010, DWR 2009).
- The Delta and Suisun Marsh have more than 1,335 miles of levees that protect more than 800,000 acres of land and play a role in the water supplies conveyed through the Delta.
- The Delta experiences more than 12 million visitor days annually from recreational boaters (DPC 2012).* Fishing, hunting, birdwatching, and camping draw even more visitors to the area.

* The *Sacramento–San Joaquin Delta Boating Needs Assessment* (2000-2020) estimated 6.4 million annual boating-related visitor days and 2.13 million boating trips to the Delta in 2000 (DBW 2002).

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Lawsuits. Over the years, improved understanding about water quality needs and environmental protection in the Delta launched an era of complex regulation that today governs SWP and CVP water supply operations. Litigation over a host of issues related to the CVP and SWP has created a recent spate of water management actions guided by courtroom decisions. Incomplete understanding about how water project operations, pollution, invasive species, and other factors affect native Delta fish species has resulted in a regulatory scheme affecting water supplies that is characterized by uncertainty. Changing rules to curtail pumping and increase Delta outflow have compounded water supply uncertainty for agencies that use water conveyed through the Delta, particularly in drier years when ecosystem conflicts are most pronounced. Some of those agencies have contributed to the uncertainty by becoming increasingly reliant on Delta exports that were intended to be supplemental supplies, but in some cases are now relied upon as core water supplies.

Flood Threats. Adding to the complexity of these problems is the increasing volatility of Delta water supplies as a consequence of climate change, including more rain and less snow, earlier snowmelt, and higher winter and lower spring-summer runoff patterns. The potential for catastrophic levee failure in the Delta and the risk to residents and infrastructure alike posed by floods, sea level rise, earthquakes, and land subsidence is real, growing, and has outpaced the State's ability to manage and fund risk-reduction measures.

Pursuit of Balance. Finding the right balance of these competing needs and demands on the Delta has bedeviled California policy makers for decades. The media and the political system tend to focus on water supply shortages, droughts, flood risk, and the decline of fisheries. Although notable and consequential, these events are all symptoms of a greater resource problem. Not unlike other policy areas, when it comes to natural resource issues, California has long attempted to manage symptoms rather than treat core problems.

Governance and the Delta Reform Act of 2009

California has a history of addressing each problem with yet another project and/or program, each generally left to find its own way among all others already set in motion or completed. Today, more than 200 federal, State, regional, and local agencies have responsibility for some aspect of the Delta. As each agency focuses on its specific mission, cooperation, collaboration, and cohesiveness have at times been elusive.

Although the seeds were sown in governmental decisions throughout the early twentieth century, California's water "wars" came to a head during the years 1987 through 1992, when a 6-year drought in California slowed water deliveries, water quality deteriorated, and two fish species unique to the Delta—the delta smelt and winter-run Chinook salmon—were pushed to the brink of extinction. During these 6 drought years, average runoff to the state's two largest rivers dipped dramatically: 44 percent into the Sacramento River and 53 percent into the San Joaquin.

State and federal officials tried, often in conflict with each other, to deal with issues of water quality, protection of Delta fisheries, and water impacts on the state's urban and agricultural water users. In the early 1990s, endangered species listings by federal fish agencies imposed export restrictions on water users. SWRCB efforts to address aquatic resource degradation under State water laws ground to a halt after the governor complained about excessive federal interference under both the Endangered Species Act and the Clean Water Act. In 1991, the U.S. Environmental Protection Agency (USEPA) formally disapproved the SWRCB water quality control plan; and in 1992, Congress passed the Central Valley Project Improvement Act (CVPIA), which reallocated a significant portion of federal (CVP) water supplies to environmental purposes. Virtually every action taken by a State or federal agency during this period ended up in court.

Amid this chaos of competing interests and regulations, the cornerstone for future cooperation was laid when three long-time adversarial interests—environmentalists, agriculture, and urban water users—agreed to work together to find common ground. Four federal agencies—the USEPA, Bureau of Reclamation, National Marine Fisheries Service, and U.S. Fish and Wildlife Service—began collaboration on Delta issues and became known as "Club Fed." After being on the losing side of a 5-year-long State-federal tug of war over water quality standards, the State and federal administrations negotiated updated water quality standards and, in 1995, created the CALFED Bay-Delta Program.

After 5 years of negotiations and planning, the CALFED agencies completed an ambitious 30-year plan and record of decision heavily dependent on goodwill, generous State and federal funding, and Delta conditions remaining generally as they had in the immediate past. Instead, goodwill and funding evaporated in the face of fiscal crisis, scientists learned more about looming effects of climate change and emerging stressors on the Delta, and competing interests turned back to the courts to force one viewpoint or the other.

While CALFED attempted to bring a holistic focus, it was criticized for not having authority to hold individual agencies and projects accountable for interrelationships and progress and—toward the end of its first 7 years (Stage 1, 2000 through 2008)—for not being focused enough on the Delta. And yet the inescapable truth remains: actions that affect the Delta's ecosystem and its ability to provide a reliable amount of water for export are inextricably linked. The Delta Vision Task Force, created by then-Governor Arnold Schwarzenegger in 2006 to point the path forward from CALFED, reinforced the need for integration and linkage in both its 2008 *Vision for the Delta* and its *Strategic Plan*.

IS MORE GOVERNANCE REFORM NEEDED?

Senate Bill X7 1 (SBX7 1), which included the Delta Reform Act, enacted the most significant governance reform related to water and the Delta since the mid-twentieth century. Two new bodies were formed, the Sacramento-San Joaquin Delta Conservancy and the Council; the Delta Protection Commission was reorganized; and a new Delta Watermaster position was created at the SWRCB. However, some argue that governance change should not stop there.

In recent years, two nonpartisan and independent entities have proposed new water and Delta governance models, with the State's Little Hoover Commission (LHC) releasing reports in 2005 and 2010, and the Public Policy Institute of California (PPIC) releasing reports in 2007 and 2011.* Their conclusions are summarized here.

Little Hoover Commission: LHC is an independent state oversight agency established in 1962. It has a mission to identify and spur government reform in various policy areas, and has confronted the topic of water governance multiple times. In August 2010, LHC proposed dramatic restructuring of Delta and water governance in its report *Managing for Change: Modernizing California's Water Governance* (www.lhc.ca.gov).

Public Policy Institute of California: Established in 1994, the mission of PPIC is to inform and improve public policy in California through independent, objective, nonpartisan research. In 2011, PPIC released *Managing California's Water: From Conflict to Resolution* (Hanak et al. 2011), which focused more on thematic reforms building on current practices such as increasing urban water conservation and streamlining water transfers (www.ppic.org).

Although PPIC and LHC would remake water governance differently, both proposals have considerable thematic overlap:

- California lacks a system to adequately incorporate the needs of public trust resources with water supply management and planning.
- California lacks a centralized leadership structure to set statewide policy goals and manage inevitable conflicts.
- The institutional separation of water rights planning, administration, and enforcement responsibilities from water supply management complicates policy making.
- Insufficient incentives exist to promote regional cooperation and local consistency with State policy directions.
- There is concern that the demands of California Department of Water Resources' role in managing the SWP conflicts with its overall statewide water planning responsibilities.

This Delta Plan recommends governance reform related to regional Delta participation in flood management activities. As part of its role in coordinating overall efforts in the Delta, the Council will hold hearings and recommend additional governance reform to the Legislature.

** LHC 2005, LHC 2010, Lund et al. 2007, Hanak et al. 2011*

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The recommendations from the Delta Vision Task Force, along with general understanding and support from a wide variety of competing interest groups, allowed the Legislature, in 2009, to craft a package of bills that would, for the first time, begin to define those linkages in law and require accountability for implementation. In addition to the Delta Reform Act, the package included measures that set ambitious water conservation policy (20 percent reduction in statewide urban per capita water use by 2020), ensure better groundwater monitoring, and provide for increased enforcement to prevent illegal water diversions. It also included a bond measure that would help fund implementation of various parts of the package, and local and regional water supply and ecosystem projects.

The fifth bill in the package was Senate Bill X7 1 (SBX7 1), which included the Delta Reform Act. With its passage, California embarked upon a new era in Delta governance with creation of the Council, and established as overarching State policy coequal goals of a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem. Through its hybrid approach—both regulatory and collaborative—the Council now has the task of facilitating coordination across a broad range of entities to achieve the State's water policy objectives.

The Delta Reform Act includes an important caveat: while past Delta efforts focused almost exclusively on water supply reliability or ecosystem protection, the Delta Reform Act requires that the coequal goals be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place.

In addition, the Delta Reform Act recognized the need to change the way the Delta is viewed, asking not what can be taken, but instead what can be given back. Thus, the Legislature established that the policy of the State is to reduce reliance on the Delta in meeting future water supply needs through a statewide strategy of investing in improved regional supplies, conservation, and water use efficiency. The Delta Reform Act specifies that each region depending on water from the Delta watershed shall improve its regional self-reliance for water through investment in water use efficiency, water recycling, advanced water technologies, local and regional water supply projects, and improved regional coordination of local and regional water supply efforts.

Finally, in a distinct departure from CALFED and the status quo of disparate agencies struggling to tackle complex modern resource problems, the Council was established with the authority and responsibility to develop a legally enforceable Delta Plan, and to coordinate and collaborate across the myriad governmental agencies that have responsibility for some aspect of the Delta. The Council also was charged with ensuring that actions by State and local agencies in the Delta are consistent with the Delta Plan, and adequately incorporate the best available science and adaptive management principles.

The Delta Plan

The foundation of the Delta Reform Act is the adoption of the coequal goals and direction to the Council to develop an enforceable Delta Plan to further those goals. Figure 1-4 shows the primary area covered by the Delta Plan, including features and uses referred to in policies and recommendations. Accordingly, the Council presents a Delta Plan that is practical, foundational, integrated, and adaptive:

- **Practical:** The Delta Plan builds on years of planning efforts and incorporates actions, recommendations, and strategies developed by other entities—governmental and nongovernmental—that have already invested countless hours on Delta issues and have specialized expertise.
- **Foundational:** The Delta Plan addresses intertwined challenges and establishes foundational actions for Delta management throughout this century. It lays the groundwork for near-term actions for improvement and focuses on the immediate avoidance of further harm or increased risk to the Delta. The Delta Plan shines a spotlight on urgently needed Delta habitat projects and the significant potential for local and regional water supply development. Similarly, the Delta Plan seeks to immediately halt practices known to be detrimental to the sustainability of the Delta's many functions and services.
- **Integrated:** The Delta Plan establishes an open and accountable governance mechanism for coordinating actions across agency jurisdictions and statutory objectives.

The Delta Plan

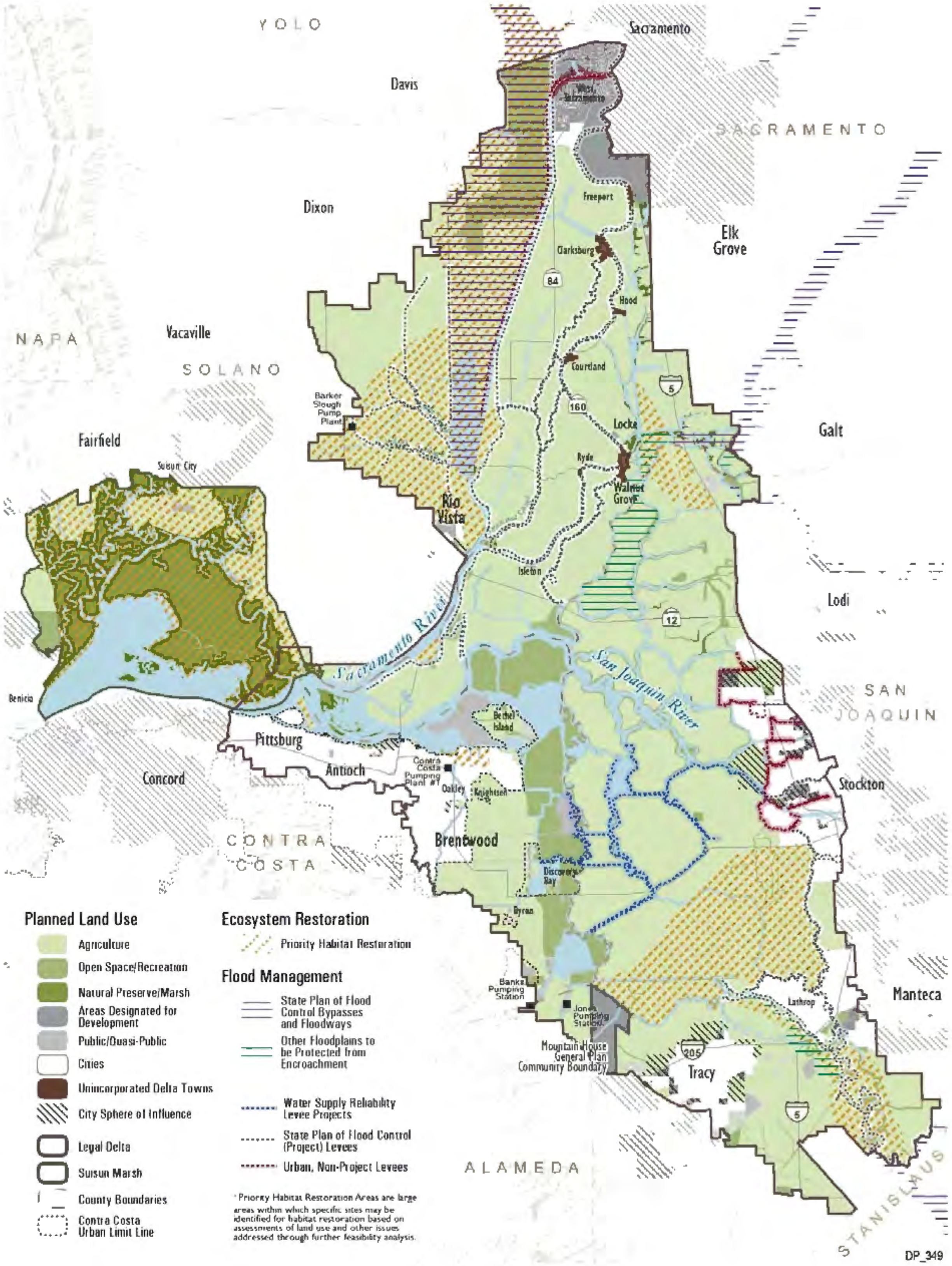

Figure 1-4 The map shows land uses designated by city and county general plans. Within cities' spheres of influences (SOIs), the map shows land use designations proposed in city general plans, where available. In cases where cities have not proposed land uses within their SOIs, the map shows land uses designated by county general plans.

Sources: City of Benicia 2003, Contra Costa County 2008, Contra Costa County 2010, DWR 2011b, DWR 2011c, DWR 2011d, City of Fairfield 2008, Jones & Stokes 2007, City of Lathrop 2012, City of Manteca 2012, Mountain House Community Services District 2008, City of Rio Vista 2001, SACOG 2009, City of Sacramento 2008, Sacramento County 2011, Sacramento County 2013, Sacramento County 2013, San Joaquin County 2008a, San Joaquin County 2008b, Solano County 2008a, Solano County 2008b, South Delta Levee Protection and Channel Maintenance Authority 2011, City of Stockton 2011a, City of Stockton 2011b, City of Suisun City 2011, City of Tracy 2011, City of Stockton 2011b, City of West Sacramento 2010, Yolo County 2010a, Yolo County 2010b.

- **Adaptable:** The Delta Plan sets direction through policies and recommendations and can incorporate other plans and new information as it becomes available. Informed by science and consistent monitoring, portions of the Delta Plan that do not adequately meet or make progress toward stated goals over time will be refined or revised. The Delta Plan will be updated at least every 5 years, and likely sooner, given the major changes facing the Delta under the Bay Delta Conservation Plan (BDCP) and the Council's commitment to Delta levee prioritization.

It is inevitable that the Delta Plan will generate controversy. This Delta Plan integrates existing State and federal laws and policies and ongoing programs, and is informed by the best available science to chart a course to further the coequal goals. The Council is one of many agencies with an interest in the Delta, and it was not granted unlimited authority over actions related to water supply and the environment. Specific and targeted authority and actions, however, were included by the Delta Reform Act; these form the basis for the Delta Plan's enforceable policies and nonenforceable recommendations.

The Delta Plan's policies and recommendations are based on the following imperatives:

- **Act now.** We have been studying the problems of California's water supply and the declining Delta ecosystem for decades. While all parties agree the *status quo* is not acceptable, failure to take action only prolongs a worsening *status quo*. Near-term actions must move forward while the long-term conveyance, storage, and ecosystem solutions are being decided over the next 5, 10, and 15 years. Waiting is NOT an option. We must continue to invest in the Delta ecosystem and in the improvement of California's water supplies and water use efficiency.
- **Success depends on integrated approaches and awareness of tradeoffs.** Tradeoffs are inherent in managing a supply for multiple benefits. Water exports out of the Delta can harm the ecosystem unless carefully managed. Protecting the Delta as a place means focusing development in urban areas to reduce effects on agricultural land, and risk to people, property, and state interests. Multiple stressors affect the ecosystem in ways that are not yet fully understood and which may be impossible to completely control. The most effective actions will depend upon the coordinated actions of multiple actors.
- **Improve water supply reliability.** Fundamentally, water supply reliability means that California must better match its demands for and use of water to the available supply. Everyone in California must conserve water and must increase their efforts to do so. New surface and groundwater storage is necessary to manage the timing of water for people and for fish. Done right, additional storage can make efficient water management possible and better allow for water use that is wildlife friendly. Improved Delta conveyance, including successful completion of the BDCP, is essential; and it should be done as soon as possible.
- **Commit to Delta ecosystem restoration.** We must preserve land in the Delta for future habitat restoration, and we must immediately begin restoration efforts on long-studied priority areas. In the Delta, the conflict between the way we move water and the health of native species must be resolved. A successfully permitted BDCP is key to that, including water quality objectives updated by the SWRCB for beneficial uses including the Delta's ecosystem. Without adequate water flow (the right mix of timing and amount), we cannot expect fisheries to recover, no matter how well we deal with the range of other stressors.
- **Preserve Delta as a place.** The Delta serves many demands, but we must preserve and protect a unique sense of place distinguished by geography, legacy communities, a rural and agricultural setting, vibrant natural resources, and a mix of economic and recreational activities.

What the Delta Plan Will Achieve

The Delta Plan seeks to further the coequal goals and their inherent objectives in the face of dramatically changing conditions. The Delta of 2100 likely will be very different from the Delta of today (see Table 1-1 for examples of anticipated changes). Some of the changes will be intentional or predictable, and others will be unintended and surprising. Changes are likely or expected to result from population growth, climate change and sea level rise, land subsidence, and earthquakes—most beyond human ability or willingness to control. Human-made changes in land use and water use are also expected to continue.

All of this will involve tradeoffs between competing—in some cases, mutually exclusive—values, goals, and objectives. The Delta Plan seeks to ensure that these decisions are made in a timely and open manner, and based on best available information and science as a predictor of the future. The law requires that the Delta Plan be updated every 5 years, and each update is intended to build on an evolving base of knowledge, directing near- and mid-term actions, and preserving and protecting longer-term opportunities as yet unknown.

Summary of Anticipated Changes Affecting the Delta by 2050 and 2100

TABLE 1-1

Anticipated Change	Change Predicted by 2050	Change Predicted by 2100
Population of California[a]	Increase from 37.2 million in 2010 to 51 million	Continued increase in population
San Francisco Bay/East Bay Area earthquake affecting Delta by 2032[b]	63% probability of at least one magnitude 6.7 or greater earthquake	
Probability of island flooding from high water, relative to 2005 conditions[c]	In range of 200% increase (medium risk scenario)	In range of 450% increase (medium risk scenario)
Increased weather variability, including longer-term droughts[d]	Models and analyses of tree rings and other evidence back to the year 800 suggest greater variability and long periods of drought, especially for the Colorado River Basin, a current source of some water to California.	
Sea level rise, relative to 2000[e]	14 inches	55 to 65 inches
Snow pack, relative to 1956–2000 average of 15 MAF[f]	Reduction of 25% (4.5 MAF) to 40% (6 MAF)	Continued reduction expected

a California Department of Finance 2012

b 2007 Working Group on California Earthquake Probabilities 2008

c DWR 2008

d For examples, see research by Richard Seager, Columbia University, available at http://www.ldeo.columbia.edu/res/div/ocp/drought/, or the California Global Climate Change Portal, available at http://www.climatechange.ca.gov

e California Ocean Protection Council 2011; other sources include higher projections

f DWR 2010

MAF: million acre-feet

The Delta Plan lays out 14 regulatory policies and 73 recommendations that start the process of addressing the current and predicted ecological, flood management, water quality, and water supply reliability challenges. As required by statute, the Delta Plan adopts a science-based adaptive management strategy to manage decision making in the face of uncertainty (Water Code section 85308(f)). All of these changes—some foreseeable, some not—will create a dynamic context in which the Delta Plan must adapt.

Over the life of the Delta Plan, the coequal goals of providing a more reliable water supply for California and restoring the Delta ecosystem are the foundation of all State water management policies. No water rights decisions or water contracts that directly or indirectly impact the Delta are made without consideration of the coequal goals. Over time, balanced application of the Public Trust Doctrine and the California Constitution, Article 10, Section 2 (requirements for beneficial use, reasonable water use, and no waste), have produced optimized water use, including high levels of water use efficiency and protection of public trust resources throughout the state. California has a comprehensive, fully integrated system for tracking and evaluating actual water use and water quality for both surface water and groundwater supplies.

The Delta Plan seeks first to arrest declining water reliability and environmental conditions related to the Delta ecosystem, and ultimately to improve them. It seeks to achieve a more resilient ecosystem that can absorb and adapt to current and future effects of multiple stressors. Additionally, it seeks to reduce flood risk, improve water quality, increase recreation opportunities in the Delta, and protect Delta legacy communities. Generally speaking, these are long-term goals to reduce and reverse increasing long-term environmental impacts caused by inaction. The vision of the Delta in 2100 will be realized through a series of near-term and longer-term actions informed by performance measures and overall adaptive management.

By 2100:

- **California's water supply** will be considerably more efficient, local and regional projects will be online to increase supplies and meet the demands of a growing population, and storage will have increased to meet the challenge of climate change and the needs of water transfer systems. Regions reliant on receiving some portion of their water from the Delta watershed will have reduced their reliance and improved regional self-reliance through increased conservation and diversification of their local and regional sources of supply. Delta conveyance will be managed in an adaptive manner that successfully balances ecosystem restoration and protection with more reliable water deliveries. Water quality in the Delta will support a healthy ecosystem and the multiple beneficial uses of water, including municipal supply and recreational uses such as fishing and swimming.
- **The Delta and Suisun Marsh ecosystem** will have the capacity to provide the environmental and societal benefits the public demands (viable populations of desired species, wild habitats for recreation and solace, land for agriculture, and the conveyance of reliable and high-quality fresh water). Large areas of the Delta will be restored in support of a healthy estuary. A diverse mosaic of interconnected habitats will be re-established in the Delta and its watershed. Migratory corridors for fish, birds, and terrestrial wildlife will be largely protected and restored. Actions have been taken to ensure that sufficient freshwater flows following a more natural, functional hydrograph are now dedicated to support a healthy ecosystem. Actions have reduced the impacts caused by stressors such as invasive species, poor water quality, loss of habitat, and urban development, resulting in improved conditions for native species of fish, birds, and wildlife that depend on the Delta and its watershed.

- **The Delta itself** will be a safe, nationally recognized and vibrant place, with well-defined cities and towns, a strong agricultural sector, and a well-deserved reputation as a recreational destination. Despite an increase in sea levels and altered runoff patterns, risks will be reduced, and residents and agencies will be prepared to respond when floods threaten. In 2100, the Delta will retain its rural heritage and be a place where agricultural, recreational, and environmental uses are uniquely integrated and continue to contribute in important ways to the regional economy.

Timeline for Implementing Priority Actions of the Delta Plan

Figure 1-5 contains a timeline for implementing the priority actions contained in the Delta Plan. The timeline emphasizes near-term and intermediate-term actions. In some instances, precedent or complementary actions need to be undertaken by other agencies or entities to ensure success of the Delta Plan.

Priority Action Timeline

TIMELINE **CHAPTER 1: Priority Actions**

	ACTION (REFERENCE #)	LEAD AGENCY(IES)	NEAR TERM 2012–2017	INTERMEDIATE TERM 2017–2025	ACTION DEPENDS ON
POLICIES	**Reduce reliance on the Delta through improved regional water self-reliance** (WR P1)	Council, DWR, SWRCB	●	●	State, local water agency cooperation and compliance
	Delta flow objectives (ER P1)	SWRCB	●	●	SWRCB completes on time
	Prioritization of State investments in Delta levees and risk reduction (RR P1)	Council, DWR	●	●	Council completion; legislative adoption and implementation
RECOMMENDATIONS	**Update Delta flow objectives** (ER R1)	SWRCB	●	●	SWRCB completes on time
	Prioritize and implement projects that restore Delta habitat (ER R2)	DFW, DWR, Delta Conservancy	●	●	Funding, multiagency cooperation
	Designate the Delta as a National Heritage Area (DP R1)	DPC	●		Federal action, Congress
	Finance local flood management activities (RR R2)	DPC	●	●	
	Actions for the prioritization of State investments in Delta levees (RR R4)	Council, DWR	●		Council completion; legislative adoption and implementation
	Complete Bay Delta Conservation Plan (WR R12)	DWR, Council incorporates	●	●	State, federal agency action
	Complete surface water storage studies (WR R13)	DWR	●	●	
	Completion of regulatory processes, research, and monitoring for water quality improvements (WQ R8)	SWRCB, RWQCBs	●		
	Development of a Delta Science Plan (G R1)	Council	●	●	
OTHER	Complete Delta Finance Plan	Council	●		Ongoing funding
	Initiate Delta Plan Interagency Implementation Committee	Council	●	●	Agency cooperation
	Evaluate and update Delta Plan	Council	●		Ongoing funding

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Agency Key:

Council: Delta Stewardship Council
Delta Conservancy: Sacramento-San Joaquin Delta Conservancy
DFW: California Department of Fish and Wildlife
DPC: Delta Protection Commission
DWR: California Department of Water Resources
RWQCB: Regional Water Quality Control Board
SWRCB: State Water Resources Control Board

Figure 1-5

Organization of the Delta Plan

The Delta Plan is organized around the coequal goals and specific subgoals, strategies, actions, and measures set forth in the Delta Reform Act. The following chapters describe in detail the problems, expected outcomes, and performance measures associated with the various policies and recommendations:

- Chapter 2, The Delta Plan
- Chapter 3, A More Reliable Water Supply for California
- Chapter 4, Protect, Restore, and Enhance the Delta Ecosystem
- Chapter 5, Protect and Enhance the Unique Cultural, Recreational, Natural Resource, and Agricultural Values of the California Delta as an Evolving Place
- Chapter 6, Improve Water Quality to Protect Human Health and the Environment
- Chapter 7, Reduce Risk to People, Property, and State Interests in the Delta

In addition, Chapter 8, Funding Principles to Support the Coequal Goals, provides history and background for water project and program financing by discussing various funding schemes and by providing some current data on water-related expenditures in California. It also outlines guiding principles for developing stable financing for Delta Plan implementation and describes urgently needed near-term funding requirements for certain critical activities.

References

2007 Working Group on California Earthquake Probabilities. 2008. The Uniform California Earthquake Rupture Forecast, Version 2 (UCERF 2). U.S. Geological Survey Open-File Report 2007-1437 and California Geological Survey Special Report 203. http://pubs.usgs.gov/of/2007/1437/of2007-1437_text.pdf, or Presentation to Delta Stewardship Council: http://www.deltacouncil.ca.gov/ delta_council_meetings/january_2011/Item_15_Presentation.pdf.

California Department of Finance. 2012. Interim Population Projections for California and its Counties 2010-2050, Sacramento, California. May. http://www.dof.ca.gov/research/demographic/reports/projections/interim/view.php.

California Ocean Protection Council. 2011. *Resolution of the California Ocean Protection Council on Sea-Level Rise*. March. http://www.opc.ca.gov/webmaster/ftp/pdf/docs/ OPC_SeaLevelRise_Resolution_Adopted031111.pdf.

City of Benicia. 2003. General Plan land use designations within Suisun Marsh. Digitized into GIS format by AECOM from City of Benicia Land Use map in 2012.

City of Fairfield. 2008. General Plan land use designations within Suisun Marsh. Received from the City of Fairfield in 2012.

City of Lathrop. 2012. General Plan Land Use map for the City of Lathrop. October. Site accessed March 14, 2013. http://www.ci.lathrop.ca.us/cdd/documents/.

City of Manteca. 2012. General Plan land use designations in GIS format. Received by Eryn Pimentel, AECOM, from Jeffrey Davis, City of Manteca, on September 4.

City of Rio Vista. 2001. General Plan land use designations in electronic non-GIS format. Site accessed 2009. http://www.riovistacity.com/images/Documents/chapter_04.pdf.

City of Sacramento. 2008. General Plan land use designations in electronic GIS format. Site accessed 2009. http://www.cityofsacramento.org/gis/data.html.

City of Stockton. 2011a. GIS layers for city spheres of influence and General Plan land use designations. Site accessed April 14, 2011. http://www.stocktongov.com/services/gis/mapdatDat.html.

City of Stockton. 2011b. General Plan land use designations in GIS format and General Plan land use designations within Suisun Marsh (digitized into GIS format by AECOM from Land Use map in 2012). Site accessed April 14, 2011. http://www.stocktongov.com/services/gis/mapdatDat.html.

City of Suisun City. 2011. General Plan land use designations within Suisun Marsh. Digitized into GIS format by AECOM from Land Use map in 2012.

City of Tracy. 2011. City of Tracy sphere of influence and General Plan land use designations provided in GIS format. Delivered via file transfer protocol from Victoria Lombardo, Senior Planner, City of Tracy, to Jessica Law, Urban and Environmental Planner, AECOM, on March 10.

City of West Sacramento. 2010. General Plan land use designations in GIS format. Site accessed December 28, 2010. http://www.cityofwestsacramento.org/services/gis/downloads.cfm. Accessed

CNDDB (California Natural Diversity Database). 2010. Records search of plan area quadrangles. California Department of Fish and Game, Sacramento, California.

CNPS (California Native Plant Society). 2010. Inventory of Rare and Endangered Plants. Site accessed February 2010. http://cnps.web.aplus.net/cgi-bin/inv/inventory.cgi.

Contra Costa County. 2008. GIS layer for Urban Limit Line for Contra Costa County. October. Site accessed June 27, 2011. http://ccmap.us/Details/asp?Product=134490.

Contra Costa County. 2010. GIS layer for City Spheres of Influence in Contra Costa County. January. Site accessed January 28, 2011. https://www.ccmap.us/catalog.asp?UserChoice=2&Layercntrl=0000000000000000000000.

DBW (California Department of Boating and Waterways). 2002. *Sacramento–San Joaquin Delta Boating Needs Assessment (2000-2020)*. Prepared by The Dangermond Group.

DFG (California Department of Fish and Game). 2009. *Outdoor California*. (page 8). July-August.

DOC (California Department of Conservation). 2008. Farmland Mapping and Monitoring Program 2008. Important Farmland designations for Alameda, Contra Costa, Sacramento, San Joaquin, Solano, and Yolo Counties. ftp://ftp.consrv.ca.gov/pub/dlrp/fmmp/.

DPC (Delta Protection Commission). 2010. *Economic Sustainability Plan Framework Study*. Final Draft. Submitted by Bay Area Economics in association with Rooney Tate Group Parus Consulting. December 6.

DPC (Delta Protection Commission). 2012. Proposal to Protect, Enhance, and Sustain the Unique Cultural, Historical, Recreational, Agricultural, and Economic Values of the Sacramento-San Joaquin Delta as an Evolving Place. January 26.

DWR (California Department of Water Resources). 2007a. *Past and Present Land Uses in the Sacramento-San Joaquin Delta and Suisun Marsh*. Water Plan Land and Water Use Work Team. November 21.

DWR (California Department of Water Resources). 2007b. Land use survey agricultural crop data for the Legal Delta and Suisun Marsh area. Developed for the Delta Vision program. Received by AECOM from DWR.

DWR (California Department of Water Resources). 2008. *Delta Risk Management Strategy. Risk Analysis Report Final.* Tables 14-12 and 14-13. Raising levees to keep up with sea level rise is assumed (page 14-28). December. http://www.water.ca.gov/floodmgmt/dsmo/sab/drmsp/ docs/Risk_Report_Section_0_Final.pdf. See also: http://www.science.calwater.ca.gov/pdf/ drms/IRP_DRMS_Review_Final_20oct08.pdf and CALFED Independent Science Board assessment of DWR Delta Risk Management Strategy Phase 1, page 22: http://www.science.calwater.ca.gov/pdf/drms/Appendix_5_executive_summary_review.pdf.

DWR (California Department of Water Resources). 2009. *California Water Plan Update 2009*. Sacramento, CA. http://www.waterplan.water.ca.gov/cwpu2009/index.cfm.

DWR (California Department of Water Resources). 2010. *Climate Change Characterization and Analysis in California Water Resources Planning Studies.* Final Report. December.

DWR (California Department of Water Resources). 2011a. Dayflow. Estimate of Average Daily Outflow. Site accessed August 2011. http://www.water.ca.gov/dayflow/.

DWR (California Department of Water Resources). 2011b. Floodplain inundation and floodways in the vicinity of the Sacramento-San Joaquin Delta.

DWR (California Department of Water Resources). 2011c. Locations and attributes of levees in California as maintained by the DWR California Levee Database.

DWR (California Department of Water Resources). 2011d. Restoration opportunity areas in the Sacramento-San Joaquin Delta.

Hanak, E., J. Lund, A. Dinar, B. Gray, R. Howitt, J. Mount, P. Moyle, and B. Thompson. 2011. *Managing California's Water: From Conflict to Reconciliation*. San Francisco, CA. Public Policy Institute of California.

Hart, John. 2010. The once and future Delta. *Bay Nature*. April 1, 2010. http://baynature.org/articles/apr-jun-2010/the-once-and-future-delta/once-future-delta.

Jones & Stokes. 2007. *Draft Environmental Impact Report North Delta Flood Control and Ecosystem Restoration Project*. Volume 2-Figures. November.

Katibah, E. F. 1984. A brief history of riparian forests in the Central Valley of California. In *California Riparian Systems: Ecology, Conservation, and Productive Management*. R. E. Warner and K. M. Hendrix, eds. (pages 23–29). University of California Press, Berkeley.

LHC (Little Hoover Commission). 2005. Still Imperiled, Still Important. The Little Hoover Commission's Review of the CALFED Bay-Delta Program. November 17.

LHC (Little Hoover Commission). 2010. *Managing for Change: Modernizing California's Water Governance*. Report 201. August.

Lund, J., E. Hanak, W. Fleenor, R. Howitt, J. Mount, P. Moyle. 2007. *Envisioning Futures for the Sacramento-San Joaquin Delta*. Public Policy Institute of California. San Francisco, CA.

Mountain House Community Services District. 2008. Mountain House Zoning map. September 18, 2008. Site accessed July 27, 2011. http://www.ci.mountainhouse.ca.us/master-plan.asp.

SACOG (Sacramento Area Council of Governments). 2009. GIS layer for spheres of influence in SACOG region. December. Site accessed January 28, 2011. http://sacog.org/mapping/clearinghouse/Mapping Center.

Sacramento County. 2011. General Plan land use designations in GIS format. Site accessed 2012. http://www.sacgis.org/GISDataPub/Data/.

Sacramento County. 2012. Letter from Sacramento County to the Delta Stewardship Council, Re: Revised Maps of the Unincorporated Delta Communities. November 20.

Sacramento County. 2013. Sacramento County Online Map, Sacramento County, California. Site accessed March 10, 2013. http://generalmap.gis.saccounty.net/JSViewer/county_portal.aspx.

San Joaquin County. 2008a. City of Lathrop sphere of influence map. March 4. Site accessed February 3, 2011. http://www.sjgov.org/lafco/SOI%20Maps/Lathrop_Sphere_new%202008.pdf.

San Joaquin County. 2008b. City of Manteca sphere of influence map. October 29. Site accessed February 3, 2011. http://www.co.san-joaquin.ca.us/lafco/Manteca%20MSR/Manteca_Sphere.pdf.

Solano County. 2008a. GIS layers for city spheres of influence and General Plan land use designations in Solano County. May. Site accessed August 10, 2011. http://regis.solanocounty.com/data.html.

Solano County. 2008b. General Plan land use designations provided in GIS format. Obtained 2009.

South Delta Levee Protection and Channel Maintenance Authority. 2011. *Lower San Joaquin Flood Bypass Proposal*. March.

USFWS (U.S. Fish and Wildlife Service). 2010. Records search of Federal Endangered and Threatened Species in plan area quadrangles. Site accessed February 16, 2010. http://www.fws.gov/ sacramento/es/spp_lists/auto_list.cfm.

Western Regional Climate Center. 2011. California climate tracker database query. Statewide annual precipitation by water year from 1896-2010. Site accessed July 2011. http://www.wrcc.dri.edu/monitor/cal-mon/frames_version_html.

Yolo County. 2010a. General Plan land use designations in GIS format. Site accessed 2010. http://www.yolocounty.org/Index.aspx?page=823.

Yolo County. 2010b. Yolo County General Plan 2030 layer provided in GIS format. Delivered via file transfer protocol from Marcus Neuvert, GIS Specialist, Yolo County DITT, to Dillon Cowan, Staff Engineer, CH2M HILL, Inc., on July 1.

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CHAPTER 2

The Delta Plan

ABOUT THIS CHAPTER

This chapter discusses the purpose and role of the Delta Stewardship Council (Council) in the context of Sacramento-San Joaquin Delta (Delta) governance. It also describes the Council's approach to developing, implementing, and updating the Delta Plan, all within the framework of adaptive management. It describes why best available science and adaptive management are particularly important tools in the Delta, and proposes the development of a new Delta Science Plan to aid in the coordination and focus of science efforts across agencies. For State of California (State) or local agencies that propose a plan, program, or project occurring in whole or in part in the Delta, this chapter contains a description of the regulatory application of the Delta Plan. For instance:

- What is a covered action?
- Certifications of consistency
- Covered action consistency appeals

The chapter includes one policy and one recommendation.

RELEVANT LEGISLATION

The Sacramento-San Joaquin Delta Reform Act of 2009 established the Delta Stewardship Council to achieve more effective governance while providing for the sustainable management of the Delta ecosystem and a more reliable water supply, using an adaptive management framework, as reflected in the Water Code sections below.

> *85001 (c) By enacting this division, it is the intent of the Legislature to provide for the sustainable management of the Sacramento-San Joaquin Delta ecosystem, to provide for a more reliable water supply for the state, to protect and enhance the quality of water supply from the Delta, and to establish a governance structure that will direct efforts across state agencies to develop a legally enforceable Delta Plan.*
>
> *85020 (h) Establish a new governance structure with the authority, responsibility, accountability, scientific support, and adequate and secure funding to achieve these objectives.*
>
> *85022 (a) It is the intent of the Legislature that state and local land use actions identified as "covered actions" pursuant to Section 85057.5 be consistent with the Delta Plan. This section's findings, policies, and goals apply to Delta land use planning and development.*
>
> *85052 "Adaptive management" means a framework and flexible decision making process for ongoing knowledge acquisition, monitoring, and evaluation leading to continuous improvement in management planning and implementation of a project to achieve specified objectives.*
>
> *85204 The council shall establish and oversee a committee of agencies responsible for implementing the Delta Plan. Each agency shall coordinate its actions pursuant to the Delta Plan with the council and the other relevant agencies.*
>
> *85211 The Delta Plan shall include performance measurements that will enable the council to track progress in meeting the objectives of the Delta Plan. The performance measurements shall include, but need not be limited to, quantitative or otherwise measurable assessments of the status and trends in all of the following:*
>
>> *(a) The health of the Delta's estuary and wetland ecosystem for supporting viable populations of aquatic and terrestrial species, habitats, and processes, including viable populations of Delta fisheries and other aquatic organisms.*
>>
>> *(b) The reliability of California water supply imported from the Sacramento River or the San Joaquin River watershed.*
>
> *85225.5 To assist state and local public agencies in preparing the required certification, the council shall develop procedures for early consultation with the council on the proposed covered action.*
>
> *85225.10 (a) Any person who claims that a proposed covered action is inconsistent with the Delta Plan and, as a result of that inconsistency, the action will have a significant adverse impact on the achievement of one or both of the coequal goals or implementation of government-sponsored flood control programs to reduce risks to people and property in the Delta, may file an appeal with regard to a certification of consistency submitted to the council.*
>
>> *(b) The appeal shall clearly and specifically set forth the basis for the claim, including specific factual allegations, that the covered action is inconsistent with the Delta Plan. The council may request from the appellant additional information necessary to clarify, amplify, correct, or otherwise supplement the information submitted with the appeal, within a reasonable period.*
>>
>> *(c) The council, or by delegation the executive officer, may dismiss the appeal for failure of the appellant to provide information requested by the council within the period provided, if the information requested is in the possession or under the control of the appellant.*
>
> *85300(c) The council shall review the Delta Plan at least once every five years and may revise it as the council deems appropriate. The council may request any state agency with responsibilities in the Delta to make*

recommendations with respect to revision of the Delta Plan.

> *(d) (1) The council shall develop the Delta Plan consistent with all of the following:*
>
> > *(A) The federal Coastal Zone Management Act of 1972 (16 U.S.C. Sec.1451 et seq.), or an equivalent compliance mechanism.*
> >
> > *(B) Section 8 of the federal Reclamation Act of 1902.*
> >
> > *(C) The federal Clean Water Act (33 U.S.C. Sec. 1251 et seq.).*
>
> *(2) If the council adopts a Delta Plan pursuant to the federal Coastal Zone Management Act of 1972 (16 U.S.C. Sec. 1451 et seq.), the council shall submit the Delta Plan for approval to the United States Secretary of Commerce pursuant to that act, or to any other federal official assigned responsibility for the Delta pursuant to a federal statute enacted after January 1, 2010.*

85300(a) The Delta Plan shall include subgoals and strategies to assist in guiding state and local agency actions related to the Delta.

85302(e) The following subgoals and strategies for restoring a healthy ecosystem shall be included in the Delta Plan:

> *(1) Restore large areas of interconnected habitats within the Delta and its watershed by 2100.*
>
> *(2) Establish migratory corridors for fish, birds, and other animals along selected Delta river channels.*
>
> *(3) Promote self-sustaining, diverse populations of native and valued species by reducing the risk of take and harm from invasive species.*
>
> *(4) Restore Delta flows and channels to support a healthy estuary and other ecosystems.*
>
> *(5) Improve water quality to meet drinking water, agriculture, and ecosystem long-term goals.*
>
> *(6) Restore habitat necessary to avoid a net loss of migratory bird habitat and, where feasible, increase migratory bird habitat to promote viable populations of migratory birds.*

85300(a) The Delta Plan may also identify specific actions that state or local agencies may take to implement the subgoals and strategies.

85302(a) Implementation of the Delta Plan shall further the restoration of the Delta ecosystem and a reliable water supply.

85302(b) The Delta Plan may include recommended ecosystem projects outside the Delta that will contribute to achievement of the coequal goals.

85302(c) The Delta Plan shall include measures that promote all of the following characteristics of a healthy Delta ecosystem:

> *(1) Viable populations of native resident and migratory species.*
>
> *(2) Functional corridors for migratory species.*
>
> *(3) Diverse and biologically appropriate habitats and ecosystem processes.*
>
> *(4) Reduced threats and stresses on the Delta ecosystem.*
>
> *(5) Conditions conducive to meeting or exceeding the goals in existing species recovery plans and state and federal goals with respect to doubling salmon populations.*

85302(d) The Delta Plan shall include measures to promote a more reliable water supply that address all of the following:

> *(1) Meeting the needs for reasonable and beneficial uses of water.*
>
> *(2) Sustaining the economic vitality of the state.*
>
> *(3) Improving water quality to protect human health and the environment.*

85302(h) The Delta Plan shall include recommendations regarding state agency management of lands in the Delta.

85303 The Delta Plan shall promote statewide water conservation, water use efficiency, and sustainable use of water.

85304 The Delta Plan shall promote options for new and improved infrastructure relating to the water conveyance in the Delta, storage systems, and for the operation of both to achieve the coequal goals.

85305(a) The Delta Plan shall attempt to reduce risks to people, property, and state interests in the Delta by promoting effective emergency preparedness, appropriate land uses, and strategic levee investments.

85305(b) The council may incorporate into the Delta Plan the emergency preparedness and response strategies for the Delta developed by the California Emergency Management Agency pursuant to Section 12994.5.

85306 The council, in consultation with the Central Valley Flood Protection Board, shall recommend in the Delta Plan priorities for state investments in levee operation, maintenance, and improvements in the Delta, including both levees that are a part of the State Plan of Flood Control and nonproject levees.

85307(a) The Delta Plan may identify actions to be taken outside of the Delta, if those actions are determined to significantly reduce flood risks in the Delta.

85307(b) The Delta Plan may include local plans of flood protection.

85307(c) The council, in consultation with the Department of Transportation, may address in the Delta Plan the effects of climate change and sea level rise on the three state highways that cross the Delta.

85307(d) The council, in consultation with the State Energy Resources Conservation and Development Commission and the Public Utilities Commission, may incorporate into the Delta Plan additional actions to address the needs of Delta energy development, energy storage, and energy distribution.

85308 The Delta Plan shall meet all of the following requirements:

(a) Be based on the best available scientific information and the independent science advice provided by the Delta Independent Science Board.

(b) Include quantified or otherwise measurable targets associated with achieving the objectives of the Delta Plan.

(c) Where appropriate, utilize monitoring, data collection, and analysis of actions sufficient to determine progress toward meeting the quantified targets.

(d) Describe the methods by which the council shall measure progress toward achieving the coequal goals.

(e) Where appropriate, recommend integration of scientific and monitoring results into ongoing Delta water management.

(f) Include a science-based, transparent, and formal adaptive management strategy for ongoing ecosystem restoration and water management decisions.

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CHAPTER 2

The Delta Plan

No single entity in California has the sole responsibility or authority for managing water supply and the Delta ecosystem. Instead, authority, expertise, and resources are spread out among a cadre of federal, State, and local agencies, with no single government agency empowered to provide leadership or a long-term vision. This is why governance reform enacted by the Delta Reform Act is fundamentally different from past approaches to managing the Delta. The milestone legislation created the Council, and gave it the direction and authority to serve two primary governance roles: (1) set a comprehensive, legally enforceable direction for how the State manages important water and environmental resources in the Delta through the adoption of a Delta Plan, and (2) ensure coherent and integrated implementation of that direction through coordination and oversight of State and local agencies proposing to fund, carry out, and approve Delta-related activities.

Recommended in significant part by the Delta Vision Task Force effort in 2008, this new approach is different from governance attempts over the past several decades that have tried, but largely failed, to provide effective and stable leadership. The *Delta Vision Strategic Plan* referred to some 200 agencies that play some role in managing the Delta's varied resources (Delta Vision 2008). One of the major goals articulated in that strategic plan was the establishment of a new governance structure with sufficient authority, responsibility, accountability, science support, and secure funding to achieve the coequal goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem. The creation of the independent Council was a significant step toward implementing this goal. The Council is made up of seven members who provide a broad, statewide perspective and diverse expertise, and is advised by a 10-member board of nationally and internationally renowned scientists, the Delta Independent Science Board (ISB). The Delta Reform Act instructs the Council to "direct efforts across state agencies," but considerable challenges lie ahead in coordinating and supporting the multitude of agencies to achieve the goals of the Delta Plan.

The first major task for the newly created Council is the development of this Delta Plan. The Delta Reform Act requires the Council to develop and adopt a legally enforceable, long-term management plan for the Delta that uses best available science and is built upon the principles of adaptive management. The Delta Reform Act also established the Delta Science Program within the Council to provide the best possible unbiased scientific information to inform water and environmental decision making in the Delta. Because California's Delta is linked to so many statewide issues, described in Chapter 1, the Delta Plan's scope and purview encompasses statewide water use, flood management, and the Delta watershed, but with a specific focus on the legal Delta and Suisun Marsh. The Delta Plan contains a set of regulatory policies that will be enforced by the Council's appellate authority and oversight, described in this chapter. These regulatory policies and supporting documents are contained in Appendix B. The Delta Plan also contains priority recommendations, which are nonregulatory but call out actions essential to achieving the coequal goals. The Council has chosen to apply its regulatory authority in a targeted manner, and does so in an effort to ensure that all significant activities occurring in whole or in part in the Delta become better aligned over time with State policy priorities, including—and especially—the achievement of the coequal goals. The process for demonstrating compliance with Delta Plan policies is described in detail in this chapter.

In developing the first Delta Plan, the Council sought extensive public, stakeholder, and government agency input and, based on that input, developed the foundational set of policies and recommendations detailed in the following chapters to guide actions over the first few years of Plan implementation. Every stage of implementing the Delta Plan will necessitate leadership by the Council and ongoing coordination across a broad range of agencies, nongovernmental entities, and stakeholders.

The Delta Stewardship Council

As described in Chapter 1, the Delta of today is the result of centuries of natural and human-made actions and reactions. Government historically has worked to treat individual problems rather than adopt a systemwide approach. Dozens of agencies, task forces, and working groups have struggled to find the right combination of policy, science, and structure to address what are now California's fundamental goals for managing the Delta, the coequal goals.

The mission of the Council is to further the achievement of the coequal goals. To do so, the Council was charged with the development of a legally enforceable, long-term management plan for the Delta. To accomplish this, the Council will apply a common-sense approach based on a strong scientific foundation in an adaptive management framework to protect and restore the Delta ecosystem; improve the quality and reliability of California's water supplies; reduce risk to people, property, and State interests; and protect and enhance the Delta as an evolving place.

The Council's most important and challenging role is the facilitation, coordination, and integration of a range of actions and policies in support of the coequal goals. Implementation will occur through the Council's leadership of a formal Interagency Implementation Committee, ongoing informal staff-to-staff agency coordination, development of science to support the Delta Plan, and use of the Council's various authorities to ensure progress and accountability in how the Delta is managed. See Table 2-1 for a reference list of agencies with responsibilities in the Delta or related to the management of the Delta.

In addition to its role in setting State policy for the Delta in the Delta Plan, and in facilitating and coordinating agencies to achieve policy objectives, the Council was granted specific regulatory and appellate authority over certain actions that take place in whole or in part in the Delta. To do this, the Delta Plan contains a set of regulatory policies with which State and local agencies are required to comply. The Delta Reform Act specifically established a certification process for compliance with the Delta Plan. This means that State and local agencies that propose to carry out, approve, or fund a qualifying action in whole or in part in the Delta, called a "covered action," must certify that this covered action is consistent with the Delta Plan and must file a certificate of consistency with the Council that includes detailed findings. This process is described in the section "Covered Actions and Delta Plan Consistency" later in this chapter.

Agencies with Responsibilities in the Delta

TABLE 2-1

State	
Delta Stewardship Council	Established in 2009 by the Delta Reform Act to further the achievement of the coequal goals through the development and implementation of a legally enforceable Delta Plan.
California Department of Fish and Wildlife	Provides fish and wildlife protection and management, including management of wildlife areas and ecological reserves, public access, conservation planning, permitting, and implementation of the Ecosystem Restoration Program.
California Department of Water Resources	Owns and operates the State Water Project (which stores water upstream and conveys water through the Delta), has emergency response and flood planning responsibilities, holds water quality/supply contracts with Delta water agencies, and coordinates overall statewide water planning.
Delta Protection Commission	Prepares a comprehensive long-term resource management plan for land uses within the approximate 500,000-acre Primary Zone. Local government plans must be consistent.
Sacramento-San Joaquin Delta Conservancy	A primary State agency to implement ecosystem restoration in the Delta and also to assist/protect the region's agricultural, cultural, economic, and historical value.
State Water Resources Control Board	Required to develop in 2010 nonregulatory flow criteria for the Delta ecosystem necessary to protect public trust uses to inform planning proceedings for the Delta Plan and Bay Delta Conservation Plan (BDCP). Responsible for developing and implementing the Bay-Delta Water Quality Control Plan to establish water quality objectives, including flow objectives, to ensure reasonable protection of beneficial uses in the Bay-Delta. Responsible for establishing, implementing, and enforcing water right requirements to ensure the proper allocation and efficient use of water in and out of the Delta, including the role of the Delta Watermaster and implementation of the Bay-Delta Water Quality Control Plan. With regional boards, responsible for developing and implementing other water quality standards and control plans consistent with State and federal laws to reasonably protect aquatic beneficial uses.
California Emergency Management Agency	Plans, prepares emergency response, and coordinates the activities of all State agencies in connection to an emergency in the Delta; provides resources if local agencies are overwhelmed.
Central Valley Flood Protection Board	Plans flood control along the Sacramento and San Joaquin rivers and their tributaries in cooperation with the U.S. Army Corps of Engineers.
Office of the Delta Watermaster	Created in 2009 to oversee day-to-day administration of water rights, enforcement activities, and reports on water right activities regarding diversions in the Delta.
California Natural Resources Agency	Coordinates with a group of local water agencies, environmental and conservation organizations, State and federal agencies, and other interest groups developing the BDCP, a conservation strategy to be compliant with the Endangered Species Act (ESA) and Natural Community Conservation Planning Act, to be implemented over the next 50 years.
Other State agencies	Have various roles or responsibilities in the Delta relevant to the agency's concern (for example, California Department of Food and Agriculture, California Department of Transportation, California State Parks, California Department of Boating and Waterways, State Lands Commission, California Environmental Management Agency, and others).

Agencies with Responsibilities in the Delta

TABLE 2-1

Federal	
Bureau of Reclamation	Owns and operates the Central Valley Project, which, among other activities, pumps water through and out of the Delta.
U.S. Fish and Wildlife Service	Develops plans for the conservation and recovery of fish and wildlife resources, and addresses the variable needs of fish and wildlife pursuant to the ESA.
U.S. Army Corps of Engineers	Involved with both federal and nonfederal partners in assessing channel navigation, ecosystem, and flood risk management projects in the Delta. Works cooperatively with its nonfederal partners regarding the regulation, maintenance, and improvement of project levees in the Delta.
National Marine Fisheries Service	Develops plans for the conservation and recovery of salmonids in the Delta pursuant to the ESA.
U.S. Environmental Protection Agency	Responsible for protection and restoration of water quality in the Delta, pursuant to the Clean Water Act, which regulates the discharge of pollutants into waterways and sets standards for water quality. Oversees implementation of Clean Water Act programs and policies delegated to the State.
Other federal agencies	Various roles or responsibilities in the Delta relevant to the agency's concern (for example, U.S. Department of Agriculture, Natural Resources Conservation Service, and others).
Local	
Hundreds of local reclamation districts, resource conservation districts, water districts, city and county governments, and other special districts.	

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To be effective, governance to support science and implement adaptive management for a changing Delta must be flexible and have the capacity to change policies and practices in response to what is learned over time. An adaptive management approach as detailed in this chapter will ensure that the Delta Plan is updated as often as necessary to incorporate new information or modify policies and recommendations to ensure achievement of the coequal goals. The following section discusses the particular importance of science and adaptive management as they relate to the Delta.

Science and Adaptive Management in the Delta

The Delta Reform Act requires that the Delta Plan be based on and implemented using the best available science, and requires the use of science-based, transparent, and formal adaptive management strategies for ongoing ecosystem restoration and water management decisions. This section describes the importance of science, especially as it relates to the Delta, describes how the Delta Plan itself uses an adaptive management plan, and proposes the development of a Delta Science Plan as a companion to the Delta Plan.

The State of Bay-Delta Science report concluded that most of the decision making in the Delta was occurring on the basis of a false understanding that the Delta was a static system, and that "the Delta of the future would be much the same as the Delta of today" (Healey et al. 2008). Science indicates that significant changes are expected in the Delta over the coming decades, including climate change and the potential for earthquakes and flooding, as described in Chapter 1. In addition, current planning processes for habitat restoration, changes to water conveyance in the Delta, urban expansion, and other human drivers could reshape the Delta as we know it today.

The State of Bay-Delta Science urged a new perspective for decision making in the Delta (Healey et al. 2008). Decision making should be based on best available science, should account for risk and uncertainty, should acknowledge the dynamic nature of ecosystems, and should be responsive and adaptive to future change. The Delta Reform Act, enacted 1 year after that report, requires a strong science foundation for Council decisions. This includes the ongoing provision of scientific expertise to support the Council and other agencies through the Delta Science Program and Delta ISB. The Delta Science Program's mission is to provide the best possible scientific information for water and environmental decisions in the Bay-Delta system. The Delta ISB provides oversight of the scientific research, monitoring, and assessment programs that support adaptive management of the Delta to ensure that the application of the best science is used in Delta programs. The Delta ISB reviewed early drafts of this Delta Plan to ensure that the best science was used in the Delta Plan.

Why is it important that the Delta Plan emphasize science? First, science provides the basis of nearly all current understanding of the Delta's status (Healey et al. 2008, Lund et al. 2010). Second, new perspectives on science and policy in the Delta instill urgency for addressing the health of Delta ecosystems and the need for a more reliable water supply. Third, the interaction of multiple stressors to the ecosystem must be understood if they are to inform effective policy decisions.

Science and adaptive management are not simply academic exercises; they are tools that provide managers and decision makers an approach for using public funds more effectively, and increase the likelihood of success for a given project. Science by itself does not make or prioritize management decisions; it only informs actions and proposals. "Using the best science is only part of what is needed to resolve the competing interests…" that clamor over the Delta (NRC 2012).

The next sections describe what the Council means when it comes to best available science and adaptive management in the context of the coequal goals.

Best Available Science

Not all science is created equal nor deserves equal weight in decision making. Best available science provides the knowledge base for making sound decisions and is foundational for adaptive management. Best available science provides understanding for defining problems, developing conceptual models, identifying potential management actions, monitoring ecological and physical responses, and analyzing responses relative to the actions taken. Adaptive management both uses best available science and contributes to the creation of the best available science.

Best available science is specific to the decision being made and the time frame available for making that decision. There is no expectation of delaying decisions to wait for improved scientific understanding. Action may be taken on the basis of incomplete science if the information used is the best available at the time.

Best available science is developed through a process that meets the criteria of (1) relevance, (2) inclusiveness, (3) objectivity, (4) transparency and openness, (5) timeliness, and (6) peer review (NRC 2004). Best available science is consistent with the scientific process (Sullivan et al. 2006). Ultimately, best available science requires scientists using the best information and data to assist management and policy decisions. The processes and information used should be clearly documented and effectively communicated to foster improved understanding and decision making.

Under the Delta Plan, covered actions are required to demonstrate the use of best available science in their decision making (see policy G P1 in this chapter). Guidelines and criteria for identifying or developing best available science are provided in Appendix C.

SCIENCE IN THE DELTA – ADVANCES IN UNDERSTANDING

The following is a partial list of scientific advances that have changed understanding of the Delta and California's water supply over the last decade.

Effects of Climate Change on People and the Environment

- Increased frequency of (1) extreme water heights that cause floods, (2) water temperatures lethal to salmon and delta smelt, and (3) flooding in the Yolo Bypass, which will be much more common by the latter half of this century (Cloern et al. 2011).
- Trends in snowfall versus rainfall precipitation in the western United States show that temperatures have warmed during winter and early spring storms; and, consequently, the fraction of precipitation that falls as snow has declined while the fraction that falls as rain has increased. This shift from snowfall to rainfall will reduce natural water storage and is likely to increase risks of winter and spring flooding (Knowles et al. 2006).
- By mid-century, the Colorado River Reservoir System will not be able to meet all of the demands placed on it, including water supply for Southern California and the inland southwest, because reservoir levels will be reduced by over one-third and releases reduced by as much as 17 percent. Reductions in precipitation for the Colorado River Basin will threaten the ability to meet mandated water allocations (Barnett et al. 2004).

Water Supply Reliability

- The rate of groundwater depletion in the Central Valley was quantified using satellite imaging; approximately 2.5 million acre-feet per year of groundwater was lost during the period from October 2003 to March 2010 (Famiglietti et al. 2011).
- Precipitation and streamflow are proportionally more variable from year to year in California than in any other part of the United States (Dettinger et al. 2011).

Ecosystem Restoration

- Several open-water (pelagic) fish species have undergone steep declines known as the Pelagic Organism Decline (POD) (Sommer et al. 2007). The Interagency Ecological Program investigation of these declines led to new insights about the effects of multiple stressors on these species and the Delta ecosystem (summarized in Baxter et al. 2010). Improved knowledge about the POD also led to regulatory changes for water exports and pollutant discharges.
- In 86 percent of approximately 3,000 assessed streams across the United States, streamflow magnitudes (especially flow maxima and minima) were altered. In comparison to other evaluated stressors, streamflow alterations were found to have the greatest significance for explaining ecological impairment (Carlisle et al. 2011).
- Altered flow regimes by human activities influence the ecological impact of drought anomalies and increase the susceptibility of ecosystems to biological invasion. Extreme climatic events act together with environmental disturbances to enable the establishment of invasive species (Winder et al. 2011).
- Ratios of nutrients in Delta waters have been hypothesized to be a primary driver in the composition of aquatic food webs in the Bay-Delta (Glibert et al. 2011).

Water Quality

- Ammonium concentrations may be having a significant impact on phytoplankton composition and open-water food webs because of suppression of diatom blooms in the Bay-Delta (Dugdale et al. 2007).
- Pyrethroid pesticides largely derived from urban and suburban runoff are regularly found at levels that are toxic to aquatic invertebrates (Weston et al. 2005, Weston and Lydy 2010).

Risk Reduction

- With permanently flooded conditions and managed water depths, short-term sediment accretion rates as high as 7 to 9 centimeters per year can be obtained to help reverse subsidence on Delta islands (Miller et al. 2008).
- Atmospheric rivers (narrow corridors of concentrated moisture in the atmosphere) contribute 33 to 50 percent of the total average amount of rainfall for California and have been the source of many floods along the West Coast of the United States. California's water resources and floods come from the same storms to an extent, which makes integrated flood and water resources management all the more important (Dettinger et al. 2011).

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Adaptive Management

Adaptive management is defined in the Delta Reform Act as:

> *a framework and flexible decision making process for ongoing knowledge acquisition, monitoring, and evaluation leading to continuous improvements in management planning and implementation of a project to achieve specified objectives (Water Code section 85052).*

Adaptive management is useful in that it provides flexibility and feedback to manage natural resources in the face of often considerable uncertainty. This approach requires careful science-based planning followed by measurement to determine whether a given action actually achieves intended goals.

If goals are not achieved, informed adjustments can be made. This is especially important in the context of the Delta because, in some instances, competing and uncertain explanations arise, and decision making cannot be delayed until causes are better understood (Healey et al. 2008). The Council has adopted a three-phase adaptive management framework for the purposes of developing, implementing, and updating the Delta Plan, described later in this chapter, and also for use by ecosystem restoration and water management covered actions, as set forth in G P1 with additional detail in Appendix C.

A Delta Science Plan

Multiple frameworks for science in the Delta have been proposed, but a comprehensive science plan that specifies how scientific research, monitoring, analysis, and data management will be coordinated among entities has yet to be developed. Currently, science efforts in the Delta are performed by multiple entities with varying missions and mandates, and without an overarching plan. The National Research Council (NRC) found that "only a synthetic, integrated, analytical approach to understanding the effects of suites of environmental factors (stressors) on the ecosystem and its components is likely to provide important insights that can lead to enhancement of the Delta and its species" (NRC 2012). Therefore, a comprehensive science plan for the Delta is needed to organize and integrate ongoing scientific research, monitoring, and learning about the Delta as it changes over time.

A Delta Science Plan will guide efficient use of resources for balancing investments in addressing short-term science needs and those that build understanding over the long run. This plan will address effective governance for science in the Delta, strategies for addressing uncertainty and conflicting scientific information, the prioritization of research, near-term science needs, financial needs to support science, and more. Such a plan is essential to support the adaptive management of ecosystem restoration and water management decisions in the Delta.

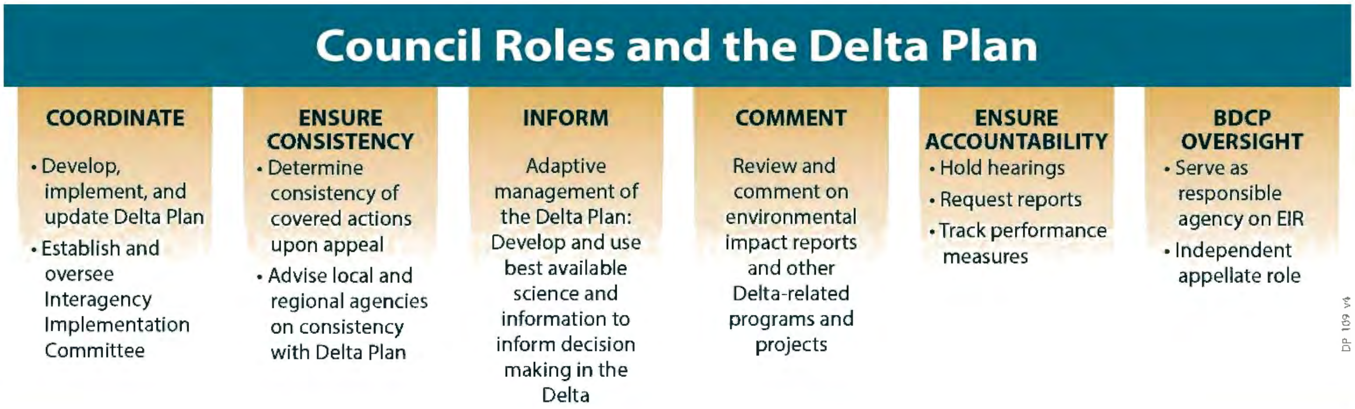
Additional detail regarding the proposed Delta Science Plan is provided in recommendation G R1 in this chapter.

The Delta Plan

The Delta Reform Act established the Council and directed it to develop an overarching, long-term management plan for the Delta. Figure 2-1 shows the roles assigned to the Council under the Act. The Act specifically requires that this plan for the Delta include a science-based, formal adaptive management strategy for ongoing ecosystem restoration and water management decisions.

This section presents a three-phase adaptive management framework (Plan, Do, and Evaluate and Respond), describes specific considerations that went into the development of the Delta Plan, and provides the overarching framework for how the Council (in collaboration with others) will implement and continuously amend the Delta Plan to achieve the coequal goals.

Council Roles and the Delta Plan



Council Roles and the Delta Plan

COORDINATE	ENSURE CONSISTENCY	INFORM	COMMENT	ENSURE ACCOUNTABILITY	BDCP OVERSIGHT
• Develop, implement, and update Delta Plan • Establish and oversee Interagency Implementation Committee	• Determine consistency of covered actions upon appeal • Advise local and regional agencies on consistency with Delta Plan	Adaptive management of the Delta Plan: Develop and use best available science and information to inform decision making in the Delta	Review and comment on environmental impact reports and other Delta-related programs and projects	• Hold hearings • Request reports • Track performance measures	• Serve as responsible agency on EIR • Independent appellate role

Figure 2-1

The Council's Three-phase Adaptive Management Framework

Several existing frameworks for adaptive management provide the basis for the Delta Plan's own adaptive management approach.[1] Although there are differences among various frameworks, they generally consist of three broad phases: Plan, Do, and Evaluate and Respond. Throughout all three phases of the adaptive management process, decisions are made by managers, policy makers, and/or technical experts. In developing an adaptive management plan, the best available science should be used to inform all phases of the adaptive management process.

In addition to requiring adaptive management for certain proposed covered actions, the Council, in coordination with others, will use adaptive management to develop, implement, and update the Delta Plan. The Council will rely in large part on the Delta Science Program to determine the relevance, value, and reliability of the best available science and to organize that information for its use in the Council's decisions. The Council has the final responsibility for determining the best available science used in support of its actions, including when a choice among competing interpretations of available science must be made.

The three phases of the Council's adaptive management framework (Plan, Do, and Evaluate and Respond) are shown on Figure 2-2, and are further broken down into nine steps, which are described in detail in Appendix C.

The Delta Stewardship Council's Three-phase Adaptive Management Framework

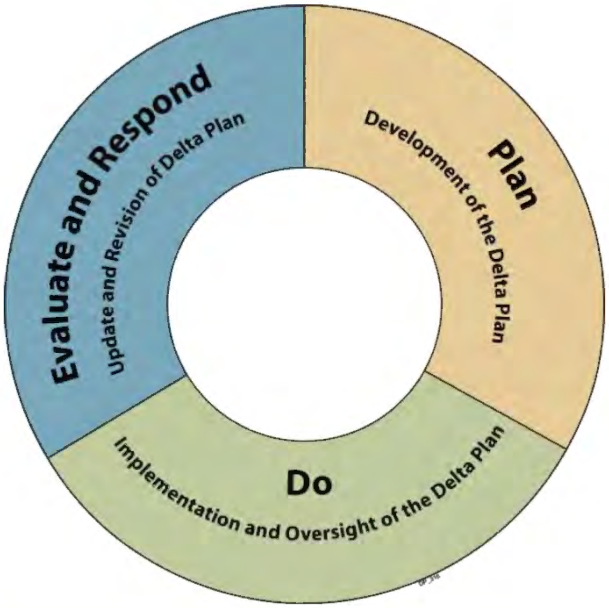

Plan
Development of the Delta Plan
Do
Implementation and Oversight of the Delta Plan
Evaluate and Respond
Update and Revision of Delta Plan

Figure 2-2

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[1] Christensen et al. 1996, Stanford and Poole 1996, CALFED Bay-Delta Program 2000, Habron 2003, Abal et al. 2005, Healey et al. 2008, Kaplan and Norton 2008, Bay Delta Conservation Plan Independent Science Advisors on Adaptive Management 2009, Williams et al. 2009.

Plan: Development of the Delta Plan

The first phase of adaptive management is "Plan." The Plan phase requires clear definition of the problem, establishment of objectives, how to achieve those objectives, and actions for implementation. Performance measures are included to evaluate whether the actions are successfully meeting their intended objectives. As described in Chapter 1, the Council was established in response to an ongoing crisis in the Delta. Water supply reliability and the health of the Delta ecosystem are both at risk, and the status quo—including the patchwork governance of State, local, and federal agencies—is not making acceptable progress toward reversing disturbing trends in a balanced and sustainable manner.

The Delta Plan is intended to be foundational and adaptive. It is foundational in that the Council has built on previous efforts, including CALFED, the Delta Vision, the California Water Plan, planning efforts of the State Water Resources Control Board (SWRCB), the Delta Protection Commission (DPC), and others. The framework established in this Delta Plan is intended to advance the coequal goals of water supply reliability and ecosystem health, and to employ adaptive management to improve the Plan over time.

This Delta Plan officially supersedes and replaces the Interim Delta Plan adopted by the Council on August 27, 2010.

Structure of the Delta Plan

The Delta Plan contains five core policy chapters (Chapters 3 through 7) and a chapter on Funding Principles to Support the Coequal Goals (Chapter 8). The narrative sections of each policy chapter provide subject matter context and rationale for the selection and implementation of core strategies. These core strategies are then broken down into actions: the policies and recommendations. The policies in the Delta Plan are regulatory in nature, and compliance is required for those who propose covered actions. In each policy chapter, the Policies and Recommendations section is followed by a section identifying both science needs and key issues for future evaluation by the Council.

Finally, each policy chapter concludes with a set of performance measures. The Delta Reform Act requires that the Delta Plan include performance measures to evaluate whether it is achieving its objectives over time. Information learned from performance measures will be an important part of how the Council determines when and how to update the Delta Plan as part of the Evaluate and Respond phase of the adaptive management process. See the sidebar, Performance Measures in the Delta Plan, later in this chapter.

Considerations in the Development of the Delta Plan

The Delta Reform Act set forth certain requirements and guidance for the development of the Delta Plan. The Act required the development of several State agency plans to inform the Delta Plan planning process and set forth statutory guidelines for the consideration or inclusion of certain plans, some of which were not yet completed at the date of Delta Plan publication and will be considered in future plan updates.

- **Delta Reform Act objectives.** The Act lists numerous objectives and, in some sections, provides detailed guidance for what the Delta Plan shall include (see Table 2-2).
- **State agency proposals.** Specific agencies are named in the Delta Reform Act as being responsible for submitting reports or recommendations to the Council for consideration for inclusion in the Delta Plan. The DPC, California State Parks, and the California Department of Food and Agriculture (CDFA) all submitted proposals that were considered in the development of this Delta Plan.
- **Consistency with federal law.** The Delta Reform Act requires that the Delta Plan be developed consistent with the federal Clean Water Act, Section 8 of the federal Reclamation Act of 1902, and the federal Coastal Zone Management Act of 1972 (CZMA), or an equivalent compliance mechanism. See sidebar, Federal Participation in Implementing the Delta Plan, for more information.

Delta Plan Requirements by Water Code Section

TABLE 2-2

Water Code Section	Requirement
85211	The Delta Plan shall include performance measurements that will enable the council to track progress in meeting the objectives of the Delta Plan. The performance measurements shall include, but need not be limited to, quantitative or otherwise measurable assessments of the status and trends in all of the following:
85211(a)	– The health of the Delta's estuary and wetland ecosystem for supporting viable populations of aquatic and terrestrial species, habitats, and processes, including viable populations of Delta fisheries and other aquatic organisms.
85211(b)	– The reliability of California water supply imported from the Sacramento River or the San Joaquin River watershed.
85300(a)	The Delta Plan shall include subgoals and strategies to assist in guiding state and local agency actions related to the Delta.
85302(e)	The following subgoals and strategies for restoring a healthy ecosystem shall be included in the Delta Plan:
85302(e)(1)	– Restore large areas of interconnected habitats within the Delta and its watershed by 2100.
85302(e)(2)	– Establish migratory corridors for fish, birds, and other animals along selected Delta river channels.
85302(e)(3)	– Promote self-sustaining, diverse populations of native and valued species by reducing the risk of take and harm from invasive species.
85302(e)(4)	– Restore Delta flows and channels to support a healthy estuary and other ecosystems.
85302(e)(5)	– Improve water quality to meet drinking water, agriculture, and ecosystem long-term goals.
85302(e)(6)	– Restore habitat necessary to avoid a net loss of migratory bird habitat and, where feasible, increase migratory bird habitat to promote viable populations of migratory birds.
85300(a)	The Delta Plan may also identify specific actions that state or local agencies may take to implement the subgoals and strategies.
85302(a)	Implementation of the Delta Plan shall further the restoration of the Delta ecosystem and a reliable water supply.
85302(b)	The Delta Plan may include recommended ecosystem projects outside the Delta that will contribute to achievement of the coequal goals.
85302(c)	The Delta Plan shall include measures that promote all of the following characteristics of a healthy Delta ecosystem:
85302(c)(1)	– Viable populations of native resident and migratory species.
85302(c)(2)	– Functional corridors for migratory species.
85302(c)(3)	– Diverse and biologically appropriate habitats and ecosystem processes.
85302(c)(4)	– Reduced threats and stresses on the Delta ecosystem.
85302(c)(5)	– Conditions conducive to meeting or exceeding the goals in existing species recovery plans and state and federal goals with respect to doubling salmon populations.
85302(d)	The Delta Plan shall include measures to promote a more reliable water supply that address all of the following:
85302(d)(1)	– Meeting the needs for reasonable and beneficial uses of water.
85302(d)(2)	– Sustaining the economic vitality of the state.
85302(d)(3)	– Improving water quality to protect human health and the environment.
85302(h)	The Delta Plan shall include recommendations regarding state agency management of lands in the Delta.

Delta Plan Requirements by Water Code Section

TABLE 2-2

Water Code Section	Requirement
85303	The Delta Plan shall promote statewide water conservation, water use efficiency, and sustainable use of water.
85304	The Delta Plan shall promote options for new and improved infrastructure relating to the water conveyance in the Delta, storage systems, and for the operation of both to achieve the coequal goals.
85305(a)	The Delta Plan shall attempt to reduce risks to people, property, and state interests in the Delta by promoting effective emergency preparedness, appropriate land uses, and strategic levee investments.
85305(b)	The council may incorporate into the Delta Plan the emergency preparedness and response strategies for the Delta developed by the California Emergency Management Agency pursuant to Section 12994.5.
85306	The council, in consultation with the Central Valley Flood Protection Board, shall recommend in the Delta Plan priorities for state investments in levee operation, maintenance, and improvements in the Delta, including both levees that are a part of the State Plan of Flood Control and nonproject levees.
85307(a)	The Delta Plan may identify actions to be taken outside of the Delta, if those actions are determined to significantly reduce flood risks in the Delta.
85307(b)	The Delta Plan may include local plans of flood protection.
85307(c)	The council, in consultation with the Department of Transportation, may address in the Delta Plan the effects of climate change and sea level rise on the three state highways that cross the Delta.
85307(d)	The council, in consultation with the State Energy Resources Conservation and Development Commission and the Public Utilities Commission, may incorporate into the Delta Plan additional actions to address the needs of Delta energy development, energy storage, and energy distribution.
85308	The Delta Plan shall meet all of the following requirements:
85308(a)	– Be based on the best available scientific information and the independent science advice provided by the Delta Independent Science Board.
85308(b)	– Include quantified or otherwise measurable targets associated with achieving the objectives of the Delta Plan.
85308(c)	– Where appropriate, utilize monitoring, data collection, and analysis of actions sufficient to determine progress toward meeting the quantified targets.
85308(d)	– Describe the methods by which the council shall measure progress toward achieving the coequal goals.
85308(e)	– Where appropriate, recommend integration of scientific and monitoring results into ongoing Delta water management.
85308(f)	– Include a science-based, transparent, and formal adaptive management strategy for ongoing ecosystem restoration and water management decisions.

- **Incorporation of the Bay Delta Conservation Plan into the Delta Plan.** The Bay Delta Conservation Plan (BDCP) is a major project considering large-scale improvements in water conveyance and large-scale ecosystem restoration in the Delta. When completed, it must be incorporated into the Delta Plan if it meets certain statutory requirements. Completion of the BDCP process and the number of projects now under consideration in that process would have large impacts on the Delta and would affect the coequal goals. (More detailed discussions of the BDCP are provided in Chapters 3 and 4.) The Delta Reform Act describes a separate, explicit process for incorporating the BDCP into the Delta Plan (Water Code section 85320), and the

Council has adopted administrative procedures governing appeals to the Council related to BDCP incorporation (see Appendix D). If the BDCP is incorporated into the Delta Plan, it becomes part of the Delta Plan and, therefore, part of the basis for future consistency determinations.

- **Incorporation of other plans into the Delta Plan.** The Council may incorporate other plans or programs in whole or in part into the Delta Plan to the extent that they promote the coequal goals.

Do: Implementation and Oversight of the Delta Plan

The second phase of adaptive management is "Do." The "doing," or implementation, of the Delta Plan will occur over time (through 2100) through the coordinated efforts of many State, local, and federal agencies, in cooperation with nongovernmental organizations and private parties, and Council oversight and exercise of appellate authorities.

Federal participation in implementing the Delta Plan and the coequal goals is described in detail in the sidebar, Federal Participation in Implementing the Delta Plan.

The Council is responsible for overseeing the Delta Plan's implementation. Given the numerous government agencies that frequently have conflicting or overlapping jurisdictional and programmatic interest in Delta matters (see Table 2-1), there is a compelling need for the Council to fulfill the role as integrator of Delta policy and coordinator of actions. This integration and coordination will occur through convening a formal Interagency Implementation Committee, providing ongoing informal staff-to-staff agency coordination, providing comments and advice from the Council to other agencies on proposed or ongoing plans and programs, holding public hearings, developing science to support the Delta Plan, and using the Council's appellate authority over consistency of significant actions in the Delta with the Delta Plan.

Delta Plan Interagency Implementation Committee

Perhaps the most significant tool the Council will have for implementing the Delta Plan and ensuring accountability is a formal method for active agency coordination. The Delta Reform Act directs the Council to establish and oversee a committee of agencies responsible for implementing the Delta Plan. Notably, the law states that "each agency shall coordinate its actions pursuant to the Delta Plan with the Council and other relevant agencies" (Water Code section 85204). Governance challenges have long plagued management of the Delta and California's ability to achieve stated objectives for water supply and the Delta ecosystem. Ambiguous and sometimes conflicting authorities and responsibilities among agencies thwart real progress (NRC 2012).

The Council, therefore, will coordinate implementation of the Delta Plan through the establishment and leadership of an Interagency Implementation Committee to do the following:

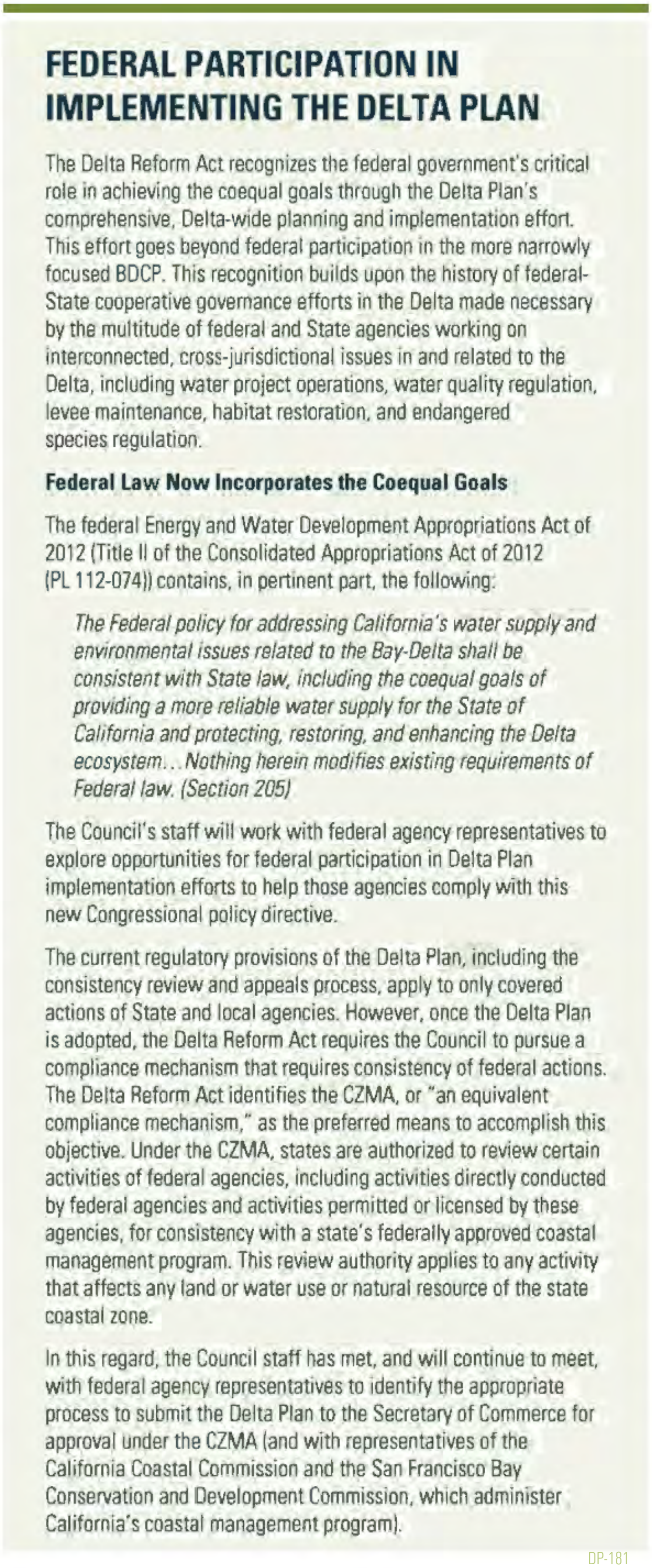
- Monitor progress of priority actions and agency activities to implement the Delta Plan;
- Report regularly on implementation plans and actions;
- Identify opportunities for integration and leveraging of funding;
- Identify funding needs and support development of a finance plan to implement the Delta Plan;
- Assist in the ongoing development and tracking of Delta Plan performance measures;
- Coordinate regulatory actions on significant projects to implement the Delta Plan, as appropriate; and
- Discuss common issues and resolve interagency conflicts.

The Interagency Implementation Committee, which shall convene at least twice each year and more often as needed, will be overseen by the Council and will be organized around the implementation of the Delta Plan. The Interagency Implementation Committee will include federal, local, and State agency representatives as dictated by the specific matter or subject area in the Delta Plan. At a minimum, the Interagency Implementation Committee will consist of the Council's Executive Officer, the Delta Science Program lead scientist, and executive officers or directors from the California Department of Water Resources (DWR); California Department of Fish and Wildlife (DFW); SWRCB and regional water quality control boards; the San Francisco Bay Conservation and Development Commission; the California Water Commission; the Sacramento-San Joaquin Delta Conservancy; the DPC; the Delta Watermaster; the CDFA; the Natural Resources Agency; the Business, Transportation and Housing Agency; and the California Environmental Protection Agency. Federal agencies such as National Oceanic and Atmospheric Administration Fisheries, U.S. Fish and Wildlife Service, Bureau of Reclamation, Natural Resources Conservation Service, U.S. Geological Survey, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, and others, as appropriate, will be invited to participate and provide status reports on various projects and programs related to Delta Plan implementation.

The meetings of the Interagency Implementation Committee will be open to the public, and the agenda will be noticed in advance. The committee will create ad hoc workgroups as appropriate to facilitate focus on specific issues. Stakeholder representatives will be encouraged to participate in the various workgroups. The work of both the formal Interagency Implementation Committee and the workgroups may be supplemented with meetings or hearings conducted by the Council.

The Delta Protection Commission's Role in Delta Plan Implementation

The Delta Protection Act states that the DPC is the appropriate agency to identify and provide recommendations to the Council on methods of preserving the Delta as an evolving place. The DPC developed and submitted a set of recommendations to the Council, many of which were incorporated in this Delta Plan (DPC 2012). The Delta Protection Act outlines a process for the DPC to review and provide comments and recommendations to the Council on any significant project or proposed project within the scope



FEDERAL PARTICIPATION IN IMPLEMENTING THE DELTA PLAN

The Delta Reform Act recognizes the federal government's critical role in achieving the coequal goals through the Delta Plan's comprehensive, Delta-wide planning and implementation effort. This effort goes beyond federal participation in the more narrowly focused BDCP. This recognition builds upon the history of federal-State cooperative governance efforts in the Delta made necessary by the multitude of federal and State agencies working on interconnected, cross-jurisdictional issues in and related to the Delta, including water project operations, water quality regulation, levee maintenance, habitat restoration, and endangered species regulation.

Federal Law Now Incorporates the Coequal Goals

The federal Energy and Water Development Appropriations Act of 2012 (Title II of the Consolidated Appropriations Act of 2012 (PL 112-074)) contains, in pertinent part, the following:

> *The Federal policy for addressing California's water supply and environmental issues related to the Bay-Delta shall be consistent with State law, including the coequal goals of providing a more reliable water supply for the State of California and protecting, restoring, and enhancing the Delta ecosystem…Nothing herein modifies existing requirements of Federal law. (Section 205)*

The Council's staff will work with federal agency representatives to explore opportunities for federal participation in Delta Plan implementation efforts to help those agencies comply with this new Congressional policy directive.

The current regulatory provisions of the Delta Plan, including the consistency review and appeals process, apply to only covered actions of State and local agencies. However, once the Delta Plan is adopted, the Delta Reform Act requires the Council to pursue a compliance mechanism that requires consistency of federal actions. The Delta Reform Act identifies the CZMA, or "an equivalent compliance mechanism," as the preferred means to accomplish this objective. Under the CZMA, states are authorized to review certain activities of federal agencies, including activities directly conducted by federal agencies and activities permitted or licensed by these agencies, for consistency with a state's federally approved coastal management program. This review authority applies to any activity that affects any land or water use or natural resource of the state coastal zone.

In this regard, the Council staff has met, and will continue to meet, with federal agency representatives to identify the appropriate process to submit the Delta Plan to the Secretary of Commerce for approval under the CZMA (and with representatives of the California Coastal Commission and the San Francisco Bay Conservation and Development Commission, which administer California's coastal management program).

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of the Delta Plan that may affect the unique values of the Delta (Public Resources Code section 29773(a)).

The Council's adopted procedures include a process whereby the Council will notify the DPC of covered action appeals.

Other Delta Plan Implementation Actions

In addition to convening the Interagency Implementation Committee and carrying out the other responsibilities assigned to it by the Delta Reform Act, the Delta Plan assigns other tasks that will further refine the Delta Plan to the Council. These tasks are described in the following recommendations: G R1 (Chapter 2), WR R5 (Chapter 3), WR R15 (Chapter 3), DP R7 (Chapter 5), DP R19 (Chapter 5), RR R4 (Chapter 7), and FP R1 through R3 (Chapter 8).

Additional Council Authorities in Implementing the Delta Plan

The Delta Reform Act enumerated a range of specific authorities for the Council related to the implementation of the Delta Plan (as shown on Figure 2-1). A full list of authorities can be found in Water Code section 85210 and in various sections of the Delta Reform Act. In implementing the Delta Plan, the Council has the authority to:

- **Comment on environmental impact reports.** The Council has a role in commenting on any State agency environmental impact reports (EIRs) as appropriate to the mission of the Council.
- **Comment on policies related to the coequal goals and implementation of the Delta Plan.** As appropriate, the Council may comment formally on any proposed policies or regulations that will impact the achievement of the coequal goals and the implementation of the Delta Plan.
- **Advise local governments.** The Council has a role in advising local and regional planning agencies regarding the consistency of their planning documents with the Delta Plan. As described in Chapter 5, the Council will review sustainable community strategies and regional transportation plans to prevent conflicts with the Delta Plan and to coordinate metropolitan development with actions in the Delta.
- **Request reports from State, federal, and local agencies.** The Council has the authority to request reports from agencies on issues related to the implementation of the Delta Plan.
- **Hold hearings.** The Council has the authority to hold hearings in all parts of the state and to subpoena witnesses.
- **Develop, coordinate, and promote the use of science through the Delta Science Program.** The Council has a role in providing the best available unbiased scientific information to inform water and environmental decision making in the Delta by funding research, synthesizing and communicating scientific information to policy makers and decision makers, promoting independent peer review, and coordinating with Delta agencies to promote science-based adaptive management.
- **Make consistency determinations upon appeal.** The Legislature intended that State and local actions that would have a significant impact on the coequal goals or a government-sponsored flood control program be consistent with the Delta Plan. The Council has the authority to implement the Delta Plan in part through the enforcement of consistency of covered actions with the Delta Plan upon appeal. The Delta Reform Act also gave the Council a specific appellate role with respect to the BDCP and its future incorporation into the Delta Plan. The Council's appellate roles, the definition of a covered action, and the consistency determination process and appeals process are described in detail in the Covered Actions and Delta Plan Consistency section later in this chapter.

Monitoring Progress toward Achieving the Coequal Goals

The Council will use existing monitoring efforts (such as the efforts of the Interagency Ecological Program, California Water Quality Monitoring Council, and California Statewide Groundwater Elevation Monitoring) and new monitoring efforts to inform progress toward achieving the performance measures in the Delta Plan. The Council will monitor the progress of programs and projects toward achieving the administrative, output, and outcome performance measures in the current Delta Plan and those developed in the future. Working with others, in particular the Interagency Implementation Committee, the Council will use coordinated information about relevant status and trends and progress toward meeting the coequal goals to inform revisions to the Delta Plan. The Council's monitoring activities will be reported on the Council website.

Evaluate and Respond: Updating and Amending the Delta Plan

The third phase of Delta Plan adaptive management is "Evaluate and Respond." According to the Delta Reform Act, the Council must review the Delta Plan at least once every 5 years and can revise it as the Council deems appropriate. This authority is consistent with the Council's obligation to base the Delta Plan on the best available scientific information and to use an adaptive management approach in updating the Plan as new information becomes available.

When updating the Delta Plan, the Council will consider information from other adaptive management activities in the Delta; evaluation of Delta Plan policies and recommendations; performance measures; other completed plans related to the Delta; and coordination, hearings, and oversight. The Council will rely in large part on the Delta Science Program for determining the relevance, value, and reliability of the best available science, and organizing that information for its use in the Council's decisions. The Council has the final responsibility for determining the best available science used in support of its actions, including when a choice among competing interpretations of available science must be made.

Reporting on Delta Plan Performance Measures

This Delta Plan contains preliminary performance measures developed to monitor performance of Delta Plan policies and recommendations. (See sidebar, Performance Measures in the Delta Plan, for more detailed information.) Upon adoption of the Delta Plan, staff will take the lead, working with scientific, agency, and stakeholder experts to continue to refine the Delta Plan's performance measures. Delta Plan performance measures will be periodically reviewed by independent expert review panels and will be sent to the Delta ISB for further review and comment. The resulting updated performance measures will be developed no later than December 31, 2014, for consideration by the Council for incorporation into the Delta Plan. The Council will issue periodic public reports on the status of performance measures.

Data collection related to the Delta and water management in California is already occurring, although more is needed. The Council, through the Interagency Implementation Committee and working with stakeholders, will report regularly on Delta Plan performance measures and the Delta Plan's progress in advancing the coequal goals. These reports will be made available to the public.

PERFORMANCE MEASURES IN THE DELTA PLAN

The performance measures included in this Delta Plan are primarily administrative measures focused on implementation of near-term actions (generally, actions contained within policies and recommendations of the Delta Plan) that support the coequal goals. This initial set of performance measures will be expanded and refined after adoption of the Delta Plan and will be considered for inclusion in subsequent updates of the Delta Plan.

Delta Plan performance measures have been placed into three general classes:

- Administrative performance measures describe decisions made by policy makers and managers to finalize plans or approve resources (funds, personnel, projects) for implementation of a program or group of related programs.
- Output (also known as "driver") performance measures evaluate the factors that may be influencing outcomes and include on-the-ground implementation of management actions, such as acres of habitat restored or acre-feet of water released, as well as natural phenomena outside of management control (such as a flood, earthquake, or ocean conditions).
- Outcome performance measures evaluate responses to management actions or natural outputs.

Administrative performance measures are included in Appendix E. Output and outcome performance measures, where appropriate, are included at the end of individual chapters.

Development of informative and meaningful performance measures is a challenging task that will continue after the adoption of the Delta Plan. Performance measures need to be designed to capture important trends and to address whether specific actions are producing expected results. Efforts to develop performance measures in complex and large-scale systems like the Delta are commonly multiyear endeavors. The Council will improve all performance measures, but will focus on outcome measures through a multiyear effort, using successful approaches for developing performance measures employed by similar efforts elsewhere (such as the Kissimmee River Restoration, The State of San Francisco Bay, and Healthy Waterways Southeast Queensland, Australia) as positive examples (see Appendix C for more information).

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Communication and the Delta Plan

Keeping the public and decision makers informed as future Delta Plan changes are proposed and considered is a vital step. The Council is committed to open communication of current understanding gained through the evaluation of performance measures, monitoring, science, and adaptive management. This communication will be continuous as the Council receives and produces information that will be used to adapt its strategy toward meeting the coequal goals and updating the Delta Plan.

The Council's website and meetings will remain the central hub for communicating information about progress toward meeting the coequal goals and the objectives of the Delta Plan. Information learned from the analysis, synthesis, and evaluation of how well the policies and recommendations in the Delta Plan are meeting their intended goals will be gathered and communicated through a number of media and forums that may include:

- The Council's meetings and workshops, website, social media, and newsletter
- Staff reports on the status and trends of the Delta Plan performance measures
- Reports, presentations, and correspondence presented to the Council
- Interagency Implementation Committee meetings and products
- The Delta Science Program website, *Science News*; the online journal, *San Francisco Estuary & Watershed Science*; brown bag seminars; and Biennial Bay-Delta Science Conference
- Delta ISB meetings and products

Covered Actions and Delta Plan Consistency

The Delta Reform Act directs the Council to develop a legally enforceable long-term management plan for the Delta (this Delta Plan) and includes a mechanism for enforcement of Delta Plan policies over State and local actions identified as covered actions (Water Code sections 85001(c) and 85022). The Council has taken a hybrid approach to developing the Delta Plan by including both regulatory policies and nonregulatory recommendations. This section presents a discussion of the process and general requirements for certifying consistency with the Delta Plan through compliance with its regulatory policies, and includes examples of covered actions and exemptions.

Delta Plan regulatory policies are not intended and shall not be construed as authorizing the Council or any entity acting pursuant to this section to exercise their power in a manner that will take or damage private property for public use without the payment of just compensation. These policies are not intended to affect the rights of any owner of property under the Constitution of the State of California or the United States. None of the Delta Plan policies increases the State's flood liability.

Covered Actions Must Comply with Delta Plan Policies

The Delta Reform Act requires State and local actions that fit the legal definition of a covered action to be consistent with the policies included in the Delta Plan. The mechanism for determining consistency is the filing of a certification of consistency. Not all actions that occur in whole or in part in the Delta are covered actions. Only certain activities qualify as covered actions, and the Delta Reform Act establishes specific criteria and exclusions, discussed in this chapter. Furthermore:

- The State or local agency that carries out, approves, or funds a proposed action determines whether that proposed plan, program, or project is a covered action (subject to judicial review of whether the determination was reasonable and consistent with the law).
- The State or local agency that carries out, approves, or funds a covered action ("proponents") needs to certify consistency with the policies included in the Delta Plan.
- In the case of all other actions (those that do not meet the criteria of being a covered action or are otherwise explicitly excluded), the Delta Plan's policies, where applicable, are recommendations.

What Is a Covered Action?

For a State or local agency to determine whether its proposed plans, programs, or projects are covered actions under the Delta Plan and, therefore, subject to the regulatory provisions in the plan, it must start with the Delta Reform Act, which defines a covered action as (Water Code section 85057.5(a)):

> *…a plan, program, or project as defined pursuant to Section 21065 of the Public Resources Code that meets all of the following conditions:*
>
> 1. *Will occur, in whole or in part, within the boundaries of the Delta or Suisun Marsh;*
> 2. *Will be carried out, approved, or funded by the state or a local public agency;*
> 3. *Is covered by one or more provisions of the Delta Plan;*
> 4. *Will have a significant impact on the achievement of one or both of the coequal goals or the implementation of government-sponsored flood control programs to reduce risks to people, property, and state interests in the Delta.*

Figure 2-3 shows the steps to follow for identifying whether a proposed plan, project, or program is a covered action.

Screening Criteria for Covered Actions

As used in this Delta Plan, the statutory criteria for covered actions under the Delta Plan are collectively referred to as "screening criteria." Before using the screening criteria, a project proponent should first determine whether its proposed plan, program, or project is exempt from covered action status under either the Council's administrative exemptions or the Delta Reform Act's statutory exemptions, discussed below. Early consultation with Council staff is encouraged and can assist in this determination.

1. **Is a "Project," as defined by section 21065 of the Public Resources Code.** A proponent's first step in determining whether a plan, program, or project is a covered action is to identify whether it meets the definition of a project as defined in Public Resources Code section 21065. That particular provision is the section of the California Environmental Quality Act (CEQA) that defines the term "project" for purposes of potential review under CEQA.[2] If the plan, program, or project does indeed meet the definition of a project under CEQA, the next step in determining a covered action is to review the four additional screening criteria in the definition of covered action, *all* of which must be met by a proposed plan, program, or project for it to qualify as a covered action (see sidebar, What Does CEQA Consider a "Project"?).

2. **Will occur in whole, or in part, within the boundaries of the Delta or Suisun Marsh.** To qualify as a covered action, a project must include one or more activities that take place at least partly within the Delta or Suisun Marsh. This means, for example, that the diversion and use of water in the Delta watershed that is entirely upstream of the statutory Delta or Suisun Marsh would not satisfy this criterion. By contrast, this criterion *would* be met if water intended for use upstream were transferred through the statutory Delta or Suisun Marsh (pursuant, for example, to a water transfer longer than 1 year in duration).

Decision Tree for State and Local Agencies on Possible Covered Actions

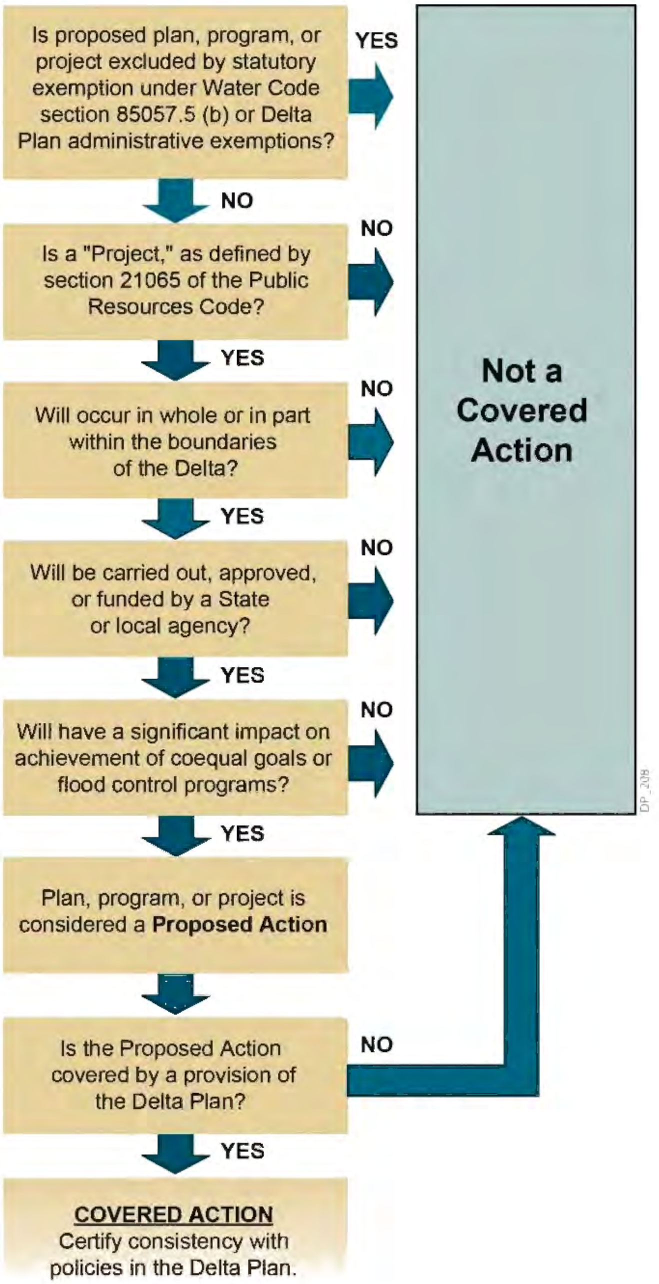
Is proposed plan, program, or project excluded by statutory exemption under Water Code section 85057.5 (b) or Delta Plan administrative exemptions?
YES
NO
Is a "Project," as defined by section 21065 of the Public Resources Code?
NO
YES
Will occur in whole or in part within the boundaries of the Delta?
NO
YES
Will be carried out, approved, or funded by a State or local agency?
NO
YES
Will have a significant impact on achievement of coequal goals or flood control programs?
NO
YES
Plan, program, or project is considered a **Proposed Action**
Is the Proposed Action covered by a provision of the Delta Plan?
NO
YES
COVERED ACTION
Certify consistency with policies in the Delta Plan.
Not a Covered Action
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Figure 2-3

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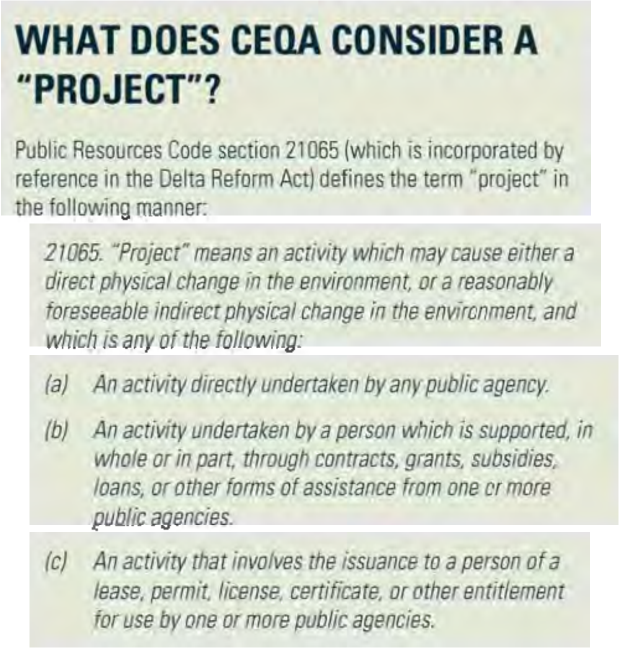
[2] It is important to note that CEQA's various statutory and categorical exemptions—which are considered only after the threshold determination of a CEQA "project" is made—are not similarly incorporated by cross-reference in the definition of covered action. Therefore, the Delta Plan must expressly incorporate a CEQA exemption for it to apply to the Delta Plan.

3. **Will be carried out, approved, or funded by the State or a local public agency.** If these screening criteria are met, it is recommended that the "significant impact" criteria be analyzed next.

4. **Will have a significant impact on the achievement of one or both of the coequal goals or the implementation of a government-sponsored flood control program to reduce risks to people, property, and State interests in the Delta.** In addition, a proposed project must have a "significant impact" as defined under Water Code section 85057.5(a)(4) to qualify as a covered action. For this purpose, significant impact means a substantial positive or negative impact on the achievement of one or both of the coequal goals or the implementation of a government-sponsored flood control program to reduce risks to people, property, and State interests in the Delta, that is directly or indirectly caused by a project on its own or when the project's incremental effect is considered together with the impacts of other closely related past, present, or reasonably foreseeable future projects. The coequal goals and government-sponsored flood control programs are further defined in Chapters 3, 4, and 7.

   The following categories of projects will not have a significant impact for this purpose:

   - "Ministerial" projects exempted from CEQA, pursuant to Public Resources Code section 21080(b)(1);
   - "Emergency" projects exempted from CEQA, pursuant to Public Resources Code section 21080(b)(2) through (4);
   - Temporary water transfers of up to 1 year in duration. This provision shall remain in effect only through December 31, 2016, and as of January 1, 2017, is repealed, unless the Council acts to extend the provision prior to that date. The Council contemplates that any extension would be based upon DWR and the SWRCB's participation with stakeholders to identify and implement transfer measures, as recommended in WR R15;
   - Other projects exempted from CEQA, unless there are unusual circumstances indicating a reasonable possibility that the project will have a significant impact under Water Code section 85057.5(a)(4). Examples of unusual circumstances could arise in connection with, among other things:
     - Local government general plan amendments for the purpose of achieving consistency with the DPC's Land Use and Resource Management Plan; and
     - Small-scale habitat restoration projects, as referred to in CEQA Guidelines, section 15333 of Title 14 of the California Administrative Code, proposed in important restoration areas, but which are inconsistent with the Delta Plan's policy related to appropriate habitat restoration for a given land elevation.



WHAT DOES CEQA CONSIDER A "PROJECT"?

Public Resources Code section 21065 (which is incorporated by reference in the Delta Reform Act) defines the term "project" in the following manner:

> *21065. "Project" means an activity which may cause either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment, and which is any of the following:*
>
> *(a) An activity directly undertaken by any public agency.*
>
> *(b) An activity undertaken by a person which is supported, in whole or in part, through contracts, grants, subsidies, loans, or other forms of assistance from one or more public agencies.*
>
> *(c) An activity that involves the issuance to a person of a lease, permit, license, certificate, or other entitlement for use by one or more public agencies.*

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The Council will consider, as part of its ongoing adaptive management of the Delta Plan, whether these exemptions remain appropriate and/or whether the Delta Plan should be amended to include other types of projects.

If the above four screening criteria are met, then for purposes of the Delta Plan, the plan, program, or project is referred to as a "proposed action." Although a proposed action meets the first four screening criteria, the action has not yet been reviewed by the State or local agency to determine whether it meets the fifth screening criterion: is the proposed action covered by one or more Delta Plan policies? If the proposed action is covered by at least one Delta Plan regulatory policy, then the proposed action is a "covered action." If the proposed action is not covered by any Delta Plan regulatory policy, it is not a covered action.

5. **Is covered by one or more provisions of the Delta Plan.** This means that the proposed action must be covered by one or more regulatory policies contained in Chapters 3 through 7 of the Delta Plan. Each of those regulatory policies specifies the types of proposed actions that they cover. If the proposed action is covered by one or more provisions of the Delta Plan—the final criteria—the proposed action is, therefore, a covered action.

Statutory Exemptions

Certain actions are statutorily excluded from the definition of covered action and are exempt from the Council's regulatory authority (Water Code section 85057.5(b)). A complete list is included in Appendix F. These exemptions include:

- A regulatory action of a State agency (such as the adoption of a water quality control plan by the SWRCB, or the issuance of a California Endangered Species Act take permit by DFW)
- Routine maintenance and operation of the State Water Project or the Central Valley Project
- Routine maintenance and operation of any facility located, in whole or in part, in the Delta, that is owned or operated by a local public agency (such as routine maintenance of levees by a reclamation district)

Although a regulatory action by another State agency is not a covered action, the underlying action regulated by that agency can be a covered action (provided it otherwise meets the definition). The Council has concurrent jurisdiction over covered actions when that action is also regulated by another State agency. For example, the issuance of a California Endangered Species Act take permit by DFW is a regulatory action of a State agency and, therefore, is not a covered action. However, the underlying action requiring the take permit could be a covered action, and, if it is, it must be consistent with the Delta Plan's policies. Therefore, even when a covered action is regulated by another agency (or agencies), the covered action still must be consistent with the Delta Plan. In the situation where a covered action is governed by multiple agencies and laws, the action must comply with all relevant legal requirements.

Who Determines Whether a Proposed Plan, Program, or Project Is a Covered Action?

A State or local agency that proposes to carry out, approve, or fund a plan, program, or project is the entity that must determine whether that plan, program, or project is a covered action. That determination must be reasonable, made in good faith, and consistent with the Delta Reform Act and relevant provisions of this Plan. If requested, Council staff will meet with an agency's staff during early consultation to review consistency with the Delta Plan and to offer advice as to whether the proposed plan, program, or project appears to be a covered action, provided that the ultimate determination in this regard must be made by the agency. If an agency determines that a proposed plan, program, or project is not a covered action, that determination is not subject to Council regulatory review, but is subject to judicial review as to whether it was reasonable, made in good faith, and is consistent with the Delta Reform Act and relevant provisions of this Plan.

Mitigation of Significant Adverse Impacts on the Environment

Public Resources Code section 21081.6 requires a public agency to adopt a mitigation monitoring or reporting program (MMRP) to ensure compliance with the mitigation measures adopted by the agency at the time of project approval. The MMRP is a working implementation document to ensure that mitigation measures are implemented. The MMRP for the *Delta Plan Program Environmental Impact Report* (PEIR) ensures compliance with the Delta Plan mitigation measures. The Delta Plan MMRP lists the mitigation measures incorporated into the Delta Plan, when they need to be implemented, who is responsible for implementing them, and who reports on compliance. As specified in policy G P1 of the Delta Plan, any covered action that is not exempt must include either the mitigation measures identified in the Delta Plan's PEIR, if applicable and feasible; substitute mitigation measures that the proposing agency finds to be equally or more effective than those identified in the Delta Plan PEIR; or an explanation of why such mitigation is not feasible. Monitoring and/or reporting on implementation of the adopted Delta Plan mitigation measures will be accomplished through the certification of consistency process as part of the certification forms. The MMRP can be found on the DSC's website at http://deltacouncil.ca.gov/.

Certifications of Consistency

Once a State or local agency has determined that their plan, program, or project is a covered action under the Delta Plan, they are required to submit a written certification to the Council, with detailed findings, demonstrating that the covered action is consistent with the Delta Plan (Water Code section 85225 et seq.). Furthermore:

- The first policy in the Delta Plan, G P1, describes requirements to be included in the certification of consistency for all covered actions and is included in this chapter.
- The certification of consistency must be submitted to the Council prior to initiating implementation of the covered action.
- The certification of consistency should not be submitted to the Council until the covered action has been fully described and the impacts associated with the covered action have been identified; this coincides with the completion of the CEQA process.
- Should the covered action project change substantially, the agency will be required to submit a new certification of consistency to the Council.

The Council has developed a discretionary checklist that agencies may use to facilitate the process, as well as certification forms and related materials, available on the Council website.

Bay Delta Conservation Plan Covered Activity Consistency Certification

The Delta Reform Act describes a specific process for the potential incorporation of BDCP into the Delta Plan. If BDCP is incorporated, an agency proposing a qualifying "covered activity" under BDCP that also meets the statutory definition of a covered action must file a short form certification of consistency with findings indicating only that the covered action is consistent with the BDCP. Consistency for these purposes shall be presumed if the certification filed by the agency includes a statement to that effect from DFW.

Covered Action Consistency Appeals

In contrast to how many other governmental plans are implemented, the Council does *not* exercise direct review and approval authority over covered actions to determine their consistency with the regulatory policies in the Delta Plan. Instead, State or local agencies self-certify Delta Plan consistency, and the Council serves as an appellate body for those determinations.

Any person, including any member of the Council or its Executive Officer, who claims that a covered action is inconsistent with the Delta Plan and, as a result of that inconsistency, will have a significant adverse impact on the achievement of one or both of the coequal goals or implementation of government-sponsored flood control program, may file an appeal with regard to a certification of consistency submitted to Council.

The Council has appellate authority to determine the consistency of covered actions with the Delta Plan if they are challenged. The Council is required to apply the standard of substantial evidence when reviewing covered action appeals. State or local agencies are required to submit detailed findings upon filing their consistency determination, described previously. These findings and the record will provide the basis for the Council's decision making.

Per statute, an appeal must be filed within 30 days; if a valid appeal is filed, the Council is responsible for subsequent evaluation and determination—as provided in statute and the Council's Administrative Procedures Governing Appeals—of whether the covered action is consistent with the Delta Plan's policies. More than one policy in the Delta Plan may apply to a covered action. If no person appeals the certification of consistency, the State or local public agency may proceed to implement the covered action.

In the event of an appeal of a covered action, the Council may consult with the DPC consistent with Public Resources Code section 29773.

Upon receiving an appeal, the Council has 60 days to hear the appeal and an additional 60 days to make its decision and issue specific written findings. If the covered action is found to be inconsistent, the project may not proceed until it is revised so that it is consistent with the Delta Plan.

The appeals process is described in statute and further defined in the appeals procedures adopted by the Council; it is attached for reference purposes as Appendix D.

POLICIES AND RECOMMENDATIONS

State and local agencies approve many important plans, programs, and projects annually that are in or otherwise affect the Delta. Interagency coordination is often limited and, despite the Delta's special status, there are no overarching guidelines or coordinated best management practices to ensure that all significant actions use best available science or adaptive management in particular. The Delta Reform Act, in describing a process for coordinating actions under the Delta Plan, requires that State or local government actions are consistent with the Delta Plan and supported by detailed findings. Policy G P1 describes compliance requirements for covered actions that are to be included in the project proponent's written findings.

Problem Statement

Independent and disparate actions by individual agencies can lead to conflict and reduce successful achievement of the coequal goals. Lack of uniform use of best available science and adaptive management for water supply and ecosystem projects can lead to unintended consequences, reduced likelihood of project success, and increased likelihood of adverse environmental impacts. In addition, management actions can be delayed when uncertainty exists, while adaptive management allows for flexible decision making despite uncertainty.

In some cases, project proponents do not carefully plan for the resources and costs of monitoring and tracking, and full adaptive management does not occur. Failure of significant Delta-related actions to comply with existing law can thwart the successful achievement of the coequal goals.

Policies

The appendices referred to in the policy language below are included in Appendix B of the Delta Plan.

G P1. Detailed Findings to Establish Consistency with the Delta Plan

(a) This policy specifies what must be addressed in a certification of consistency filed by a State or local public agency with regard to a covered action. This policy only applies after a "proposed action" has been determined by a State or local public agency to be a covered action because it is covered by one or more of the policies contained in Article 3. Inconsistency with this policy may be the basis for an appeal.

(b) Certifications of consistency must include detailed findings that address each of the following requirements:

(1) Covered actions, in order to be consistent with the Delta Plan, must be consistent with this regulatory policy and with each of the regulatory policies contained in Article 3 implicated by the covered action. The Delta Stewardship Council acknowledges that in some cases, based upon the nature of the covered action, full consistency with all relevant regulatory policies may not be feasible. In those cases, the agency that files the certification of consistency may nevertheless determine that the covered action is consistent with the Delta Plan because, on whole, that action is consistent with the coequal goals. That determination must include a clear identification of areas where consistency with relevant regulatory policies is not feasible, an explanation of the reasons why it is not feasible, and an explanation of how the covered action nevertheless, on whole, is consistent with the coequal goals. That determination is subject to review by the Delta Stewardship Council on appeal;

(2) Covered actions not exempt from CEQA must include applicable feasible mitigation measures identified in the Delta Plan's Program EIR (unless the measure(s) are within the exclusive jurisdiction of an agency other than the agency that files the certification of consistency), or substitute mitigation measures that the agency that files the certification of consistency finds are equally or more effective;

(3) As relevant to the purpose and nature of the project, all covered actions must document use of best available science;

(4) Ecosystem restoration and water management covered actions must include adequate provisions, appropriate to the scope of the covered action, to assure continued implementation of adaptive management. This requirement shall be satisfied through both of the following:

(A) An adaptive management plan that describes the approach to be taken consistent with the adaptive management framework in Appendix 1B, and

(B) Documentation of access to adequate resources and delineated authority by the entity responsible for the implementation of the proposed adaptive management process.

(c) A conservation measure proposed to be implemented pursuant to a natural community conservation plan or a habitat conservation plan that was:

(1) Developed by a local government in the Delta; and

(2) Approved and permitted by the California Department of Fish and Wildlife prior to May 16, 2013

is deemed to be consistent with sections 5005 through 5009 of this Chapter if the certification of consistency filed with regard to the conservation measure includes a statement confirming the nature of the conservation measure from the California Department of Fish and Wildlife.

23 CCR Section 5002
NOTE: Authority cited: Section 85210(i), Water Code.
Reference: Sections 85225, 85225.10, 85020, 85054, 85302(g), and 85308, Water Code.

Problem Statement

Currently, science efforts related to the Delta are performed by multiple entities with multiple agendas and without an overarching plan for coordinating data management and information sharing among entities. Increasingly, resource management decisions are made in the courtroom as conflicting science thwarts decision making and delays action. Multiple frameworks for science in the Delta have been proposed, but a comprehensive science plan that organizes and integrates ongoing scientific research, monitoring, analysis, and data management among entities has yet to be fully formulated.

Recommendations

G R1. Development of a Delta Science Plan

The Delta Stewardship Council's Delta Science Program should develop a Delta Science Plan by December 31, 2013. The Delta Science Program should work with the Interagency Ecological Program, Bay Delta Conservation Plan, California Department of Fish and Wildlife, and other agencies to develop the Delta Science Plan. To ensure that best science is used to develop the Delta Science Plan, the Delta Independent Science Board should review the draft Delta Science Plan.

The Delta Science Plan should address the following:

- *A collaborative institutional and organizational structure for conducting science in the Delta*
- *Data management, synthesis, scientific exchange, and communication strategies to support adaptive management and improve the accessibility of information*
- *Strategies for addressing uncertainty and conflicting scientific information*
- *Prioritization of research and balancing of the short-term immediate science needs with science that enhances comprehensive understanding of the Delta system over the long term*
- *Identification of existing and future needs for refining and developing numerical and simulation models along with enhancing existing Delta conceptual models (e.g., the Interagency Ecological Program (IEP) Pelagic Organism Decline (POD) and the Delta Regional Ecosystem Restoration Implementation Plan (DRERIP) models)*
- *An integrated approach for monitoring that incorporates existing and future monitoring efforts*
- *An assessment of financial needs and funding sources to support science*

Timeline for Implementing Policies and Recommendations

Figure 2-4 lays out a timeline for implementing the policies and recommendations described in the previous section. The timeline emphasizes near-term and intermediate-term actions.

Timeline for Implementing Policies and Recommendations

TIMELINE CHAPTER 2: The Delta Plan

	ACTION (REFERENCE #)	LEAD AGENCY(IES)	NEAR TERM 2012–2017	INTERMEDIATE TERM 2017–2025
POLICIES	Detailed findings to establish consistency with the Delta Plan (G P1)	Varies	●	●
RECOMMENDATIONS	Development of a Delta Science Plan (G R1)	Council	●	
COUNCIL ACTIONS	Establish Delta Plan Interagency Implementation Committee	Council	●	●

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Agency Key:
Council: Delta Stewardship Council

Figure 2-4

References

Abal, E. G., S. E. Bunn, and W. C. Dennison, eds. 2005. *Healthy Waterways Healthy Catchments: Making the Connection in South East Queensland, Australia*. Moreton Bay Waterways and Catchments Partnership, Brisbane. p. 240.

Barnett, T., R. Malone, W. Pennell, D. Stammer, B. Semtner, and W. Washington. 2004. The effects of climate change on water resources in the west: Introduction and overview. *Climatic Change* 62:1-11.

Baxter, R., R. Breuer, L. Brown, L. Conrad, F. Feyrer, S. Fong, K. Gehrts, L. Grimaldo, B. Herbold, P. Hrodey, A. Mueller-Solger, T. Sommer, and K. Souza. 2010. *Interagency Ecological Program 2010 Pelagic Organism Decline Work Plan and Synthesis of Results*. Interagency Ecological Program for the San Francisco Estuary.

Bay Delta Conservation Plan Independent Science Advisors on Adaptive Management. 2009. *Bay Delta Conservation Plan Independent Science Advisor's Report on Adaptive Management*. Page 14. Site accessed May 2011. http://www.bdcpweb.com/Libraries/Background_Documents/BDCP_Adaptive_Management_ISA_report_Final.sflb.ashx.

CALFED Bay-Delta Program. 2000. *Ecosystem Restoration Program Plan: Strategic Plan for Ecosystem Restoration*. CALFED Bay-Delta Program: Sacramento, California. 75 pp.

Carlisle, D. M., D. M. Wolock, and M. R. Meador. 2011. Alteration of streamflow magnitudes and potential ecological consequences: a multiregional assessment. *Frontiers in Ecology and the Environment* 9(5): 264-270.

Christensen, N. L., A. M. Bartuska, J. H. Brown, S. Carpenter, C. D'Antonio, R. Francis, J. R. Franklin, J. A. MacMahon, R. R. Noss, D. J. Parsons, C. H. Peterson, M. G. Turner, and R. G. Woodmansee. 1996. The report of the Ecological Society of America committee on the scientific basis for ecosystem management. *Ecological Applications* 6:665-691.

Cloern, J. E., N. Knowles, L. R. Brown, D. Cayan, M. D. Dettinger, T. L. Morgan, D. H. Schoellhamer, M. T. Stacey, M. van der Wegen, R. W. Wagner, and A. D. Jassby. 2011. Projected evolution of California's San Francisco Bay-Delta-River system in a century of climate change. *PLoS ONE* 6:e24465.

DPC (Delta Protection Commission). 2012. *Proposal to Protect, Enhance, and Sustain the Unique Cultural, Historical, Recreational, Agricultural, and Economic Values of the Sacramento-San Joaquin Delta as an Evolving Place*. January 26.

Delta Vision (Delta Vision Blue Ribbon Task Force). 2008. *Delta Vision Strategic Plan*. October 17. http://deltavision.ca.gov/strategicplanningprocess/staffdraft/delta_vision_strategic_plan_standard_resolution.pdf.

Dettinger, M. D., F. M. Ralph, T. Das, P. J. Neiman, and D. R. Cayan. 2011. Atmospheric rivers, floods and the water resources of California. *Water* 3:445-478.

Dugdale, R. C., F. P. Wilkerson, V. E. Hogue, and A. Marchi. 2007. The role of ammonium and nitrate in spring bloom development in San Francisco Bay. *Estuarine, Coastal, and Shelf Science* 73:17-29.

Famiglietti, J. S., M. Lo, S. L. Ho, J. Bethune, K. J. Anderson, T. H. Syed, S. C. Swenson, C. R. de Linage, and M. Rodell. 2011. Satellites measure recent rates of groundwater depletion in California's Central Valley. *Geophysical Research Letters* 38, L03403, doi:10.1029/2010GL046442.

Glibert, P. M., D. Fullerton, J. M. Burkholder, J. C. Cornwell, and T. M. Kana. 2011. Ecological stoichiometry, biogeochemical cycling, invasive species, and aquatic food webs: San Francisco Estuary and comparative systems. *Reviews in Fisheries Science* 19:358-417.

Habron, G. 2003. Role of adaptive management for watershed councils. *Environmental Management* 31: 29-41.

Healey, M. C., M. D. Dettinger, and R. B. Norgaard, eds. 2008. *The State of Bay-Delta Science*. CALFED Science Program: Sacramento, California, 174 pp. Abstract. Sacramento, California.

Kaplan, R. S., and D. P. Norton. 2008. Mastering the management system. *Harvard Business Review* January: 62-57.

Knowles, N., M. D. Dettinger, and D. R. Cayan. 2006. Trends in snowfall versus rainfall in the Western United States. *Journal of Climate* 19:4545-4559.

Lund, J. R., E. Hanak, W. E. Fleenor, W. A. Bennett, R. E. Howitt, J. F. Mount, and P. B. Moyle. 2010. *Comparing Futures for the Sacramento-San Joaquin Delta*. University of California Press: Berkeley, CA. p. 231.

Miller, R. L., M. Fram, R. Fujii, and G. Wheeler. 2008. Subsidence reversal in a re-established wetland in the Sacramento-San Joaquin Delta, California, USA. *San Francisco Estuary and Watershed Science* 6.

NRC (National Research Council of the National Academies). 2004. *Improving the Use of "Best Scientific Information Available" Standard in Fisheries Management.* The National Academies Press, Washington, D.C. Site accessed July 2010. http://www.nap.edu/catalog.php?record_id=11045#toc.

NRC (National Research Council of the National Academies). 2012. *Sustainable Water and Environmental Management in the California Bay-Delta*. The National Academies Press, Washington D.C. http://www.nap.edu/catalog.php?record_id=13394.

Sommer, T., C. Armor, R. Baxter, R. Breuer, L. Brown, M. Chotkowski, S. Culberson, F. Feyrer, M. Gingras, B. Herbold, W. Kimmerer, A. Mueller-Solger, M. Nobriga, and K. Souza. 2007. The collapse of pelagic fishes in the Upper San Francisco Estuary. *Fisheries* 32:270-277.

Stanford, J. A., and G. C. Poole. 1996. A protocol for ecosystem management. *Ecological Applications* 6:741-744.

Sullivan, P. J., J. M. Acheson, P. L. Angermeier, T. Faast, J. Flemma, C. M. Jones, E. E. Knudsen, T. J. Minello, D. H. Secor, R. Wunderlich, and B. A. Zanetell. 2006. *Defining and Implementing Best Available Science for Fisheries and Environmental Science, Policy, and Management*. American Fisheries Society, Bethesda, Maryland, and Estuarine Research Federation, Port Republic, Maryland. Site accessed July 2010. http://www.fisheries.org/afs/docs/policy_science.pdf.

Weston, D. P., R. J. Holmes, J. You, and M. J. Lydy. 2005. Aquatic toxicity due to residential use of pyrethroid insecticides. *Environmental Science and Technology* 39: 9778–9784.

Weston, D. P., and M. J. Lydy. 2010. Urban and agricultural sources of pyrethroid insecticides to the Sacramento–San Joaquin Delta of California. *Environmental Science and Technology* 44: 1833-1840.

Williams, B. K., R. C. Szaro, and C. D. Shapiro. 2009. *Adaptive Management: The U.S. Department of the Interior Technical Guide*. Adaptive Management Working Group, U.S. Department of the Interior, Washington, D.C. p. 72.

Winder, M., A. D. Jassby, and R. Mac Nally. 2011. Synergies between climate anomalies and hydrological modifications facilitate estuarine biotic invasions. *Ecology Letters*: DOI: 10.1111/j.1461-0248.2011.01635.x.

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CHAPTER 3

A More Reliable Water Supply for California

ABOUT THIS CHAPTER

This chapter provides an overview of California's water supply, where it comes from, and how it is used. It also describes California's water policy foundations, including federal, State of California (State), and local policies, laws, and programs, and the need for continued improvements in local water planning, management, and information. It explains the special role of the Sacramento-San Joaquin Delta (Delta) in California's water, including its history, conflicts and challenges, and necessary investments and changes to achieve flexibility, improve resiliency, and increase water supply reliability.

As a starting point for this Delta Plan, four core water strategies must be implemented throughout the state to achieve the coequal goal of providing a more reliable water supply for California:

- Increase water conservation and expand local and regional supplies
- Improve groundwater management
- Improve conveyance and expand storage
- Improve water management information

These core strategies form the basis of the 2 policies and 19 recommendations found at the end of the chapter.

RELEVANT LEGISLATION

The Sacramento-San Joaquin Delta Reform Act of 2009 declares State policy for California's water resources and the Delta (Water Code section 85054):

> *"Coequal goals" means the two goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem. The coequal goals shall be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place.*

The Legislature declares the following objectives inherent in the coequal goals for management of the Delta (Water Code section 85020):

> *(a) Manage the Delta's water and environmental resources and the water resources of the State over the long term.*
>
> *(d) Promote statewide water conservation, water use efficiency, and sustainable water use.*
>
> *(f) Improve the water conveyance system and expand statewide water storage.*

The Legislature declared that:

> *85004(b) Providing a more reliable water supply for the state involves implementation of water use efficiency and conservation projects, wastewater reclamation projects, desalination, and new and improved infrastructure, including water storage and Delta conveyance facilities.*

Reduced reliance on the Delta for water supplies is established as State policy, along with an associated mandate for regional self-reliance (Water Code section 85021):

> *The policy of the State of California is to reduce reliance on the Delta in meeting California's future water supply needs through a statewide strategy of investing in improved regional supplies, conservation, and water use efficiency. Each region that depends on water from the Delta watershed shall improve its regional self-reliance for water through investment in water use efficiency, water recycling, advanced water technologies, local and regional water supply projects, and improved regional coordination of local and regional water supply efforts.*

Water Code sections 85302, 85303, 85304, and 85211 provide direction on measures that must be included in the Delta Plan to meet the statewide water supply policy goals and objectives, and ultimately the coequal goal of increased water supply reliability:

> *85302(d) The Delta Plan shall include measures to promote a more reliable water supply that address all of the following:*
>
> > *(1) Meeting the needs for reasonable and beneficial uses of water.*
> >
> > *(2) Sustaining the economic vitality of the State.*
> >
> > *(3) Improving water quality to protect human health and the environment.*
>
> *85303 The Delta Plan shall promote statewide water conservation, water use efficiency, and sustainable use of water.*
>
> *85304 The Delta Plan shall promote options for new and improved infrastructure relating to the water conveyance in the Delta, storage systems, and for the operation of both to achieve the coequal goals.*
>
> *85211 The Delta Plan shall include performance measurements that will enable the council to track progress in meeting the objectives of the Delta Plan. The performance measurements shall include, but need not be limited to, quantitative or otherwise measurable assessments of the status and trends…*
>
> > *(b) The reliability of California water supply imported from the Sacramento River or the San Joaquin River watershed.*

The longstanding constitutional principle of reasonable use and the Public Trust Doctrine form the foundation of California's water management policy, and are particularly applicable to the Delta watershed and to the others areas that use Delta water as the basis for resolving water conflicts (Water Code section 85023). The constitutional principle is defined in Section 2 of Article X of the California Constitution as:

> *The right to water or to the use or flow of water in or from any natural stream or water course in this State is and shall be limited to such water as shall be reasonably required for the beneficial use to be served, and such right does not and shall not extend to the waste or unreasonable use or unreasonable method of use or unreasonable method of diversion of water.*

Water Code sections 85031 and 85032 provide clarification that existing water rights, procedures, or laws are not affected:

> *85031(a) This division does not diminish, impair, or otherwise affect in any manner whatsoever any area of origin, watershed of origin, county of origin, or any other water rights protections, including, but not limited to, rights to water appropriated prior to December 19, 1914, provided under the law. This division does not limit or otherwise affect the application of Article 1.7 (commencing with Section 1215) of Chapter 1 of Part 2 of Division 2, Sections 10505, 10505.5, 11128, 11460, 11461, 11462, and 11463, and Sections 12200 to 12220, inclusive.*
>
> > *(b) For the purposes of this division, an area that utilizes water that has been diverted and conveyed from the Sacramento River hydrologic region, for use outside the Sacramento River hydrologic region or the Delta, shall not be deemed to be immediately adjacent thereto or capable of being conveniently supplied with water therefrom by virtue or on account of the diversion and conveyance of that water through facilities that may be constructed for that purpose after January 1, 2010.*
> >
> > *(c) Nothing in this division supersedes, limits, or otherwise modifies the applicability of Chapter 10 (commencing with Section 1700) of Part 2 of Division 2, including petitions related to any new conveyance constructed or operated in accordance with Chapter 2 (commencing with Section 85320) of Part 4 of Division 35.*
> >
> > *(d) Unless otherwise expressly provided, nothing in this division supersedes, reduces, or otherwise affects existing legal protections, both procedural and substantive, relating to the state board's regulation of diversion and use of water, including, but not limited to, water right priorities, the protection provided to municipal interests by Sections 106 and 106.5, and changes in water rights. Nothing in this division expands or otherwise alters the board's existing authority to regulate the diversion and use of water or the courts' existing concurrent jurisdiction over California water rights.*

85032 This division does not affect any of the following:

> *(a) The Natural Community Conservation Planning Act (Chapter 10 (commencing with Section 2800) of Division 3 of the Fish and Game Code).*
>
> *(b) The California Endangered Species Act (Chapter 1.5 (commencing with Section 2050) of Division 3 of the Fish and Game Code).*
>
> *(c) The Fish and Game Code.*
>
> *(d) The Porter-Cologne Water Quality Control Act (Division 7 (commencing with Section 13000).*
>
> *(e) Chapter 8 (commencing with Section 12930) of Part 6 of Division 6.*
>
> *(f) The California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code).*
>
> *(g) Section 1702.*
>
> *(h) The application of the public trust doctrine.*
>
> *(i) Any water right.*
>
> *(j) The liability of the state for flood protection in the Delta or its watershed.*

CHAPTER 3

A More Reliable Water Supply for California

In California, the conflicts over water are legendary. The connotations of wealth and power associated with control over water were captured in dramatic fashion in the 1974 film *Chinatown*. A decade later, Marc Reisner's bestselling nonfiction book, *Cadillac Desert*, described vast, arid California land tracts turned to lush, productive fields through the modern magic of water diversion and irrigation. California is known for many things: the urban, cultural giant that is Los Angeles; the great Central Valley, breadbasket to the world; cutting-edge technological advances hailing from Silicon Valley; and the fertile human-made islands of the Delta. The thread that ties these places together is a supply of fresh water from the Sacramento-San Joaquin watershed. Similarly, dozens of fish species—some of them threatened by extinction—and a diverse palette of flora and fauna also depend on this water. As described in Chapter 1, at the heart of California's water troubles are scarcity of supply and competing uses—in particular, conflict with the water needs of the ecosystem. This dynamic of conflict characterizes the essential debate over management of the Delta.

Building on the foundations of California water policy, the Delta Reform Act established the goal of providing "a more reliable water supply for California." This is coequal with the goal of "protecting, restoring, and enhancing the Delta ecosystem." Both must be accomplished while protecting and enhancing the unique values of the Delta as an evolving place. (See sidebar, What Does It Mean to Achieve the Goal of Providing a More Reliable Water Supply for California?)

The Delta Reform Act recognizes that the "Delta watershed and California's water infrastructure are in crisis and existing Delta policies are not sustainable" (Water Code section 85001(a)). The economies of major regions of the state are reliant upon the ability to use water within the Delta watershed or on water imported from the Delta watershed. Yet, the long-term impacts of these diversions, on the Delta and its watershed, in combination with many other factors, are causing native fisheries to decline. In recent years, the populations of salmon and several other fish species have reached their lowest numbers in recorded history, and many of California's salmon runs are now listed as endangered by the State or federal government. The courts have responded by imposing constraints, particularly in dry years, on water diversions through the Delta. As a result, water deliveries—particularly those that come from the State Water Project (SWP) and the federal Central Valley Project (CVP)—have become increasingly unpredictable.

The Delta Reform Act mandates many strategies that the Delta Plan must address to improve water supply reliability for California:[1]

- Promote, implement, and invest in water efficiency and conservation
- Implement and invest in wastewater reclamation and water recycling
- Increase and invest in desalination and advanced water treatment technologies
- Promote and implement options for improved water conveyance

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[1] See Water Code sections 85004(b), 85020(d) and (f), 85021, 85023, 85302(d), 85303, and 85304.

- Expand and invest in storage
- Improve water quality to protect human health and the environment
- Invest in local and regional water supply projects and coordination
- Prohibit waste and unreasonable use, consistent with Article X, Section 2 of the California Constitution, and protect public trust resources consistent with the Public Trust Doctrine

California's precipitation is extremely variable, and both droughts and floods are not uncommon, even occurring in back-to-back years. Therefore, the State must adapt its water infrastructure and operations in the Delta to make better use of the greater volumes of water that are and, in the future, will continue to be available during wet years, and to take less water during dry years when conflicts with the Delta ecosystem and in-Delta water quality are at their greatest. Concurrently, the development and careful management of local water resources hold tremendous potential for improving water reliability and must be a priority for California.

Management of any natural resource is a continual balancing act. Establishment of the coequal goals provides policy priorities when it comes to managing water, but continuing disputes are inevitable. Given that water in California is scarce, actions that occur in one corner of the state can have ripple effects hundreds of miles away. Levee failures in the Delta may interrupt water supplies to industry in San Diego. Conversely, the way Southern California regions manage their water may affect California's water-dependent ecosystems. The management of a salinity regime to benefit the environment has implications for in-Delta water users. Upstream water use can affect the quality and quantity of water for all downstream users—urban, agricultural, or environmental. Decades-old decisions to drain swamps, build intrastate water projects, and mine gold have left legacy imprints on California's water and ecosystem management.

Although exports from the Delta account for only a fraction of California's water supplies, the Delta is of widespread importance given its geographic location and influential role in ecosystem dynamics. Those who live in the Delta watershed are concerned about how management actions in the Delta may affect them; those who live in the Delta are keenly aware of others' interest in their backyard; and those who rely fully or partially on Delta exports, in some cases located hundreds of miles from the Delta itself, fear the impacts of reduced water supply reliability on their local economies and standard of living.

The broad influence of the Delta is precisely why the Delta crisis cannot be resolved by taking actions in the Delta alone. The Delta Reform Act establishes a new policy for California of reducing "reliance on the Delta in meeting California's future water supply needs" (Water Code section 85021). Reduced reliance is to be achieved through a statewide strategy of investing in improved local and regional supplies, conservation, and water use efficiency so that "each region that depends on water from the Delta watershed shall improve its regional self-reliance." The State's water planning document, the *California Water Plan – Update 2009*, estimates that California could reduce water demand and increase water supply in the range of 5 to 10 million acre-feet (MAF) by 2030 just through the implementation of existing strategies and technology (DWR 2009). This amount of water is more than enough to meet the projected water demands of California's growing population through 2050. An integrated approach that includes increased water efficiency, local and regional diversification of water supplies, reduced reliance on water from the Delta, improved regional self-reliance, and concurrent improvements to storage and Delta infrastructure will build the resiliency and reliability of California's water supply.

WHAT DOES IT MEAN TO ACHIEVE THE GOAL OF PROVIDING A MORE RELIABLE WATER SUPPLY FOR CALIFORNIA?

Achieving the coequal goal of providing a more reliable water supply for California means better matching the state's demands for reasonable and beneficial uses of water to the available water supply.

- This will be done by promoting, improving, investing in, and implementing projects and programs that improve the resiliency of the state's water systems, increase water efficiency and conservation, increase water recycling and use of advanced water technologies, improve groundwater management, expand storage, and improve Delta conveyance and operations. The evaluation of progress toward improving reliability will take into account the inherent variability in water demands and supplies across California.

Regions that use water from the Delta watershed will reduce their reliance on this water for reasonable and beneficial uses, and improve regional self-reliance, consistent with existing water rights and the State's area of origin statutes and Reasonable Use and Public Trust Doctrines.

- This will be done by improving, investing in, and implementing local projects and programs that increase water conservation and efficiency, increase water recycling and use of advanced water technologies, expand storage, improve groundwater management, and enhance regional coordination of local and regional water supply development efforts.

Water exported from the Delta will more closely match water supplies available to be exported, based on water year type and consistent with the coequal goal of protecting, restoring, and enhancing the Delta ecosystem.

- This will be done by improving conveyance in the Delta and expanding groundwater and surface storage both north and south of the Delta to optimize diversions in wet years when more water is available and conflicts with the ecosystem less likely, and limit diversions in dry years when conflicts with the ecosystem are more likely. Delta water that is stored in wet years will be available for water users during dry years, when the limited amount of available water must remain in the Delta, making water deliveries more predictable and reliable. In addition, these improvements will decrease the vulnerability of Delta water supplies to disruption by natural disasters, such as earthquakes, floods, and levee failures.

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Accordingly, the Delta Stewardship Council (Council) envisions a future in which California has achieved the coequal goal of improved water supply reliability. In the future:

- California's water resources will be better managed, consistent with the State's Reasonable Use and Public Trust Doctrines.
- Improved efficiency and a greater diversity of sources will make more water available to meet the state's demands.
- Groundwater resources will be sustainably managed, and critical overdraft in groundwater basins will have been eliminated.
- Water suppliers in regions that use water from the Delta watershed will have reduced their reliance on this water and improved their regional self-reliance. California will be better prepared to meet the challenges of climate change and catastrophic events that may affect future water deliveries.

In the future, water exports from the Delta will more closely match water supplies available to be exported, consistent with California's variable hydrology and the coequal goal of protecting, restoring, and enhancing the Delta ecosystem. Conveyance facilities in the Delta will be improved, and additional groundwater and surface storage, both north and south of the Delta, will help optimize diversions in wet years when more water is available and conflicts with the ecosystem are less likely, and limit diversions in dry years when conflicts with the ecosystem are more likely. These patterns of Delta exports will be consistent with more natural flow patterns in the Delta, which will aid native species and reduce regulatory uncertainty. At the same time, deliveries of Delta water will be more predictable due to use of storage to deliver wet-year water that is exported and stored for future use. Flexibility of export operations will be enhanced through implementation of local and regional water efficiency, improved conveyance to reduce conflicts with the ecosystem, and water supply projects that reduce pressure on the Delta and reliance on these deliveries.

California's Water Supply Picture

California's water supply picture makes it unlike any other state in the nation. Geography, hydrology, circumstance, and governance have shaped the political landscape of California water in a manner that has both intrigued and frustrated people for decades. Engineering alterations have enabled urban metropolises to thrive—and sprawl—and expansive agricultural regions with global influence to flourish with supplemental water, imported in some cases from hundreds of miles away and across county and even state boundaries. A complex and sometimes conflicting system of laws and policies means that in dry years, frequent in California, a given water district might have surplus supplies with which to grow lettuce or alfalfa, while a district next door battles drought conditions and the associated economic and environmental impacts. A growing awareness of how past water management practices have led to current environmental conflicts and overall competition for water supplies, combined with the knowledge that past climate patterns are not necessarily indicative of the next century's hydrograph, are shaping how California plans for its water future (see Figure 3-1).

This section provides an overview of where California's water comes from and how it is used, the state's vast water supply infrastructure system, and the implications of climate change on California's water supplies.

Sources of California's Water Supply

Variability and uncertainty are the dominant characteristics of California's water resources. Precipitation is the primary source of California's water supply. However, this precipitation varies greatly from year to year, as well as by season and where it falls geographically in the state, which makes management of the state's water resources complex and challenging. Groundwater, which is often connected to surface supplies, contributes to a significant portion of California's water use, on average supplying 8 MAF (20 percent) of California's urban and agricultural uses; but in some areas, this figure is considerably higher and can be as much as 60 to 80 percent of a region's water supply (DWR 2009). Groundwater, and implications for its overuse, is discussed in greater detail later in this chapter.

The total amount of precipitation in an average year provides California with about 200 MAF of surface water falling as either rain or snow (DWR 2009).[2] The actual volume of water the state receives each year varies dramatically depending on whether the year is dry or wet. California may receive less than 100 MAF of water during a dry year and more than 300 MAF in a wet year (Western Regional Climate Center 2011a).

The term "average water year" in California is useful for explanatory purposes, but can be misleading as a measurement for planning. In fact, California experiences the most unpredictable pattern of precipitation in the nation, with the bulk of its annual water falling within just 5 to 15 days (Dettinger et al. 2011). This means that in years when fewer storms pass over California, the state faces the problem of too little water; conversely, a few extra storms may result in flooding. For example, between 2005 and 2008, Los Angeles experienced both its driest and wettest years on record (California Natural Resources Agency 2008). The historical record shows that California has frequently experienced long multiyear droughts, as well as extremely wet years that coincide with substantial flooding and consequent risk to people and property (Hanak et al. 2011).

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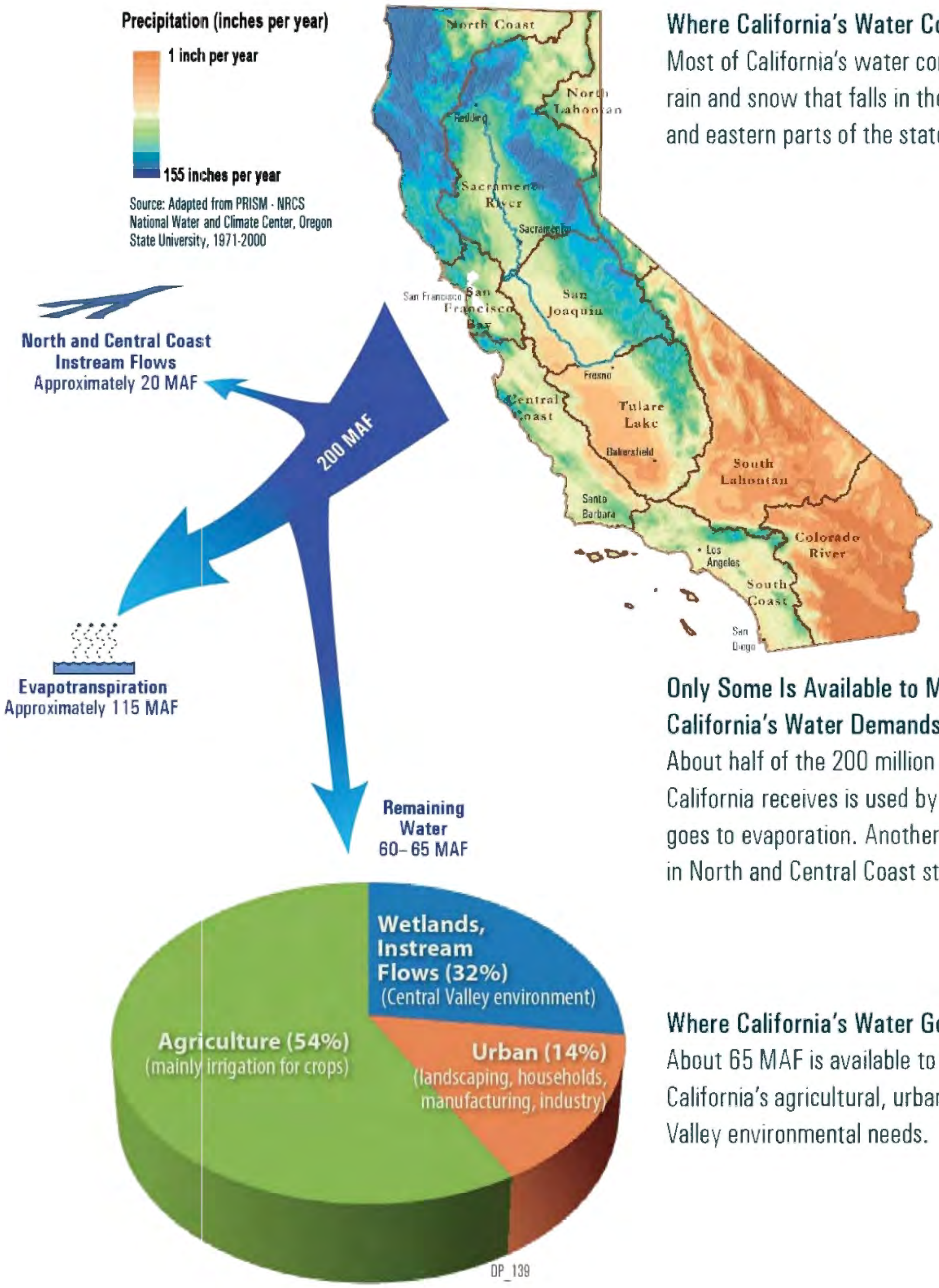
[2] Includes up to 10 MAF of precipitation that occurs in Oregon, Mexico, and the Colorado River and is imported into California.

How California's Water Is Used



Where California's Water Comes From

Most of California's water comes from rain and snow that falls in the northern and eastern parts of the state.

Only Some Is Available to Meet California's Water Demands

About half of the 200 million acre-feet (MAF) California receives is used by vegetation or goes to evaporation. Another 20 MAF stays in North and Central Coast streams.

Where California's Water Goes

About 65 MAF is available to meet California's agricultural, urban, and Central Valley environmental needs.

Figure 3-1 *Sources: Adapted from DWR 2009, USGS 2010*

Most of California's precipitation occurs between November and April, yet most of the state's agricultural and urban water demand is in the hot, dry months of summer and early fall, creating a management challenge. In addition, most of the precipitation falls in the mountains in the middle to northern half of the state, far from major population and agricultural centers. In some years, the far north of the state can receive 100 inches or more of precipitation while the southernmost regions receive only a few inches (Western Regional Climate Center 2011b). These basic characteristics of precipitation in California—seasonal timing and geography—and their fundamental disconnect with where and when Californians demand water provide the basic explanation for why water in California is such a complicated and controversial matter.

How California's Water Is Used

The amount of water available to meet agricultural, urban, and ecosystem water demands starts with the state's annual precipitation. On average, about half of this water evaporates; is used by surface vegetation for transpiration; or flows to deep subsurface areas, saline sinks, or the ocean (DWR 2009). The rest of this water—known as "dedicated water"[3]—is used to supply urban municipal and industrial uses, agricultural irrigation, water for ecosystem protection and restoration, and for storage in surface and groundwater reservoirs (DWR 2009).

Patterns of how and when water is used in the state vary with the type of water year. In fact, although best available estimates are included in this Delta Plan, state water managers often work with limited or incomplete information related to water use. The California Department of Water Resources (DWR) uses five water year–type classifications for planning and management purposes: wet, above normal, below normal, dry, and critically dry. In wet years, due to plentiful local rainfall, agricultural and urban landscape irrigation water demands are generally lower. Water demands are usually highest in years of reduced rainfall and because local supplies are low (DWR 2009). Ironically, agricultural and urban water demands may be lower during critically dry years because of short-term water use reduction actions, such as rationing or cropland fallowing to cope with water shortages.

In an average water year, this dedicated water totals approximately 80 to 85 MAF.[4] Again, the fluctuations between wet and dry years can be extreme, with wet years providing more than 95 MAF and critically dry years producing less than 65 MAF of available supply (LAO 2008, DWR 2009, USGS 2010).

However, not all of the 80 to 85 MAF is available to meet water demands within the Central Valley, Bay Area, and Southern California. In the late 1970s, the California Legislature secured State and federal protection of California's North Coast rivers and, in doing so, precluded major diversions from these rivers, including parts of the Trinity, Scott, Salmon, Eel, and Klamath rivers. Water from these rivers is now largely mandated to the environment by law, with the exception of diversions from the Trinity River to the Sacramento River for CVP supplies that are limited by federal law (Hanak et al. 2011). As a result, in an average year, approximately 20 MAF (out of the available supply of 80 to 85 MAF) are reserved for Wild and Scenic Rivers and other instream flow requirements in the North Coast and San Francisco Bay regions and some Central Coast and South Coast areas. Most of this water falls outside the Delta watershed. Although original State water plans and State and federal water contracts envisioned its capture and conveyance, permanent legal protections now prohibit it. (See the CVP and SWP Water Delivery Challenges section.)

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[3] DWR uses the terms "dedicated" and "developed" interchangeably in their publications. DWR identifies California's average annual dedicated water supply as 85 MAF.

[4] All statewide average water use values were calculated using information in Volume 5 DWR Water Plan 2009 (including average values for years 1998 through 2005) and results from CALSIM II model runs prepared for DWR State Water Project Reliability Studies (DWR 2010b, DWR 2011c).

This means that the remaining water supply (of 60 to 65 MAF in an average year) goes to meet agricultural and urban demands and Central Valley environmental needs.[5,6] In an average year, irrigated agriculture uses approximately 34 MAF (54 percent) of this water, urban areas use about 9 MAF (14 percent), and 20 MAF (32 percent) is mandated to meet instream flow requirements, including State Water Resources Control Board (SWRCB) Delta water quality requirements and Central Valley wildlife refuge commitments (DWR 2009).

Accounting for how much water each sector actually uses is complicated because water may be reused several times for different purposes or it may be taken from surface or groundwater storage held from previous years.[7] The lack of consistent and accurate estimates of statewide water use is a significant challenge that has important implications for improved water management in California.

Future population and economic growth is expected to result in increased water demand. Today, California's water supply supports a population of 36.5 million people, an economy of $1.9 trillion, and diverse natural resources (LAO 2011). The largest economic sectors in the state are trade, transportation, and financial services, with agricultural services contributing about $38 billion (2 percent). Projections by the California Department of Finance in 2010 forecast that the population may grow to 60 million people by 2050, but the rate of growth is slowing and could be much lower.[8] As more development occurs, water use will continue to shift away from agricultural toward urban uses (DWR 2005, DWR 2009, LAO 2008, Hanak et al. 2011). At the same time, increasing water needs for ecosystem protection will likely exacerbate conflicts with agricultural and urban water demands.

California's Water Supply Infrastructure

To provide more reliable water supplies despite the state's hydrologic variability and diverse geography, and also to manage floods during wet years, State, federal, and local agencies have built a vast, interconnected infrastructure system throughout California (see Figure 3-2). The Delta, because of its geographic location and role in conveying water supplies, is often described as the "linchpin" of California's water infrastructure. Rivers and dredged channels act as conveyance canals, and pumping plants provide the momentum to move stored water to areas south. California's overall system includes a range of surface reservoirs, aqueducts, pumping plants, operable gates, groundwater wells, and water treatment facilities constructed over the last hundred plus years.

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[5] Data are from 2000, which DWR categorized as an "average" rainfall year for the state.

[6] The "remaining water" of approximately 60 to 65 MAF, (62.4 MAF for purposes of percentage calculations) is referred to throughout this chapter as "total water use," unless otherwise specified. Total water use includes urban, agricultural, and Central Valley environmental uses such as instream flow requirements and non-CVP-managed wetlands.

[7] For example, water that is dedicated to instream flows often becomes available for downstream diversion to agricultural and urban uses. Some portion of the water that is used for agricultural irrigation or drinking water is returned to the ecosystem through agricultural tailwater releases, infiltration of irrigation water into groundwater, and discharges from sewage treatment plants. The State does not have a system for documenting these multiple uses.

[8] Growth projections by the California Department of Finance are regularly revised and over the past 2 decades reflect a trend toward slower expected growth for the state. Between 1993 and 2004, the California Department of Finance's population projections for 2040 declined by 12 million people, from 62 million to 50 million.

Moving and Storing California's Water

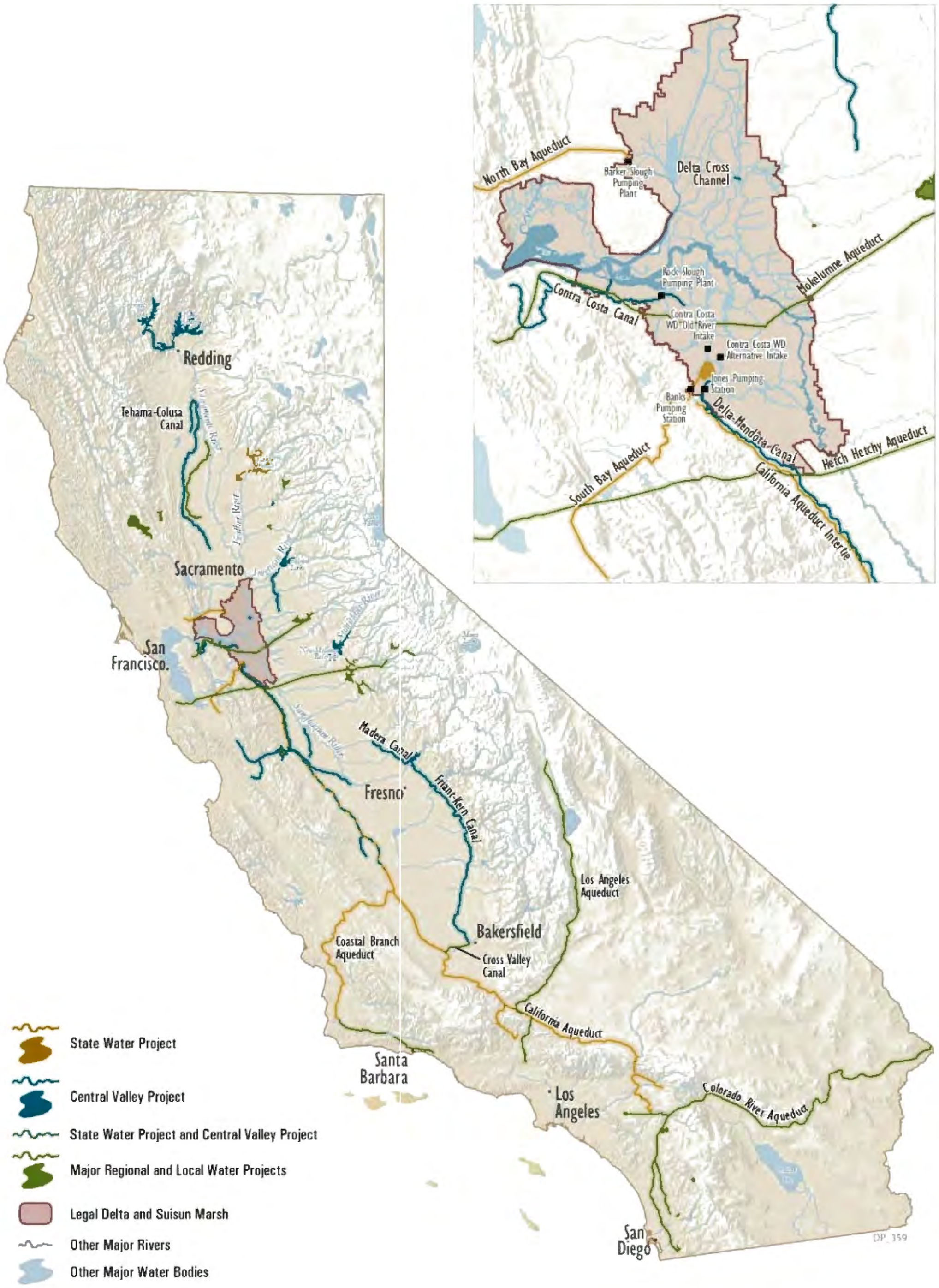

Figure 3-2

Large State, federal, and local dams and canal systems play an important role in storing and conveying water throughout California to meet a variety of urban and agricultural water demands.

Source: Adapted from DWR 2009

On average, local and regional water supplies account for 52 MAF (84 percent) of the state's total water use. Of the 52 MAF, about 44 MAF (84 percent) of the water supply comes from local surface water storage and deliveries, and includes sources such as the Santa Ana, Los Angeles, and Ventura river watersheds in Southern California; local diversions from the Sacramento and San Joaquin rivers; and stream drainages in the central coastal areas. In addition, groundwater supplies about 8 MAF (13 percent) of the state's total water use in average years (20 percent of urban and agricultural water use), and during droughts, can provide up to 60 percent or more for specific regions (DWR 2009). A small but rapidly growing percentage of local water comes from recycled water and water reuse projects.

Supplemental water supplies are conveyed from wetter regions of California, primarily through diversions of runoff from the great Sierra Nevada mountain range and some water from the Trinity River in the north state. In most regions, these imported water supplies augment local and regional sources, especially in dry years and dry seasons. On average, approximately 10.1 MAF (16 percent) of the state's total water use comes through a combination of major conveyance and storage facilities from water sources within California and from other states, with the SWP and CVP making up the majority of these imports (5.1 MAF, about 8 percent), and Hetch Hetchy (0.2 MAF), Mokelumne (0.3 MAF), and the Los Angeles Aqueduct (0.2 MAF) comprising the remaining in-state imports. A significant portion of the state's water supplies are imported from outside California, primarily from the Colorado River (4.3 MAF) through the Colorado River Aqueduct, which serves agricultural and urban demand in Southern California.

The network of infrastructure to store and convey water in California is impressive by modern standards and compared to other states. The state's single largest "reservoir" is the Sierra Nevada snowpack, which holds approximately 15 MAF per year on average (DWR 2009). However, for comparison, local, State, and federal agencies in California have constructed more than 1,200 major reservoirs with a combined storage capacity of 43 MAF, about half the average annual runoff for the entire state (Hanak et al. 2011, DWR 2011a).

Most of California's largest surface storage reservoirs are owned and operated by the federal government and total approximately 17 MAF of storage capacity. The largest federal facility, part of the CVP, is Shasta Lake, which holds 4.5 MAF. The State's single largest storage facility and keystone feature of the SWP, Lake Oroville Dam on the Feather River, has a capacity of 3.5 MAF (LAO 2008). Operating with other reservoirs as a system, these multibenefit facilities reduce the potential for floods at the same time that they make water available for seasonal water agricultural and urban demand, particularly in the summer and fall. They also generate clean electricity. Although these storage facilities provide many benefits, they have also significantly altered the natural ecology of these rivers. Dams and their associated facilities can present barriers to migrating fish and reduce or eliminate downstream gravel and sediment replenishment to the detriment of native species such as salmon. Moreover, reservoir operations have significantly modified the amount and timing of instream flows, as well as water temperature, further contributing to the decline of the state's native fish and ecological resources.

Looking to the future, fewer high-yielding surface storage sites are available in the state now because most of these areas have already been developed (NRC 2012). However, there are significant opportunities throughout California to expand groundwater storage and to reoperate surface storage in conjunction with groundwater storage (also known as conjunctive management or groundwater banking) and other programs to maximize the water supply and environmental benefits of these systems.

Climate Change Complicates Management of California's Water

With climate change, the state's water supply will become even more erratic. Weather patterns are expected to become more extreme with long, multiyear droughts becoming more frequent as well as extremely wet years. Since 1906, California has seen "dry or critically dry" years one-third of the time. This trend is increasing (California Data Exchange Center 2011).

By 2050, temperature increases of 1 to 3 degrees Celsius are expected to cause more winter precipitation to fall as rain, as opposed to snow, and to reduce the Sierra Nevada snowpack (the source of much of California's runoff) by 25 to 40 percent (DWR 2010d). Runoff patterns will shift, leading to greater cool-season runoff and decreased warm-season runoff (Reclamation 2011a). The pattern of spring runoff is also expected to change, with a more rapid spring snowmelt leading to a shorter, more intense spring period of river flow and freshwater discharge accompanied by higher flooding risks (Knowles and Cayan 2004, Knowles et al. 2006, Null et al. 2010, Willis et al. 2011). Because the Delta watershed provides a portion of the water supply for approximately 27 million Californians and irrigates millions of acres of farmland, rising sea levels leading to increased salinity intrusion, along with changes in the form of precipitation and timing of snowmelt, will profoundly alter the way water is managed in California.

Specifically, an anticipated shift in runoff patterns will present a management challenge to existing reservoir operations, with large runoff events increasingly putting pressure on reservoirs managed for multiple benefits, including flood control. Reduced natural water storage in the form of snowpack will diminish statewide carryover storage capacity, making the state increasingly vulnerable during prolonged dry periods and negatively affecting water supply reliability. Sea level rise, as much as 55 inches by 2100 (OPC 2011), will result in high salinity levels in the Delta interior, which will impair water quality for agricultural and municipal uses, and change habitat for fish species. Maintaining freshwater conditions in the Delta could require unanticipated releases of water from storage, which will reduce available water supplies for fish. Rising seas also will dramatically increase the risk of catastrophic interruption of water exports as a result of levee failure and flood events, particularly in the interior Delta where substantial subsidence has already occurred. Warmer temperatures throughout the state will cause higher evaporation rates, particularly during the hot summer and early fall months, contributing to reduced streamflows, drier soils, reduced groundwater infiltration, higher losses of water from surface reservoirs, increased urban and agricultural demand for irrigation water, and more water needed for ecosystem protection (California Natural Resources Agency 2008).

The precise local impacts of climate change on regional water resources remain less certain. Many communities in the state already experience water shortages during droughts (California Environmental Protection Agency 2006, LAO 2009). Improved modeling, especially downscaling of global climate change information to regional and local levels, will help communities to evaluate the extent of their vulnerability and to develop water management strategies that will increase the resilience of their water supply systems (USEPA and DWR 2011).

Foundations of Water Policy in California

Over the past 160 years, the California water rights system has evolved into a complex mix of public and private rights and contractual obligations that were intended to create more certainty about how water is to be allocated among urban, agricultural, and environmental uses during droughts, catastrophic interruptions in water supplies, and other times of scarcity. (See sidebar, California's Complex Water Rights System.) Yet some of these rights and obligations conflict, and now, in many years, there is insufficient water in California to support them all.

California's legal system recognizes limitations on water rights based on the longstanding doctrines of Reasonable Use and Public Trust (NRC 2012). The Delta Reform Act reiterates that the principles of reasonable use and public trust "shall be the foundation of state water management policy" and that they are "particularly important and applicable to the Delta" (Water Code section 85023). The coequal goals of improving water supply reliability for the state and restoring the Delta cannot be achieved by actions in the Delta alone. Every region in California, along with the cities and farms that receive Delta water, will need to improve their management of the state's scarce water resources.

This section discusses the legal foundations for California water policy, explains the state's system of water rights, and describes new water policies and priorities, including reduced reliance on the Delta and improved regional self-reliance, established by the Delta Reform Act.

Reasonable Use and the Public Trust Doctrines

The Reasonable and Beneficial Use and Public Trust Doctrines, in combination with existing water rights and the State's area of origin statutes, have long been the legal and policy foundation for water management in California. The State's Reasonable and Beneficial Use Doctrine specifically limits all water rights and water use in California to "such water as shall be reasonably required for the beneficial use to be served, and such right does not and shall not extend to the waste or unreasonable use or unreasonable method of use or unreasonable method of diversion of water" (California Constitution, Article X, Section 2).

The SWRCB is the primary agency responsible for ensuring that water is not wasted and that the reasonable use standard is not violated. However, DWR also shares with them the duty to "take all appropriate proceedings and actions…to prevent waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion in this state" (Water Code section 275). The SWRCB also is responsible for determining whether any water remains available in a stream or watershed for appropriation and whether the water is being fully used for "beneficial uses," consistent with State law that identifies the types of water uses that are permitted.[9] The State can review and modify existing water rights as well as consider approval of new permits and water rights to

reflect new conditions, including California statutes that require efficient water use and improved water management.

The Public Trust Doctrine provides the State with additional authority to reconsider past water allocation decisions in light of new information and changing water demands and social values, and to modify or revoke previously granted water rights if warranted. In a 1983 landmark legal decision, the California Supreme Court unanimously affirmed that the state's navigable lakes and streams are resources that are held in trust for the public and are to be protected for navigation, commerce, fishing, recreational, ecological, and other public values. The State "has an affirmative duty to take the public trust into account in the planning and allocation of water resources and to protect public trust uses whenever feasible" (*National Audubon Society v. Superior Court*, 33 Cal. 3d 419, 658 P.2d 709, 189 Cal. Rptr. 346, 1983 Cal.). This has significant implications for governance of water resources. In fact, both the Public Policy Institute of California and Appeals Court Associate Justice Ron Robie recently called for the establishment of a public trust advocate at the SWRCB to ensure that the State's duty to protect California's public trust resources is being performed adequately (Robie 2012, Hanak et al. 2011).

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[9] Beneficial uses recognized in California include domestic, fire protection, fish and wildlife, industrial, irrigation, municipal, power production, recreation, and other uses (SWRCB 2010).

CALIFORNIA'S COMPLEX WATER RIGHTS SYSTEM

Whatever the type of water right that is held by an individual, business, or public agency, no one "owns" the water they use in California (Littleworth and Garner 2007). All water within the state is held in trust for the benefit of all the people of California (Water Code sections 102, 1201). Water rights holders have the right to "take and use water, but they do not own the water and cannot waste it" (*Central and West Basin Water Replenishment District v. Southern California Water Co.* (2003) 109 Cal. App. 4th 891, 905).

Riparian Rights – Landowners who own property that abuts a natural water course are entitled to make reasonable use of water on or flowing past their property. The water must be from a natural flow (not released stored water). Water cannot be stored under a riparian right and may only be used on property that is within the drainage of the water's source. If there is not enough water in a watershed to satisfy both riparian and appropriative rights, then riparian rights must be fulfilled first. In times of shortage, riparian right holders allocate the reduced water supply by sharing the shortage among the riparian users.

Appropriative Rights – An appropriative right is typically used when the prospective water user intends to use water on nonriparian land or the water user needs to store water for later use. Pre-1914, these rights were asserted in a manner similar to the filing of a mining claim; a water user filed a public notice of his or her intent to divert water and then diverted the water for a legally recognized beneficial use such as mining, irrigation, or drinking water. In times of shortage, appropriative right holders allocate the reduced water supply among themselves under a first in time, first in right priority system. Generally, water received through appropriative rights is more predictable than riparian rights, but appropriative rights can be lost through nonuse (because beneficial use is the basis for receiving the right), and shortages are allocated based on seniority (NRC 2012). California law recognizes water conservation as a "reasonable beneficial use" so that water efficiency improvements cannot be used as a reason to reduce appropriative rights held by a water user (Water Code section 1011(a)).

CVP and SWP Contractors – The Bureau of Reclamation and DWR hold appropriative water rights for the operation of the CVP and SWP, respectively. In many instances, these project rights are junior in priority to the rights held by water users in the Delta and within the Delta watershed. This means that during droughts and other periods of water shortages, the ability of the SWP and CVP to divert water from the Delta is limited by riparian owners and by more senior appropriative water rights.

Area of Origin Laws – Several statutes provide protections to areas within the Delta and the Delta watershed where the rivers originate (Littleworth and Garner 2007). Also known as "watershed protection" statutes, these laws provide the opportunity for water users in these areas to obtain water rights with a more senior priority than the SWP and CVP contractors so that local demands might be met before water becomes available for export.

Reasonable Use and Public Trust Doctrines – The SWRCB has the authority to review and modify existing water rights as well as approve new rights. This is an important principle because it enables the State to consider what is "reasonable" based on modern societal values, the need to protect other water users, protect the environment, and prevent the waste and unreasonable use of water. This authority derives in part, from the Public Trust Doctrine, under which the State has an ongoing duty to protect the navigable waters of the state for environmental protection, fishing, navigation, and commerce; and from the Reasonable Use Doctrine of the California Constitution, a provision mandating the reasonable and beneficial use of all waters in the state (Article X, Section 2).

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California's Water Rights System and Use Reporting

California's water rights system is of great legal significance. However, our water rights system does not and cannot guarantee a supply of water that exceeds what nature provides. Nor does any individual, business, industry, or agricultural enterprise "own" the water they use.

The amount of water used in California's stream systems is not fully known because water users under pre-1914 and riparian water rights have not been required, until recently, to submit annual reports accounting for their diversions. In 2009, the State adopted statewide water diversions reporting requirements (Water Code section 5100 et seq.); and in 2010, the SWRCB adopted regulations requiring online reporting of water use by all water rights holders, including all surface and groundwater users. In addition, there is limited information available to the State on consumptive use or the number of times that water is used within a stream system.

Discussed previously, the SWRCB has the authority to determine when a river or stream has been "over-appropriated," in other words, whether the amount of water available in a stream is less than the demands placed on that water. A right to use water represents potential diversions and uses. Actual water use in many rivers and streams is frequently far less than the total volume of asserted water rights. The difference between water rights and water received can be explained by restrictions or conditions in the permits/licenses, operation restrictions on the storage and transport facilities themselves, physical and economic limitations, non-consumptive uses such as hydroelectric power generation, and the use and reuse of water.

Understanding and reconciling the human demands for water to the supply available, while providing enough water to ensure desired and legally protected environmental and water quality goals, is a difficult process. This process is nonetheless essential to achievement of the coequal goals.

The Coequal Goals and Reducing Reliance on the Delta

In 2009, California further defined its water policy priorities as they relate to the Delta, including express recognition that the Delta crisis cannot be resolved by taking action in the Delta alone. Given the interconnected nature of the Delta with the water use patterns of large parts of Northern, Central, and Southern California, the new coequal goals of statewide water supply reliability and an improved, protected, and restored Delta ecosystem will fundamentally reshape California water management over the course of this century. Achieving these coequal goals is expected to be done, in significant part, through compliance with the Delta Reform Act's various mandates and goals relating to statewide water conservation, efficiency, and sustainable use, including the State's new policy to reduce reliance on the Delta and related mandate to improve regional self-reliance.

In particular, the Delta Reform Act mandates many statewide strategies that the Delta Plan must address to achieve the coequal goals, including water efficiency and conservation; wastewater reclamation and recycling; desalination and advanced water treatment technologies; improved water conveyance, surface, and groundwater storage; improved water quality; and implementation of local and regional water supply projects (Water Code sections 85004(b), 85020(d) and (f), 85021, 85023, 85303, and 85304). These measures help achieve the requirements of Water Code section 85021, which declares that the State's policy is "to reduce reliance on the delta in meeting California's future water supply needs through a statewide strategy of investing in improved regional supplies, conservation, and water use efficiency." That section also mandates that "[e]ach region that depends on water from the delta watershed shall improve its regional self-reliance for water through investment in water use efficiency, water recycling, advanced water technologies, local and regional water supply projects, and improved regional coordination of local and regional water supply efforts."

Consequently, to achieve the statewide water supply mandates and the coequal goal of statewide water supply reliability, regions located outside the Delta also must take actions outside the Delta to increase water efficiency and develop sustainable local and regional sources of water, which will contribute to improved water supply reliability.

Individual actions by water suppliers throughout the state will be vital to success in this regard. The implementation of programs and projects that result in a significant reduction in the amount of water used, or in the percentage of water used, from the Delta watershed (evaluated at the local, regional, and statewide levels) will be the foundational measures for assessing the State's progress in achieving these policies. The baseline for this evaluation will be existing water use and supplies, as documented in the most recently adopted urban and agricultural water management plans. (See Appendix G, Achieving Reduced Reliance on the Delta and Improved Regional Self-Reliance.)

It is important to recognize that reliance on water from the Delta and the Delta watershed varies throughout California, from region to region, and supplier to supplier. (See sidebar, Reliance on the Delta Varies by Region.) Some water suppliers have greater access to alternative water supplies or have a greater ability to implement a diverse range of water efficiency and water supply projects. Others, particularly in the upper watershed, may have a narrower range of options.

The key is that every supplier is doing its part and is taking appropriate action to contribute to the achievement of the coequal goals, including the State's policy of reduced reliance and associated mandate to improve regional self-reliance.

The Delta's Role in California's Water Supply

The Delta is the terminus for California's largest watershed, which encompasses the western slopes of the Sierra Nevada, the eastern slopes of the coastal range, and the valleys that lie between these ranges. Water in the Delta watershed starts as precipitation in the Sacramento River and San Joaquin River watersheds and, unless diverted or otherwise used, flushes San Francisco Bay and flows out to the ocean under the Golden Gate Bridge. Once again, this estuarine delta where California's two largest rivers meet is at the geographic and political center of water in California.

The CVP and the SWP rely on the Delta's artificial network of channels to convey water stored in upstream reservoirs to regions south of the Delta including the Bay Area, San Joaquin Valley, Tulare Lake Basin, Central Coast, and Southern California. (See sidebar, Reliance on the Delta Varies by Region, and Figure 3-3.)

Because of the Delta's central location, the water demands of many Californians are connected in some way to the Delta. Water diverted from the Delta watershed provides some portion of water supply for more than 27 million of the state's residents and approximately 3 million irrigated acres of farmland (DWR 2007a, DWR 2009, DWR 2011c, Reclamation 2011b). This water plays a critical role in helping to sustain a major portion of the state's $1.9 trillion economy.

This section provides an overview of water use and water infrastructure in the Delta watershed, followed by a description of water project operations in the Delta and the challenges and conflicts associated with these. The section concludes with a discussion of the importance of improving the flexibility of project operations, through improved conveyance, storage, and water management, in achieving the coequal goals.

Use of Water from the Delta Watershed

About half the state's runoff flows through the Delta watershed. Since the 1849 Gold Rush, communities throughout California have planned and constructed facilities to tap into this water to support economic development.

Many diversions in the Delta watershed occur in the upper watershed. On average, approximately 31 percent of the flow from the Delta watershed is diverted before it ever reaches the Delta (DWR 2011c). See Figure 4-5 in Chapter 4. These diversions are done through an extensive network of locally constructed dams, canals, and diversion structures that have been built over the past 160 years on nearly every stream and drainage within the Delta watershed (California Natural Resources Agency 2010). Some of the water diverted from Delta tributaries is returned to the tributaries through wastewater effluent and agricultural return flows, albeit at a degraded quality.

Water from these diversions sustains the economies of the residents, businesses, and growers who live in the areas where the water comes from—the "area of origin"—as well as the economies in the export areas. Some of these historical diversions occur through two large aqueduct and reservoir systems that were constructed early in the twentieth century to serve the growing water demands of San Francisco and East Bay Area communities. These facilities divert water before it reaches the Delta and convey it directly to reservoirs, treatment facilities, or customers in the Bay Area region. The Hetch Hetchy reservoir system on the Tuolumne River, and the Pardee and Camanche reservoirs system on the Mokelumne River account on average for approximately 0.5 MAF, or about 1.6 percent of the flow from the Delta watershed, of annual water deliveries from the Delta's upper watershed (DWR 2009).

RELIANCE ON THE DELTA VARIES BY REGION

Water exported from the Delta supplies about 8 percent of the state's total water use, and local and regional water supplies provide over 84 percent on average. However, reliance on water from the Delta watershed varies throughout California from region to region, supplier to supplier, and user to user.

For example, in the Sacramento and San Joaquin river watersheds, including water uses on the valley floor, foothills, mountain communities, and the Delta, the vast majority of the water supply comes from local sources: the rivers and reservoirs that flow into the Delta or from local groundwater resources that are replenished from runoff within the Delta watershed. Most of this water is used for irrigated agriculture, although increasing amounts are being shifted to drinking water and other municipal uses by the cities and towns that are growing in these regions. High-growth areas surrounding the Delta, including Fairfield, Sacramento, Stockton, and Tracy, are increasing urban water use and decreasing agricultural water use as the communities are developed.

Other regions, including the Tulare Lake region of the Central Valley, the San Francisco Bay Area, the South Coast, and the Central Coast, receive some portion of their water supply from diversions from the Delta's eastern tributaries or from water that is pumped from the Delta to supplement their limited local surface water and groundwater supplies. These exports vary by region and, for specific water users, the significance of these exports varies dramatically. For example:

- **Tulare Lake:** This region relies upon exports delivered through the Central Valley Project (CVP) and State Water Project (SWP) for 27 percent of its regional water supply, and most of this water use is for irrigated agriculture (on average 96 percent of CVP water deliveries and 89 percent of SWP deliveries). Kern County Water Agency, a water wholesaler, has the largest SWP import contract in the Tulare Lake Basin at nearly 1 million acre-feet (MAF) (DWR 2009).
- **San Francisco Bay Area:** This region's predominant water supply is from local sources (57 percent from surface and groundwater alone). However, diversions from the Delta's tributary streams provide up to 27 percent of this region's water, and CVP and SWP exports account for another 16 percent (DWR 2009). The reliance of the region's individual water suppliers on water from the Delta varies dramatically; the Marin Municipal Water District uses none (MMWD 2010), and the Zone 7 Water Agency in Alameda County receives as much as 82 percent of its water from SWP exports (Zone 7 2010).
- **Southern California:** This region is home to 50 percent of the state's population (with most in densely urbanized areas), and 80 percent of its water use is for drinking water, municipal, and industrial uses. SWP exports from the Delta account for roughly 25 percent of the region's water supplies, and local sources (groundwater, surface water, and increasingly recycled water) comprise another 50 percent, and imported water from the Colorado River about 25 percent (DWR 2009). Within the Metropolitan Water District of Southern California, the largest wholesaler in Southern California, the dependence of its member agencies on SWP imports can vary dramatically. Some agencies have few alternative water sources, while others have sufficient local supplies and are now planning to reduce their future reliance on imported water or to roll off the system completely (WBMWD 2010, City of Santa Monica 2012).

With increasing uncertainty over the reliability of Delta water exports, many communities have developed plans and projects to increase and diversify local water supplies and to increase water efficiency. Even with improvements in Delta operations that provide more reliable Delta water exports, regions will need to implement additional local and regional water management strategies to reliably meet their future water demands.

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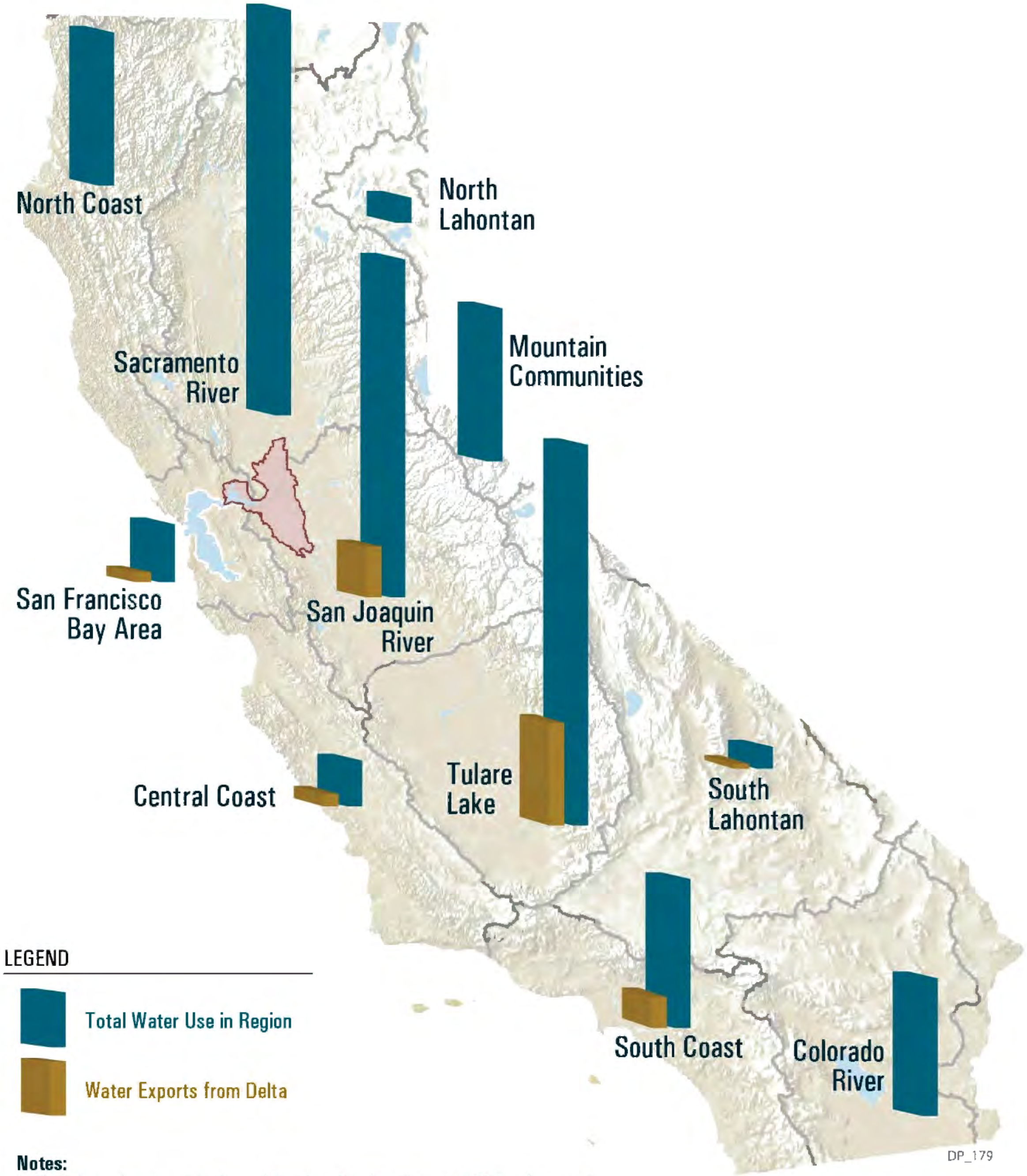
Local Water Sources Meet Most of California's Water Needs



Notes:
1. Hydrological regions are those defined by the Department of Water Resources
2. Delta water exports include contract amounts to maintain wetlands

Sources: DWR 2009, Reclamation 2011b, DWR 2011c

Figure 3-3 The vast majority of California's water comes from local sources. Exports from the Delta comprise 8 percent of California's water use. Yet, the Delta supply is important to many regions south of the Delta.

Within the Delta, growers and residents historically have relied on water from the Delta. In-Delta water use has remained relatively constant over the past 100 years (DWR 2007a) and averages about 4 percent (0.9 MAF) of inflows into the Delta. Most of this water is used for agricultural irrigation, and small and large communities throughout the Delta.

The CVP and SWP export systems became operational in the late 1940s after much of the local Delta development had occurred. Exports from the Delta now range from approximately 3 MAF in dry years to around 6.5 MAF in wet years (DWR 2009, Reclamation 2011b, Reclamation 2011c). In total, the SWP and CVP facilities export on average approximately 5.1 MAF per year from the Delta. These water diversions account for 24 percent of the inflows into the Delta (see Figures 3-4a and 3-4b).

Joint Federal and State Delta Operations

The federal CVP and California SWP were born out of long-range planning documents developed from the 1870s through the 1920s, including the 1919 Marshall Plan completed by U.S. Geological Survey and the 1930 Division of Water Resources Bulletin No. 25, "Report to the Legislature of 1931 on State Water Plan." These planning investigations developed and evaluated alternatives to provide:

- Fresh water to industries in Contra Costa and Alameda counties along Suisun and San Pablo bays
- Irrigation water to portions of the San Joaquin Valley that have substantial and increasing groundwater overdraft conditions, especially in the Tulare Lake region
- Supplemental water for Southern California urban development totaling 2 million acres in San Diego, Orange, and Ventura counties and the San Gabriel and San Bernardino valleys with water from Owens Valley, Mono Basin, and Colorado River

The California Legislature approved this plan in 1941 as the first State Water Plan (now the current California Water Plan), which included a description of facilities that would eventually be constructed as part of the CVP and SWP. Although design and construction of storage and conveyance facilities was done separately for CVP and SWP, both are operated in a coordinated manner for Delta operations.

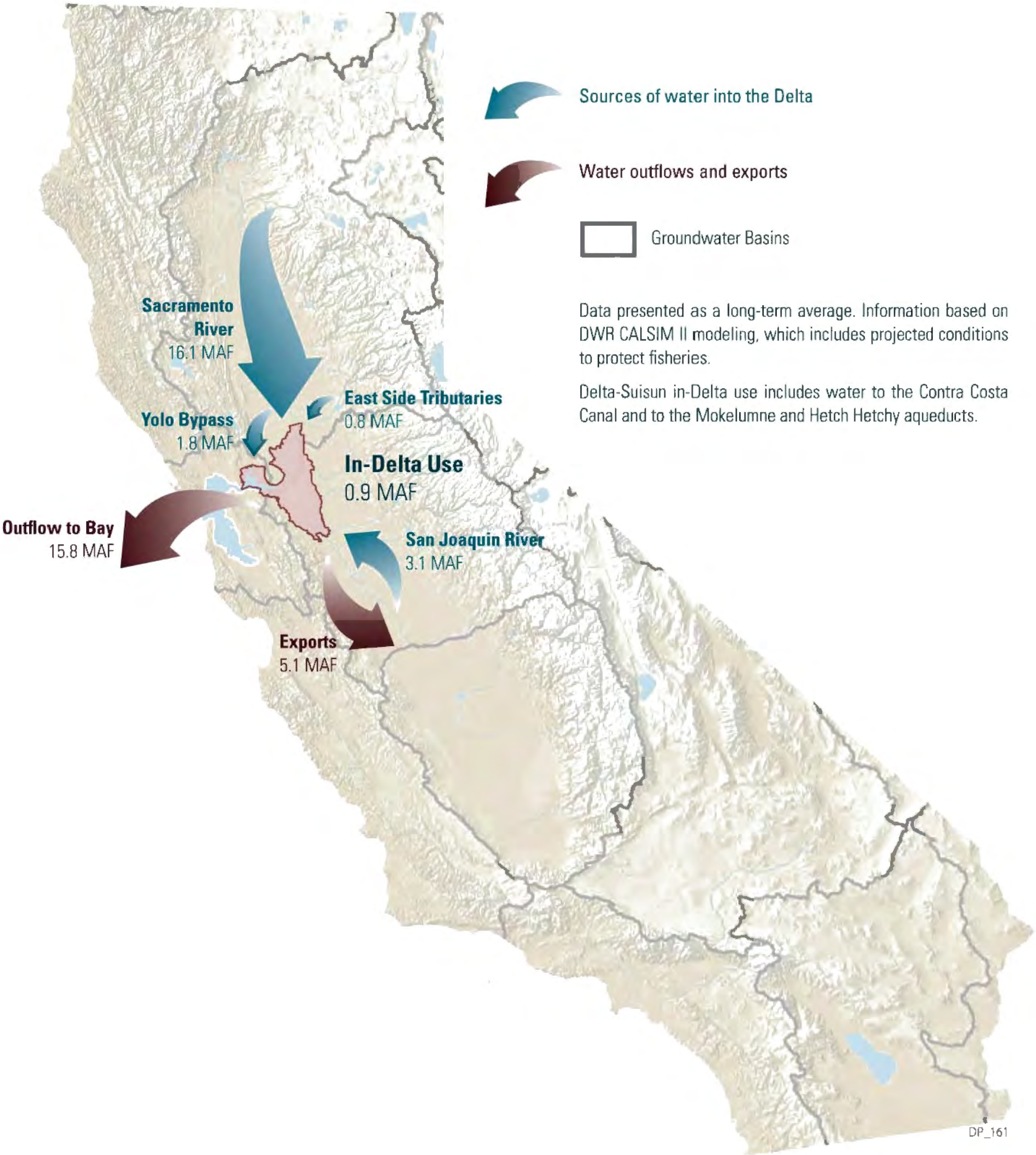
Central Valley Project

Congress appropriated $20 million in Emergency Relief Appropriation Funds and authorized construction of the CVP by the U.S. Army Corps of Engineers (USACE) as part of the Rivers and Harbors Act of 1935. When the Rivers and Harbors Act was reauthorized in 1937, the construction and operation of the CVP was instead assigned to the Bureau of Reclamation (Reclamation).

Construction of the CVP by the federal government began in 1937. The first water was sold from the CVP to the City of Antioch from the initial reaches of the Contra Costa Canal in 1940, to support shoreline industries.

By the late 1940s, it had become apparent that California's rapid urban, agricultural, and industrial growth would quickly increase demands for water and power to levels that exceeded the initial CVP system capacity. In response, Congress authorized additional federal reservoirs and conveyance facilities over the next few decades, including Folsom Dam along the American River, Tehama-Colusa Canal along the west side of the Sacramento Valley, Trinity River Dam to provide additional water from the Trinity River into the Sacramento River for CVP operations, and New Melones Dam on the Stanislaus River. In 1960, the San Luis Unit, in the western San Joaquin Valley, was authorized by Congress to be constructed under a contract between the federal government and the State.

Where Delta Water Comes From and Goes



Data presented as a long-term average. Information based on DWR CALSIM II modeling, which includes projected conditions to protect fisheries.

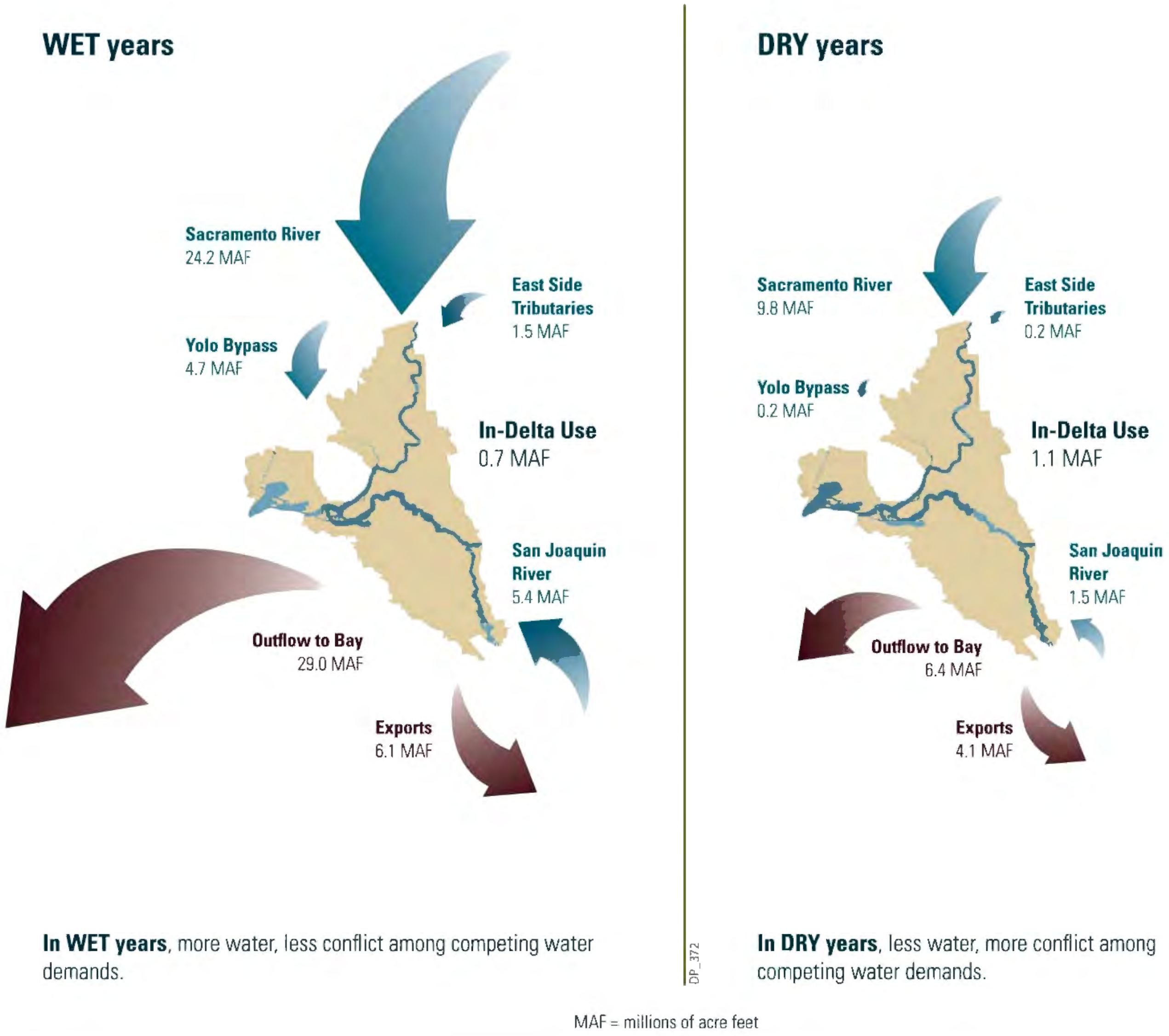
Delta-Suisun in-Delta use includes water to the Contra Costa Canal and to the Mokelumne and Hetch Hetchy aqueducts.

Figure 3-4a

Over the past century, the combination of regional diversions from within the Delta watershed and water diverted directly from the Delta has transformed the Bay-Delta ecosystem, reducing historical outflows by an average of 50 percent.

Sources: LAO 2008, Reclamation 2011b, DWR 2011c

Delta Water Flows in Wet and Dry Years


WET years
Sacramento River 24.2 MAF
East Side Tributaries 1.5 MAF
Yolo Bypass 4.7 MAF
In-Delta Use 0.7 MAF
San Joaquin River 5.4 MAF
Outflow to Bay 29.0 MAF
Exports 6.1 MAF
In WET years, more water, less conflict among competing water demands.
DRY years
Sacramento River 9.8 MAF
East Side Tributaries 0.2 MAF
Yolo Bypass 0.2 MAF
In-Delta Use 1.1 MAF
San Joaquin River 1.5 MAF
Outflow to Bay 6.4 MAF
Exports 4.1 MAF
In DRY years, less water, more conflict among competing water demands.
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MAF = millions of acre feet

Figure 3-4b *Sources: LAO 2008, Reclamation 2011b, DWR 2011c*

The CVP is the largest surface water storage and delivery system in California, with a geographic scope covering 35 of the state's 58 counties. The project includes 20 reservoirs with a combined storage capacity of approximately 11 MAF, 8 power plants and 2 pumping-generating plants, 2 pumping plants, and approximately 500 miles of major canals and aqueducts. The CVP provides water through water service contracts and water rights agreements for a total of about 9.6 MAF per year (including water service contractors that use water from the Stanislaus River and San Joaquin River).

State Water Project

In 1947, the State began an investigation to consider the next phases of the State Water Plan to meet the state's anticipated supplemental water demands through development of the SWP and to control salinity intrusion in the Delta. In 1953, the State adopted the Abshire-Kelly Salinity Control Barrier Act to evaluate placement of a saltwater barrier near Suisun Bay to protect Delta water users and allow transfer of fresh water from the Sacramento Valley to the San Joaquin Valley. This plan was not implemented primarily due to costs and technical considerations, but alternatives continue to be evaluated today.

In 1957, Bulletin No. 3 was published, which described the need for SWP facilities to convey water from the Sacramento Valley to water-short areas of California. The report identified an urgency to expand statewide water facilities because of projected population growth and to support a balanced economy; major industrial growth; 6,875,000 acres of irrigated agriculture, or approximately 25 percent of all agricultural acreage in the United States; and flood control in Northern California. The study identified that there was a “seasonal deficiency” of 2,675,000 acre-feet of water in 1950 that had been met with groundwater pumping primarily from overdrafted aquifers. In 1960, California voters authorized the Burns-Porter Act to construct the initial projects of the SWP, including Oroville Dam and Lake Oroville on the Feather River, San Luis Dam and Reservoir to be jointly constructed and operated with Reclamation, the North and South Bay aqueducts, and the 444-mile California Aqueduct. Notably, DWR continues to project a 1- to 2-MAF deficit in average annual groundwater pumping from overdrafted aquifers (DWR 2009). A more detailed discussion of groundwater is provided later in this chapter.

Delta Operations

Prior to the 1960s, the CVP and SWP operated in the Delta unrestrained by environmental regulations. However, beginning in the 1970s, with the passage of environmental laws, including the federal Clean Water Act, Endangered Species Act, Central Valley Project Improvement Act, Porter-Cologne Water Quality Control Act, California Endangered Species Act, Wild and Scenic legislation, and many others, protection of the ecosystem became an explicit legal obligation for the SWP and CVP in addition to delivery of fresh water for agricultural and urban use.

In the modern context, CVP and SWP facilities operate according to a complex web of permits, licenses, and, in some cases, court orders that impose explicit conditions on how, when, and how much water can be exported from the Delta. Some of the entities that regulate water project operations in and upstream of the Delta include:

- The SWRCB and regional boards require the SWP and CVP to meet specific water quality criteria that result in operational standards within the Delta and the Delta watershed. The SWRCB also sets instream flow standards.
- USACE sets operational “rule curves” for reservoirs that provide flood protection upstream of the Delta. The Central Valley Flood Protection Board regulates encroachments on designated floodplains and floodways. (See Chapter 7.)
- The presence of threatened and endangered species in California’s waterways and landscapes requires the California Department of Fish and Wildlife (DFW), U.S. Fish and Wildlife Service, and National Marine Fisheries Service to regulate water project operations in the Delta. Federal biological opinions that govern agency regulatory activities have been the subject of extensive recent litigation by water agencies and other interested parties.

To comply with these regulations and to optimize system efficiencies, DWR (for the SWP) and Reclamation (for the CVP) jointly coordinate their pumping operations in the Delta under the 1986 Coordinated Operating Agreement (COA). One of the benefits of the COA is that it resulted in improved reliability of deliveries for the SWP (DWR 2008). They also jointly manage portions of the water delivery facilities in the Central Valley. There are times when the CVP may use SWP export capacity or that the SWP may need to use CVP export capacity. This close coordination has resulted in flexible operation of the Delta facilities to improve reliability of Delta water deliveries as well as to reduce system vulnerability to disruption.

Additional operational changes are on the horizon for the CVP and SWP. The SWRCB has initiated a phased process to review and amend—or to adopt new—water quality and flow objectives for the Delta by 2014. Phase 1 of that review is focused on southern Delta water quality and San Joaquin River flows. Phase 2 is focused on other changes that may be needed to the remainder of the Bay-Delta Water Quality Plan to protect fish and wildlife beneficial uses. See Chapter 4 for more information on flow in the Delta and the relationship to ecosystem health, and Chapter 6 for more information on the Council's recommendations on the SWRCB process to update the Bay-Delta Water Quality Plan. Furthermore, conveyance alternatives under consideration by the Bay Delta Conservation Plan (BDCP) could mean large-scale changes to Delta infrastructure and operations.

Challenges and Conflicts in the Delta

Over time, the Delta has been transformed, mostly by human hands, to serve many purposes. As mentioned, the SWP and CVP were originally engineered to reliably deliver water to water service contractors and water rights holders without commensurate consideration for impacts on native species. The Delta is the only saltwater estuary in the world that is used as a conveyance system to deliver fresh water for export. This creates substantial water supply and ecosystem conflicts.

Legal changes in recent decades, combined with growing societal awareness and scientific understanding of water project operations on ecosystem health, had major implications for water operations in the Delta. The collision of changing societal values, growing demands for water deliveries from the Delta, and declining health of the Delta ecosystem have resulted in numerous complex and often bitter legal challenges that have increasingly shifted critical Delta water management decisions to the courts.

CVP and SWP Water Delivery Challenges

Overall, exports from the Delta have been rising over the past 4 decades (see Figure 3-5). Historically, the SWP and CVP have pumped more water from the Delta during dry years than wet years; but over time, exports have increased in all water year types, except in critically dry years. The SWP and CVP have each reached record exports in the past 10 years. In part, this is because recent increases in surface and groundwater storage south of the Delta have enabled more water to be taken during wet years. Increased south-of-Delta storage has also led to more agricultural-to-urban water transfers, which help improve the flexibility of operations in the Delta.

Yet, many factors threaten the ability of State and federal water managers to continue pumping water through the two projects at current export levels. Subsidence of the agricultural lands on the Delta islands, rising sea level, and earthquakes threaten the physical integrity of the Delta ecosystem and the levees that protect the export water quality. The location of the two pumping stations (one each for the CVP and SWP) in the south Delta is a problem for fisheries. Described previously, most of the water enters the Delta from the north through the Sacramento River. Pumping stations for the CVP and SWP are located in the south Delta and, when operating, frequently cause a net "flow reversal" in the central and south Delta channels. (See Chapter 4 for more details.) This reverse flow affects fish movement, including migration through the Delta, and often results in species that are free-floating or have weak swimming capability being drawn into the pumping facilities where they can be entrained (Grimaldo et al. 2009). Water quality is an issue too. A portion of the water flowing into the Delta is specifically allocated to Delta outflow to help repel salinity intrusion from the San Francisco Bay and to maintain low-salinity water near the western edge of the Delta. This means that water that might otherwise be used for exports must be released from upstream reservoirs to help control salinity (NRC 2012).

Historical Exports and In-Delta Use

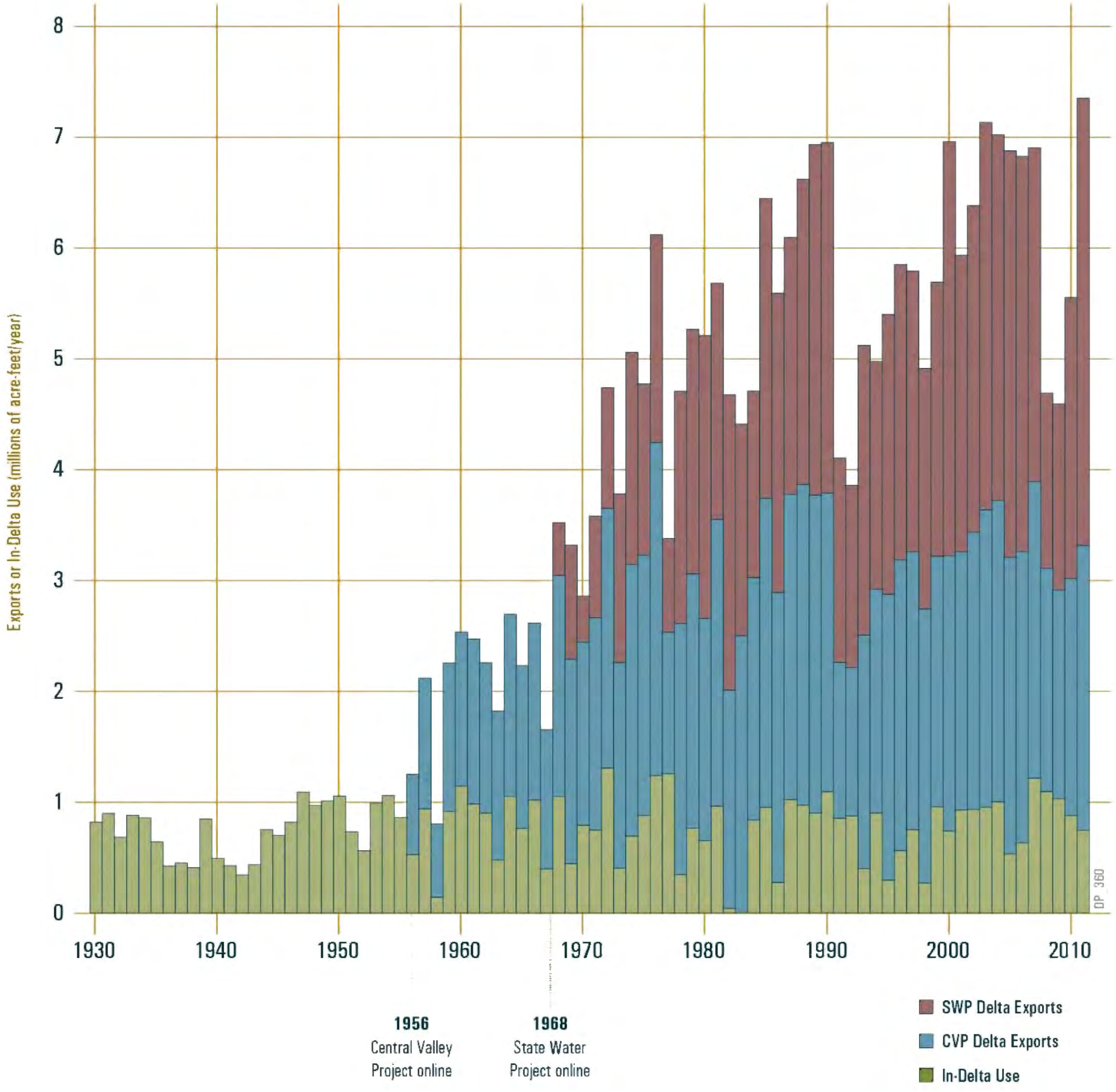

Figure 3-5 Overall exports from the Delta have been rising over the past 4 decades, while in-Delta uses have remained fairly constant. Exports by the CVP and SWP have reached record levels in the past 10 years.

Conflicts over water use are further complicated by original SWP and CVP contracts that assumed greater water export quantities than consistently can be delivered. Since 1990, the CVP has fulfilled 100 percent of its contract water allocations only three times, and the SWP has delivered 100 percent of its contract amounts only twice (Reclamation 2011c, DWR 2010b). The CVP's ability to meet maximum contracted amounts, particularly during dry years, has diminished since the addition of new municipal and industrial contractors who have priority over agricultural water deliveries.[10] Also, the 1992 passage of the Central Valley Project Improvement Act dedicated up to 800,000 acre-feet of CVP exports for wildlife refuges and environmental needs (Public Law 102-575, section 3406(b)(2)). The original SWP contract amounts were based on assumptions that additional major new dams and conveyance facilities would be constructed at a later date, which did not occur. As a result, even though the SWP had contracted to supply 4.2 MAF, average SWP exports between 1996 and 2006 were just 2.9 MAF (DWR 2008).

The reality is that the State and federal systems have never been able to reliably deliver the full contract amounts. Now, additional court-ordered and regulatory restrictions on State and federal pumping of export water, in combination with the 2007 through 2009 drought, further reduced the reliability of Delta water exports to SWP and CVP contractors. According to DWR, SWP deliveries are now expected to average 60 percent of maximum contract amounts in future years, down from 66 to 69 percent estimated in 2005 (DWR 2010b).

The process for allocating water shortages within the State and federal projects also impacts the extent to which various contractors experience different levels of Delta water supply reliability. Within the SWP, shortages are uniformly distributed across all water contractors. Within the CVP, municipal and industrial water users have a higher priority than agricultural water users. As a result, in dry years, CVP water rights contractors, such as the Sacramento River Settlement Contractors, may receive 100 percent of their water allocations while non-water rights contractors, including Westlands Water District, may receive as little as 10 percent.

North-to-south water transfers across the Delta can be an important tool for improving water supply reliability. However, transfers require the use of SWP or CVP facilities and, as such, are subject to the regulatory constraints on Delta exports. Because Delta pumping windows of opportunity are shorter and generally filled by contract deliveries, excess capacity for water transfers is increasingly hard to come by.

Although lesser known, an increasing challenge to Delta export reliability relates to the operations and maintenance of the large, complex facilities that make up the SWP. The SWP has experienced a significant and growing decline in operational reliability that has directly impacted DWR's ability to store and move water, produce electricity, and export water from the Delta when the appropriate hydrological conditions present themselves (DWR 2010b). These challenges include maintaining SWP delivery capabilities under continued manpower resource limitations, aging infrastructure, and constraints in providing competitive employee compensation despite adequate SWP funding. Further resource challenges are attributed to complex and cumbersome State contracting processes and State hiring freezes.

Improving Delta Water Supply Reliability through Investments in System Flexibility

Because California's annual precipitation is remarkably variable, the past expectation that each year—wet or dry—should yield the same quantity of water exported from the Delta watershed is unrealistic and can be an obstacle to necessary improvements in water supply reliability.

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[10] Additional municipal and industrial water contracts were implemented in the late 1980s for the CVP San Felipe Unit and in the last 10 years for the CVP American River Division.

The greatest conflicts between the water needs of people and fish within the Delta occur during dry years. That is when the least amount of water is flowing into the Delta and, historically, when exports have been a much larger percentage of Delta inflows than in wet years (see Figure 3-6). On average, exports have diverted about 17 percent of Delta inflows in wet years and about 36 percent during dry years (DWR 2011c). In past years, exports have exceeded 60 percent of Delta inflows in some dry months, but recent regulatory decisions now constrain such operations.

The recovery of the Delta ecosystem and listed species will help reduce regulatory restrictions on Delta exports and increase the long-term stability and predictability of rules governing Delta pumping.

More natural flow patterns in the Delta can be compatible with improving the reliability of water deliveries from the Delta. More water can be taken in wet years when more water is available, less water will be taken in dry years when it is needed for in-Delta water quality and environmental protections, and operations can be improved to increase seasonal flexibility to avoid impacts on Delta species and habitat. Many local water management actions that help reduce reliance on the Delta and improve regional self-reliance are also essential to improving overall flexibility of Delta operations and improving reliability of water supplies during periods when pumping is constrained.

Upstream, downstream, and in-Delta improvements can all add to export system flexibility, producing both water supply and ecosystem benefits. Storage capacity, however, is a current limitation to this scenario, and will worsen under anticipated climate change conditions. Were sufficient storage available, flows that exceed water needed to meet environmental and other requirements could be captured and stored. This stored water could then be released later in the year or carried over into subsequent years.

Fish predation and mortality at the export pumps could be reduced if the diversion points of the State and federal water projects in the Delta were moved or modified. Risks to a reliable source of fresh water conveyed through the Delta could be reduced through conveyance alternatives that could provide multiple diversion locations in the Delta (as those being analyzed in the BDCP process) and through strategic levee investments.

It is important to note that storage can increase the benefits of conveyance improvements, and conveyance improvements may be limited without the benefit of added storage. Improved operational flexibility, consistent with ecosystem restoration, can result in more reliable water supplies for all beneficial uses from year to year and, when managed for multiple benefits, can also ensure adequate flows to meet public trust needs, including the protection of the Delta ecosystem.

The Role of Storage in Increased Flexibility

Statewide water storage capacity, both above and below ground, is currently inadequate, especially south of the Delta, to facilitate export of water at times of surplus when the impacts on the Delta's ecosystem are reduced and the only impediment is lack of available storage capacity (DWR 2009). For example, in 2010, the SWP and CVP pump operations were slowed even though water was available to be pumped at a time when it would not have conflicted with endangered species or other water quality requirements. The SWP and CVP could not convey the surplus water through the Delta at that time because storage capacity south of the Delta was full.

Historical Delta Inflow and Delta Exports

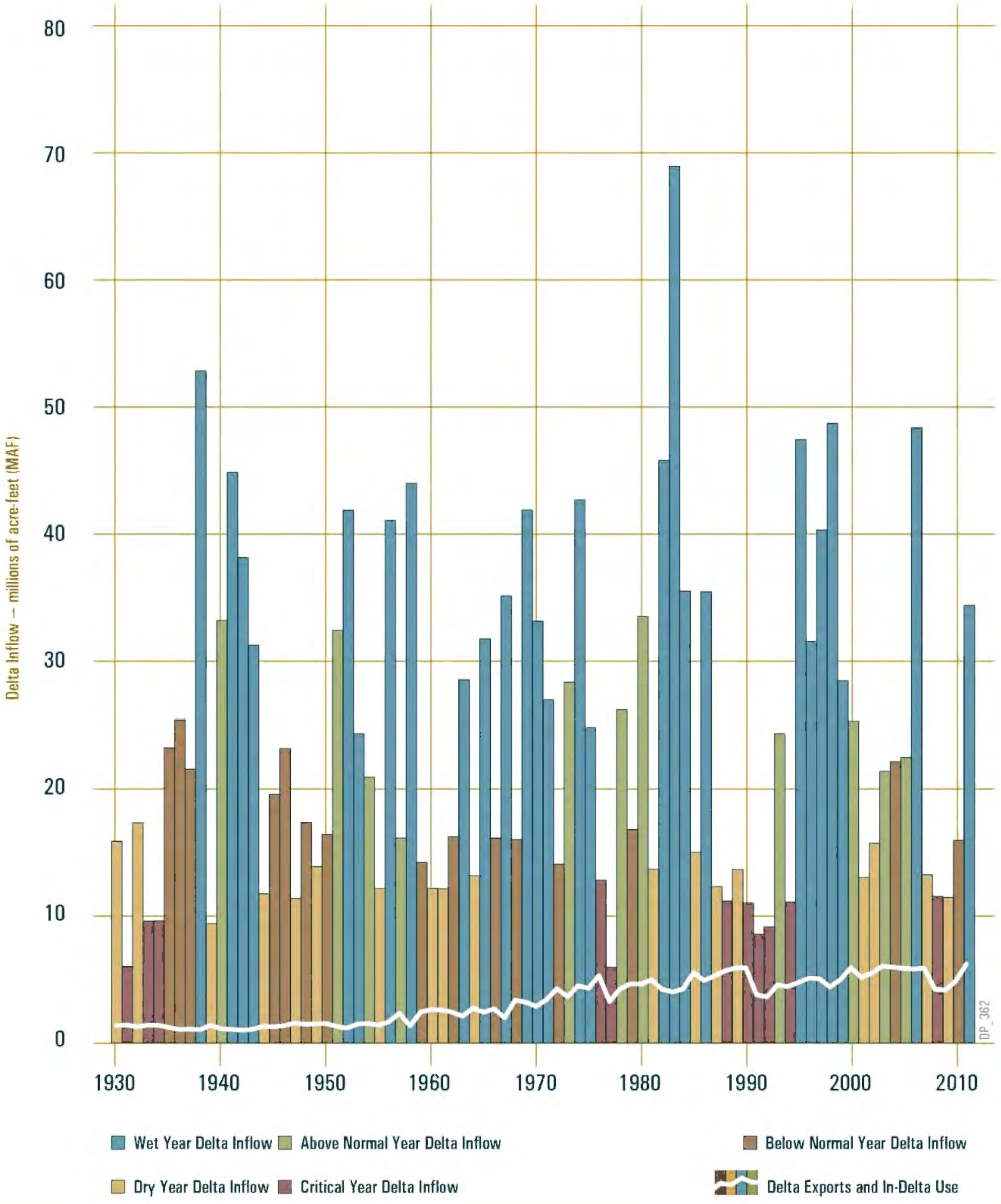

Figure 3-6

In many years, water flowing into the Delta greatly exceeds the amount of water that is exported from or used in the Delta. However, in dry years, total exports and in-Delta use have averaged as much as 36 percent of inflows.

Source: DWR 2012a

Applying Adaptive Management To Water Management Decisions

An adaptive management approach for water management decisions should be taken to plan for and assess the water supply outcomes of conveyance and storage improvement actions. The following is a hypothetical example of how the Council's three-phase and nine-step adaptive management framework (see Appendix C) could be applied to a water management decision.

Adaptive Management Step			Hypothetical Water Supply Reliability Improvement Project
Plan	1	Define/redefine the problem	Current storage and conveyance configuration is not adequate for providing a more reliable water supply to south-of-Delta users under modern operating rules.
	2	Establish goals and objectives	**Goal:** Improve water supply reliability for south-of-Delta water users. **Objective:** Optimize storage for south-of-Delta water users in wet years so that interruptions in deliveries are reduced and the amount of water delivered during wet years can be increased consistent with environmental regulations in the Delta.
	3	Model linkages between objectives and proposed action(s)	There are inadequate options for south-of Delta water users to optimize storage in wet years, leading to vulnerability to interruptions and reduced capacity to divert water when it is available. The San Luis Reservoir is the only CVP water source for San Luis Unit, Cross-Valley Contractors, and San Felipe Division (SFD) water users. SFD serves water to Santa Clara and San Benito counties. As the San Luis Reservoir is drawn down during the summer and into the late fall (when predictable water supplies are needed most), a dense layer of algae develops near the surface. As the water level lowers, this algae gets captured by SFD intakes. The algae degrade water quality and make water more difficult to treat. As a result, SFD deliveries can be interrupted when the reservoir falls below 300,000 acre-feet. It is hypothesized that improving the San Luis Reservoir low-point intake would increase the predictability of water deliveries and make more water available to south-of-Delta water users during dry years. Alternatives to improving the low-point intake could include expanding the Pacheco Reservoir to provide storage for SFD water users. As a result of taking one or a combination of these actions, progress would be made toward improving water supply reliability for south-of-Delta water users by (1) reducing potential for interruptions, (2) diverting more water during wet years, and (3) making this water available during dry years when water from the Delta may not be available.
	4	Select action(s) (research, pilot, or full-scale) and develop performance measures	**Selected Action:** Conduct feasibility analyses and modeling to determine which option would enable the highest increase in the reliability of water conveyance for south-of-Delta users in compliance with environmental requirements. **Performance Measures:** ▪ Administrative – Complete feasibility analyses and modeling. ▪ Output – Select and implement an improvement project (e.g., improve the low-point intake at San Luis Reservoir only). ▪ Outcome – Progress toward improving water supply reliability by (1) reducing potential for interruptions, (2) diverting more water during wet years, and (3) making this water available during dry years when water from the Delta may not be available.
Do	5	Design and implement action(s)	Design and implement the feasibility analyses and modeling.
	6	Design and implement monitoring plan	Design and implement the monitoring plan, including baseline monitoring, and measurement of (1) reduced interruptions of SFD deliveries when the reservoir falls below 300,000 acre-feet, (2) the amount of increased delivery of water during wet years, and (3) the amount of increased water deliveries from the reservoir during dry years to offset reduced Delta diversions.
Evaluate and Respond	7	Analyze, synthesize, and evaluate	Analyze, synthesize, and evaluate the feasibility analyses and model outputs, and make recommendations for selecting a project or adjusting the conceptual model.
	8	Communicate current understanding	Provide project manager(s) and decision makers with synthesized information learned. For example, present information on the extent to which interruptions would be reduced, the value of the reduced interruptions, and the benefits of a specific operation scheme as part of a cost-benefit analysis.
	9	Adapt	The DWR, Reclamation, and SFD contractors decide on a pilot- or full-scale improvement project.

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In the past decade, the State has spent tens of millions of dollars on integrated studies to evaluate how large surface storage and conveyance may be improved. DWR is now completing surface storage investigations that were initiated under CALFED more than 10 years ago (DWR 2010a). The three proposed new major surface storage reservoirs that are being evaluated are the North-of-the-Delta Offstream Storage (Sites Reservoir), Los Vaqueros Reservoir Expansion, and Upper San Joaquin River Basin Storage investigation (Temperance Flat Reservoir). DWR expects to make its decision on recommended projects by 2014.

In the meantime, smaller facility improvements, particularly for storage, are being implemented. Since 1995, more than 1.2 MAF of additional surface storage has been constructed at the regional level, including the Diamond Valley, Seven Oaks, and Olivenhain reservoirs in Southern California, and the Los Vaqueros Reservoir in Contra Costa County.[11] The sidebar, Applying Adaptive Management to Water Management Decisions, provides a hypothetical example of an approach to providing more reliable water supplies.

A legacy of both overdraft and water quality contamination has compromised groundwater storage in many regions of the state; however, important improvements are being made through expanded regional groundwater storage north and south of the Delta. Notably, an assessment of groundwater storage in 2000 identified more than 21 MAF of potential groundwater storage in Southern California and the southern portion of the San Joaquin groundwater basin (AGWA 2000). A more detailed discussion of groundwater management in California is included later in this chapter.

Significant opportunities are available to improve the operation of existing storage and conveyance facilities, build small-scale storage projects, or enhance opportunities for groundwater conjunctive management and water transfers in the next 5 to 10 years that are consistent with the coequal goals. DWR is leading a System Reoperation Task Force with Reclamation; USACE; and other State, federal, and local agencies to study and assess opportunities for reoperating existing reservoir and conveyance facilities to improve flood protection and capture of available water runoff, particularly in the context of climate change. Reservoir reoperation is also addressed in Chapter 7.

Many local storage and conjunctive management projects were identified through competitive State and federal grant funding application processes in the past decade. Most of these projects could not be funded because of limited funding and restrictions in some of the grant provisions. Later in this chapter, the New Water for California section provides further detail on the range of options and describes necessary steps that regions should take to improve regional self-reliance and reduce reliance on the Delta.

The Role of Conveyance in Increased Flexibility

Conveyance improvements can enhance the operational flexibility of the Delta system to divert and move water at times and from locations that are less harmful to fisheries, or to reliably transport environmental water supplies to specific locations at times when it can benefit fish and water quality (California Natural Resources Agency 2010). Existing configurations of Delta water conveyance and associated conveyance facilities do not provide adequate long-term reliability to meet current and projected water demands for SWP and CVP water exports from the Delta watershed (DWR 2009).

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[11] Contra Costa Water District will complete a 160,000-acre-foot expansion of Los Vaqueros Reservoir in 2012. The feasibility of an additional 275,000-acre-foot expansion is still under consideration by State and federal agencies.

Conveyance improvements and associated ecosystem restoration actions are being evaluated as part of the multiagency BDCP effort. (See sidebar, Bay Delta Conservation Plan and Water Supply Reliability.) Once decisions are made regarding whether to build and, if so, in what manner to build conveyance improvements, construction of these facilities will likely take at least a decade or more and will not provide near-term reliability improvements. This means that Delta operations and deliveries of export supplies will continue to be constrained by existing infrastructure for at least the next 15 years.

During this time, steps must be taken to implement local water management programs and projects, described later in this chapter. Additionally, the State needs to address the continuing vulnerability of the Delta levee system and make improvements to protect the existing in-Delta conveyance system from catastrophic failure. (See Chapter 7 for a discussion of the benefits and vulnerabilities of Delta levees.) In particular, immediate improvements to the Delta levee system are critical because of the current instability and interdependence of the levees—the failure of one can affect the entire system (NRC 2012).

BAY DELTA CONSERVATION PLAN AND WATER SUPPLY RELIABILITY

The BDCP is a Habitat Conservation Plan (HCP) and Natural Community Conservation Plan (NCCP) that "proposes major physical changes to the Delta, including new diversion and conveyance facilities and their operational criteria, extensive new aquatic habitat, and other measures to help reverse the Delta's ecological decline and secure water supplies from the Delta for human use" (BDCP 2012c).

The BDCP is planned to be implemented over a 50-year timeframe using an adaptive management and monitoring program to adapt as conditions change and new information emerges. The parties seeking one of several permits pursuant to the BDCP include DWR, Reclamation, Metropolitan Water District of Southern California, Kern County Water Agency, Santa Clara Valley Water District, Zone 7 Water Agency, Westlands Water District, and the State and Federal Water Contractors Agency (BDCP 2012a). The goal of these parties, with the exception of Reclamation, is to formulate a plan that could ultimately be approved by the U.S. Fish and Wildlife Service and the National Marine Fisheries Service as an HCP under the provisions of Endangered Species Act section 10(a)(1)(B) and as an NCCP by DFW under Fish and Game Code section 2800 et seq. and/or the California Endangered Species Act section 2050 et seq. Reclamation intends to use information developed as part of the BDCP process to help inform its Endangered Species Act Section 7 consultation on the coordinated long-term operation of the CVP and SWP with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service. If the BDCP is successfully completed, and DFW determines that the BDCP meets the requirements in Water Code section 85320, it must be incorporated into the Delta Plan. That determination by DFW may be appealed to the Council (Water Code section 85320 (e)).

The BDCP is being developed to contribute to improving water supply reliability by modifying Delta conveyance facilities to create a more natural flow pattern in the Delta and allow for water exports when hydrologic conditions result in the availability of sufficient water, consistent with the requirements of State and federal law and the terms and conditions of SWP and CVP water delivery contracts, and other existing applicable agreements.

The BDCP process is considering a range of options for conveying water through or around the Delta:

- **Through-Delta Conveyance:** Continue to divert water in the southern Delta at existing or modified intakes/diversions for SWP and CVP operations.
- **Isolated Conveyance:** Divert water from the Sacramento River at new intakes/diversions and convey the water to the existing SWP and CVP pumping plants through a pipeline/tunnel.
- **Dual Conveyance:** Combine through-Delta conveyance and isolated conveyance to allow operational flexibility.

The BDCP process is ongoing. As of this publication, the public draft of the BDCP and the related environmental impact report/environmental impact statement are planned for release by late 2012, with final documents expected to be released in mid-2013 (BDCP 2012b). The Council is a Responsible Agency for California Environmental Quality Act purposes.

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New Water for California

The fact that water is a scarce resource does not mean that California is "running out of water" (NRC 2012). It does mean that California will need to develop plans, and implement programs and projects that can adapt to a highly variable and uncertain water future. The primary source of new water supplies for California in the future will come from local and regional sources.

This section discusses local water supply opportunities, the importance of local and regional water management planning, and the need for improved groundwater management and water data so that the state can better match its water demands to the available supplies.

California's Wealth of Water Opportunities

California has many new and underused water resources that can be developed to improve regional self-reliance. In 2009, DWR estimated that the state could further reduce water demand and increase water supplies in the range of 5 to 10 MAF by 2030 through the use of existing strategies and technologies (see Figure 3-7).[12] If the state developed only half this water (about 5 MAF) through water efficiency and new local supplies, it would be sufficient to support the addition of almost 30 million residents, more than the population growth that is expected to occur by 2050.[13]

Nearly all these potential supplies will come from a combination of improved conservation and water use efficiency in the urban and agricultural sectors, local groundwater and surface storage, conjunctive management, recycled water, drinking water treatment, groundwater remediation, and desalination. DWR has identified 27 "resource management strategies" that water suppliers should consider when expanding their water management programs throughout the diverse regions of the state (DWR 2009). Resource managers can combine these strategies into a response package, crafting them to provide multiple water resource benefits, diversify their water portfolio, and become more regionally self-reliant.

Often, the new local and regional water supplies have the additional advantage of being available even during extreme drought conditions, making them some of the most reliable sources of water for urban and agricultural uses. In particular, recycled water and the treatment and reuse of poor-quality groundwater are two of the most resilient water supplies under conditions of drought and climate change. The treatment of poor-quality groundwater also can significantly improve drinking water supplies, especially for rural and economically disadvantaged communities that have limited alternatives to secure clean water. In 2012, the California Legislature enacted Assembly Bill (AB) 685, declaring the established State policy that "every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes" (Water Code section 106.3 (a)). For more about drinking water quality, see Chapter 6.

For some local water resources, California has adopted specific targets, including:

- **Urban water conservation.** The State's goal is to achieve a reduction in statewide per capita urban water use of 20 percent, from a 2005 baseline of an estimated

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[12] The range of 5 to 10 MAF is a conservative estimate and is consistent with recent studies that assess California's potential for increased water savings and water supplies. DWR provides a cautionary note that the water supply benefits summarized in the California Water Plan are not intended to be additive, recognizing the same resource management strategies may complement or compete with one another for funding, system capacity, or other elements that are necessary for implementation. In addition, unlike the 2005 version, DWR did not include in the 2009 California Water Plan an estimate for water supply benefits from improved conveyance. Instead, DWR states that the main benefits of conveyance improvements are increased water supply reliability, water quality protection, and operational flexibility (DWR 2009).

[13] Under California law, water conservation is considered a source of supply (Water Code section 1011(a)). A 2008 report from the Los Angeles Economic Development Corporation found that "using water more efficiently reduces demand, which has the same effect as adding water to the system." For Southern California, the report concludes that "urban water conservation could have an impact equivalent to adding more than 1 MAF of water to the regional supply (about 25 percent of current annual use)" (LAEDC 2008).

198 gallons per capita daily (GPCD) to 166 GPCD (DWR 2012b). This represents a potential annual water savings of approximately 1.8 MAF per year that will be accomplished by 2020. This is consistent with DWR's 2009 estimate that 2.1 MAF can be conserved in roughly the same period through increased use of water-efficient appliances, reduced water use for landscaping, and tiered rate structures, such as increasing block rates or budget-based rate structures.

- **Recycled water.** The State's goal is to increase the use of recycled water over 2002 levels by at least 1 MAF per year by 2020, and by at least 2 MAF per year by 2030 (DWR et al. 2010). DWR's 2009 estimate indicates that as much as 2.25 MAF could be recovered, about half of the amount of wastewater that is treated and released to flow to the ocean.
- **Stormwater runoff.** The State's goal is to increase capture and reuse of stormwater by at least 500,000 acre-feet per year by 2020, and at least 1 MAF per year by 2030 (DWR et al. 2010). The 2008 Scoping Plan for California's Global Warming Solutions Act of 2006 (AB 32) finds that up to 333,000 acre-feet of stormwater could be captured on an annual average for reuse in Southern California alone (CARB 2008).

California's Wealth of New Water Supplies

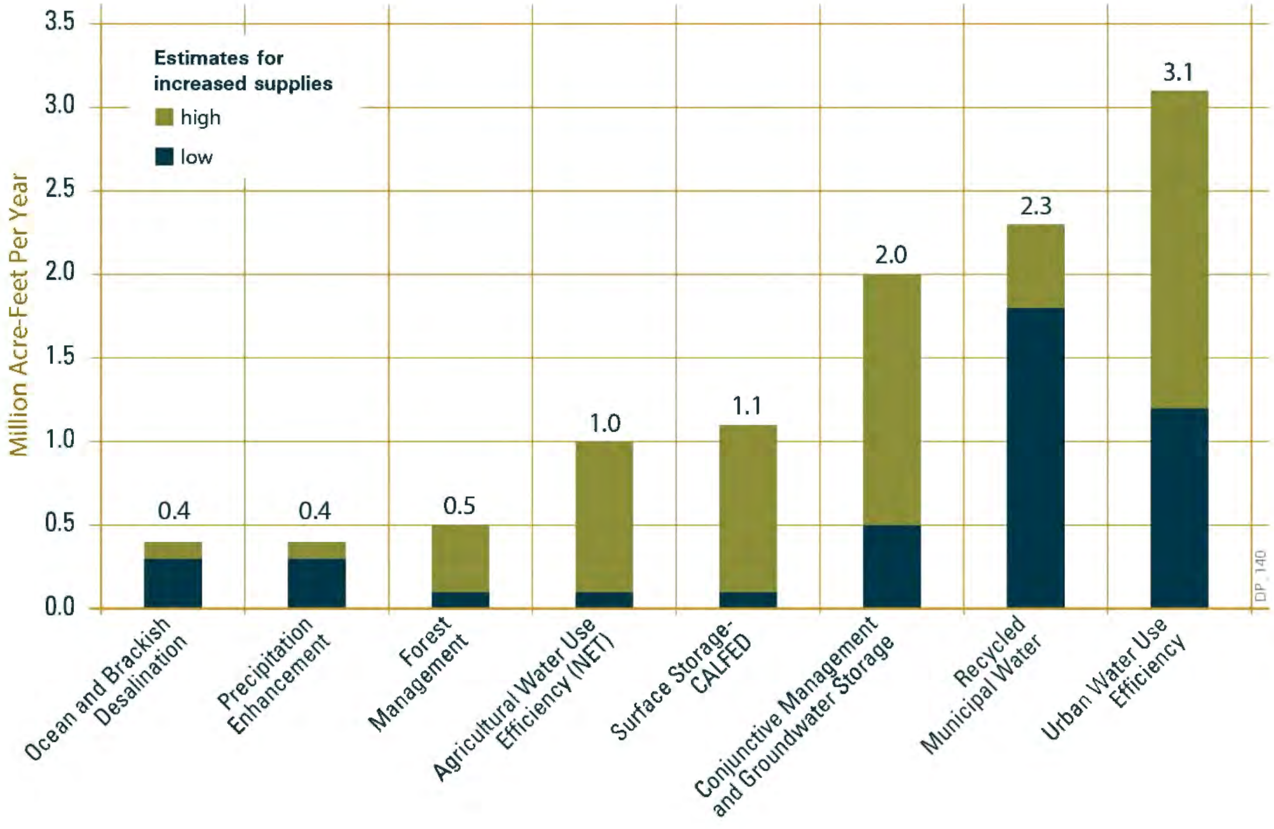

Figure 3-7

DWR estimates that California could further reduce its water demands and increase water supplies by 5 to 10 MAF per year over the next 30 years through the use of existing technologies.

Source: DWR 2009

The Importance of Local Water Management Planning

Over the past few decades, the State has built on successful local water management planning and, when possible, has provided funding for local districts to develop and implement water management plans. These plans are of benefit to all regions, not just those who rely on the Delta or Delta watershed.

These programs and projects increase the reliability of water supplies by increasing water efficiency and diversify the portfolio of water sources for urban and agricultural water suppliers that are more resilient under conditions of drought, emergency shortage, and climate change. Water developed through these activities can help reduce conflicts among urban, agricultural, and environmental uses, and can contribute to the ability of regions in California to reduce their reliance on water from the Delta watershed.[14]

The responsibility for implementing most of these water management strategies and achieving State objectives lies with over 600 local water agencies, including several privately owned and operated companies, plus wastewater districts, community service districts, and other special districts. The sheer number of local agencies engaged in water management makes it difficult to monitor and account for the significant new amounts of water supplies and increased water efficiency that is being implemented. Later in this chapter, the Informed Decision Making Requires Information section details this challenge and associated water management implications.

Since the mid-1980s, California has enacted progressively more stringent water conservation, efficiency, and water planning requirements for urban and agricultural water suppliers (see Appendix H). Beginning in 1983, wholesale and retail municipal water suppliers (those with at least 3,000 connections or delivering at least 3,000 acre-feet per year) have been required by the Urban Water Management Planning Act to prepare 20-year urban water management plans to guide investments in future water reliability. This law has been strengthened through several revisions to include specific water conservation goals (such as the 20 percent reduction in urban per capita water usage by 2020 adopted in 2009), compliance with demand management measures including adoption of rate structures that promote water conservation (AB 1420 in 2007), landscape conservation requirements (AB 1881 in 2006), and required installation of water meters (AB 2572 in 2004).

Existing law requires that urban water suppliers include a water supply reliability element and water shortage provisions in their urban water management plans, recognizing that suppliers need to prepare for extended droughts, the effects of climate change, and potential catastrophic interruption of deliveries caused by earthquakes or other events. Water suppliers must evaluate whether their water sources may be available at a consistent level of use and describe their plans for supplementing or replacing these sources, to the extent practicable with alternatives or water demand management measures (Water Code section 10631(c)(2)). Water suppliers must also describe the tools and options that will be used to maximize resources and minimize the need to import water from other regions (Water Code section 10620(f)).

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[14] As used in the Delta Plan, "regions" refer to the 10 hydrologic areas identified by DWR that correspond to the state's major water drainage basins, and included the two regional overlays for the Mountain Counties area and the Delta. The use of these regions as planning boundaries allows consistent tracking of their natural water runoff and accounting of surface and groundwater supplies.

Agricultural water suppliers (those that provide water to 25,000 or more irrigated acres, or 10,000 irrigated acres and who receive State funding to implement the plan provisions) have a requirement similar to urban suppliers and must prepare agricultural water management plans. The Agricultural Water Management Planning Act was adopted in 2009 (Senate Bill X7 7 [SBX7 7]). Requirements include reporting on farm gate water deliveries, adoption of rate structures that promote water conservation, and identification and implementation of locally cost-effective and technically feasible water efficiency measures.

Since 2000, the State has also promoted voluntary integrated regional water management plans (IRWMPs), recognizing that collaboration among multiple agencies, especially within watersheds, provides opportunities for better water management decisions and coordinated infrastructure investments. Significant bond funding has been made available to support implementation of projects identified through these IRWMPs. A 2006 report on the investments made for IRWMP projects identified over 1.2 MAF of water benefits in combined water supply and demand reductions that have been achieved through the expenditure of $1 billion in State bond funds in local and regional projects (DWR 2009). An additional $1 billion or more of local dollars were leveraged because of this State investment. Applicants for IRWMP funding must now demonstrate how their plans help reduce their region's dependence on water imported from outside their region (DWR 2010c).

As climate change begins to affect California's water supplies, the U.S. Environmental Protection Agency (Region 9) and DWR are encouraging water managers to plan for these impacts and to take steps to adapt to them. IRWMPs, and the agricultural and urban water management plans provide an excellent framework for addressing water-related climate change impacts (USEPA and DWR 2011). Because each region is unique, there is no single "correct" planning approach. Key concepts include risk assessment, such as the potential for interruption of water supplies for up to 36 months due to catastrophic events impacting the Delta, including earthquakes or floods. For example, DWR identified the potential for some portion of Delta deliveries to be interrupted for up to 36 months if a catastrophic earthquake occurred (DWR 2010b). Although this would have a primary impact on water suppliers that rely on water from the Delta, it might also affect upstream water suppliers that may be called upon to release more water into the Delta during the crisis.

Another useful tool is the regional water balance. According to DWR, the purpose of a regional water balance is to provide an accounting of all water that enters and leaves a specific hydrologic region, how it is used, and how it is exchanged between regions. A regional water balance can be used to compare how water supplies and uses in a region can vary between wet and critically dry hydrologic conditions, and how each region's water balance compares with other regions and with the state's overall water balance. This is important to all water planning activities and provides a basis for evaluating unsustainable water management practices and making appropriate improvements (DWR 2009).

Implementing a Path to Success in Local Water Management

Many agricultural and urban water suppliers are taking commendable action to improve water conservation and efficiency, and to expand their local and regional water supplies. (See sidebar, Regional Success Stories.) However, others are not.

For example, despite longstanding State laws that require preparation and implementation of urban water management plans, many water suppliers still regard these plans as voluntary because the only consequence of not completing them has been ineligibility to receive State grant and loan funding

REGIONAL SUCCESS STORIES

Significant improvements in water management are being implemented throughout California, especially in regions that rely upon water from the Delta and the Delta watershed. The 2010 urban water management plan updates and voluntary IRWMP grant applications filed in 2010 provide insight into what individual water agencies and regional planning efforts are doing to improve water efficiency and develop additional local water supplies. Examples of successful strategies to reduce reliance on the Delta and improve regional self-reliance follow.

In Southern California:

- **West Basin Municipal Water District.** Increased water efficiency and diversification of the district's water supplies between 2010 and 2035 will enable West Basin Municipal Water District to reduce its potable water demand despite expected future population growth. The total volume of imported water usage is projected to decline by 40,000 acre-feet over this period, and conservation, recycled water, and ocean desalination will expand the district's water resources by over 60,000 acre-feet (RMC Water and Environment 2011).
- **City of Los Angeles.** Today the City of Los Angeles uses less water than it did 30 years ago, despite population growth of more than 1 million residents. In 2011, per capita water usage was 123 gallons daily—the lowest in Los Angeles in more than 40 years and the lowest among any United States city with a population over 1 million (LADWP 2012). Through regional watershed planning efforts, the city is bringing together local and county public works departments, planning agencies, local and regional water supplies, and citizen groups to develop integrated multibenefit projects. In 2004, the city overwhelmingly approved Proposition O, which authorized $500 million in local bonds to fund water efficiency, stormwater capture, water treatment, recycled water, flood protection, open space, recreation, and other projects.

In the central San Joaquin Valley and Tulare Lake regions:

- **Poso Creek Regional Water Management Group.** The IRWMP focuses on more effective coordination of each participating irrigation district's water assets, recognizing that competition for the three sources of water that meet the region's demands (local supplies/Kern River, CVP, and SWP) is increasing. Proposed improvements include 400 acres of spreading ponds and additional conveyance (canals, pipelines, and pumping plants) between the Friant-Kern Canal and California Aqueduct and among irrigation districts, which will enable the region to take advantage of wet-year (unscheduled) water diversions from the Delta and reduce diversions in dry years (Semitropic Water Storage District 2011).

In the Delta:

- **East Contra Costa County.** Located entirely within the statutory Delta, all the water suppliers that participate in this IRWMP rely upon the Delta for more than 80 percent of average-year water demands, with three water suppliers receiving 100 percent. The IRWMP priorities for reducing reliance on the Delta include expanded use of recycled water, installation of water meters, increased water conservation, and new wellhead treatment for groundwater supplies (Contra Costa Water District 2011).

In the Bay Area:

- **City and County of San Francisco.** Increased water efficiency has resulted in general decline in total consumption and per capita water use since the mid-1970s to record low levels in the state despite growth in the county's population. Recognition of the vulnerability of the city's Hetch Hetchy Reservoir and aqueduct system to earthquakes and other emergencies, San Francisco is working to diversify its local water supplies, including increased conservation, new local groundwater wells, expansion of recycled water, use of gray water, rainwater harvesting, and participation in the Bay Area Regional Desalination Project with Contra Costa Water District, East Bay Municipal Utility District, Santa Clara Valley Water District, and Zone 7 Water Agency (San Francisco Public Utilities Commission 2011).

In the Delta upper watershed:

- **American River Basin.** The IRWMP features reduced reliance on water in the Delta's American River tributaries through expanded conjunctive use operations, development of recycled water, and increased water conservation. More water will be diverted during wetter periods and made available as groundwater in drier periods, which will help increase regional water supply reliability while improving flow and temperature conditions that benefit salmon and steelhead fisheries in the lower American River (Regional Water Authority 2011).

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to implement water projects. In the 2005 round of urban water management plan submittals, this incentive increased the number of plans submitted over previous years; however, only 75 percent of agencies that should submit plans actually did as of December 31, 2006, and more than 50 percent of these failed to include required conservation or drought contingency plans (DWR 2006). In the 2010 round of urban water management plan submittals, 66 percent of the agencies required to submit plans actually did by the August 2011 deadline. One year later, this percentage had increased to 85 percent, but no assessment for completeness has been performed (DWR 2012b).

Widespread compliance with existing water management laws alone would achieve great progress in improving water supply reliability for California. Compliance with all State water efficiency and management statutes and policies, at a minimum, should be the starting point for assessing a water supplier's reasonable use of California's water. In particular, water suppliers that do not engage in efficient use of water, particularly where the implementation of proven measures and technologies are economically justifiable, locally cost effective, and do not harm other water users, should be held accountable for wasting water. The SWRCB should be encouraged to use its authority to prevent waste and unreasonable use by seeking enforcement of these requirements. The potential for this type of action was anticipated in the Water Conservation Act of 2009 (SBX7 7), which explicitly recognized that the failure of urban water suppliers to reduce urban per capita water demand consistent with the State's 20 percent by 2020 conservation targets can be used after January 2021 to establish a violation of the law for the purposes of State administrative or judicial proceedings (Water Code section 10608.8(a)(2)).

Importantly, for those who prepare them, urban water management plans and integrated regional water management plans appear to be working. As a result of these efforts and increased irrigation efficiency, the amount of water needed to meet future urban and agricultural demands has changed. Since 1980, the total volume of water used in the urban and agricultural sectors has declined. Urban areas that have implemented the strongest water conservation programs show the greatest improvements in water efficiency and the largest reductions in water use (see Figure 3-8).

Groundwater Overdraft Is an Impediment to the Coequal Goals

Groundwater is a major source of water supply for nearly every region in California and a vital component of the state's water storage system, particularly during droughts (DWR 2009). More than 40 percent of Californians rely on groundwater for part of their water supply, and many small- to moderate-sized towns and cities are entirely dependent on groundwater for their drinking water systems (DWR 2003a). The state's most significant groundwater use occurs in regions that also rely on water from the Delta watershed, including the San Joaquin Valley, Tulare Lake, Sacramento Valley, Central Coast, and South Coast (see Figures 3-9 and 3-10). The Tulare Lake region alone accounts for more than one-third of the state's total groundwater pumping (DWR 2009). Because of historical groundwater overdraft and resulting land subsidence experienced in these regions, water users switched to using surface water from the CVP and SWP when the water projects were completed in the late 1960s. However, groundwater pumping and overdraft continued to become more severe as water demands continued to exceed available supplies. Recent satellite imaging revealed that the Central Valley lost approximately 25 MAF of stored groundwater during the period of October 2003 to March 2010 (Famiglietti et al. 2011).

As a result of use continually exceeding recharge, many of California's groundwater basins are in overdraft, and groundwater levels are declining over the long term (Faunt 2009). In some areas, overdraft can lead to a permanent loss of groundwater storage. According to DWR, a groundwater basin is in a state of "critical overdraft" when continuation of present water management practices would result in significant adverse overdraft-related environmental, social, or economic impacts. DWR estimates statewide average overdraft of about 1 to 2 MAF per year (DWR 2009). Groundwater use is also increasing, and is expected to grow at a faster rate in future decades as climate change reduces the reliability of surface water deliveries and increases the potential for extended droughts (DWR 2009). Without more efficient management, the state's groundwater resources will be significantly impacted, and in severe overdraft conditions, the aquifer's capacity to store groundwater may be irretrievably lost (DWR 2003a). Improved management is also needed to take advantage of opportunities to store water underground, particularly to aid flexibility when done in coordination with improved operations in the Delta.

California has established laws, regulations, and programs to protect the quality of its groundwater resources. Despite the major importance of this water supply to California, however, the quantity of groundwater used by agencies or individuals is largely unregulated at the State level. Except for Texas, California is the only state where use of its groundwater resources is managed at the local rather than State level. The lack of State oversight means that limited and often incomplete information is available to the public about how California's groundwater basins are being managed. So little is known, that in 2003, DWR was unable to revise the designation of critically overdrafted basins in its update on California's groundwater (DWR 2003a). Lacking current information and having limited resources to complete additional investigations, DWR simply republished the list of 11 basins identified in 1980.

Trends in California's Water Use

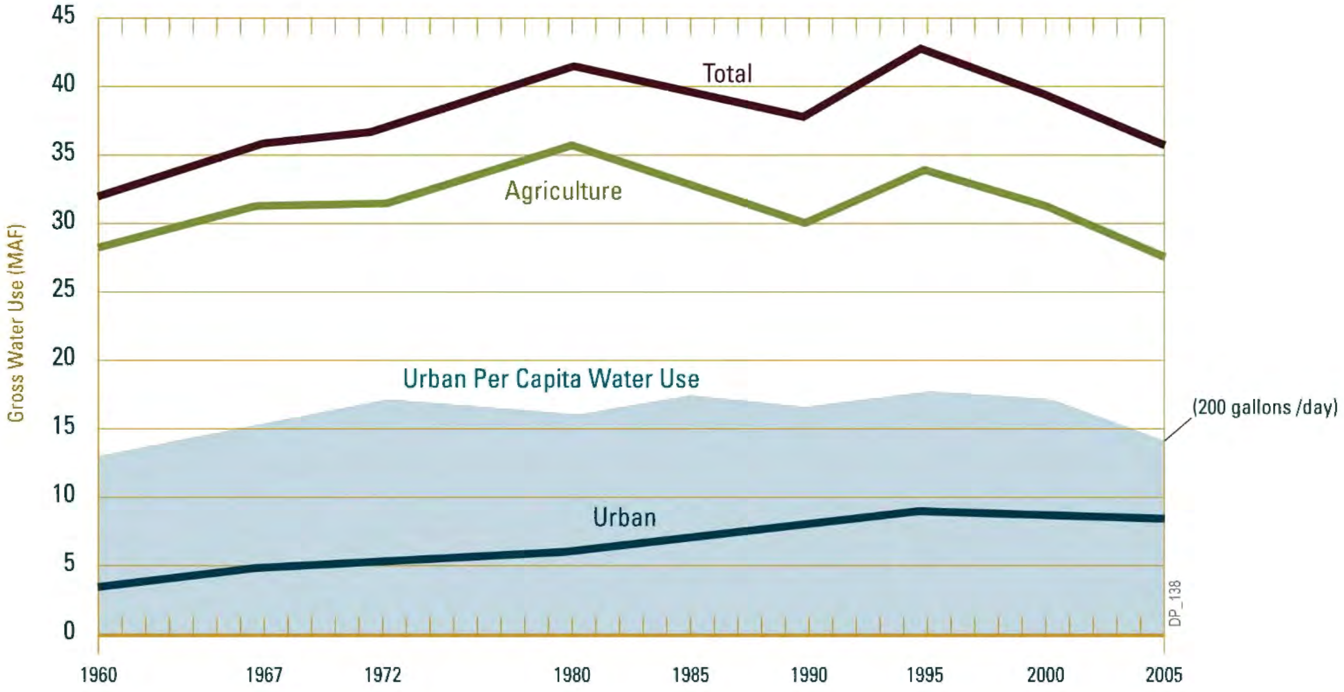

Figure 3-8

California's water use is declining, primarily due to increased water efficiency in both agricultural and urban areas. The City of Los Angeles, like many other cities, reports that it is using the same amount of water as it did over 30 years ago, even though its population has grown by more than 1 million people.

Sources: Hanak et al. 2011; adapted from DWR 2009

Critically Overdrafted Groundwater Basins

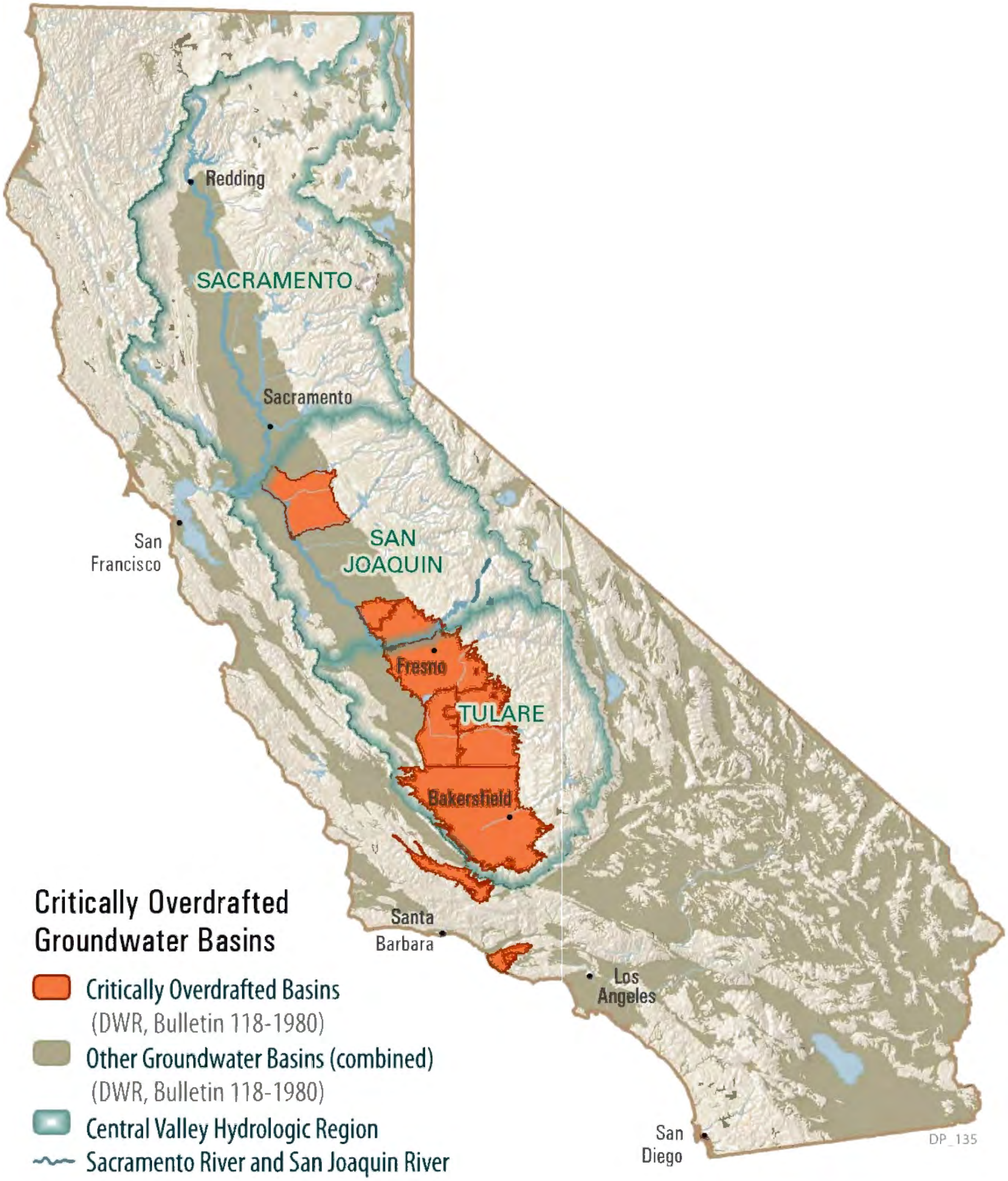
Redding
SACRAMENTO
Sacramento
San Francisco
SAN JOAQUIN
Fresno
TULARE
Bakersfield
Santa Barbara
Los Angeles
San Diego
DP_135
Critically Overdrafted Groundwater Basins
Critically Overdrafted Basins (DWR, Bulletin 118-1980)
Other Groundwater Basins (combined) (DWR, Bulletin 118-1980)
Central Valley Hydrologic Region
Sacramento River and San Joaquin River

Figure 3-9

Groundwater overdraft is a critical water supply problem, especially in the Central Valley. More than 40 percent of Californians rely on groundwater for some portion of their supply, and many small- and moderate-sized communities are entirely dependent on groundwater for drinking water.

Sources: DWR 2003a; DWR 2009

San Joaquin Groundwater Pumping Is Unsustainable

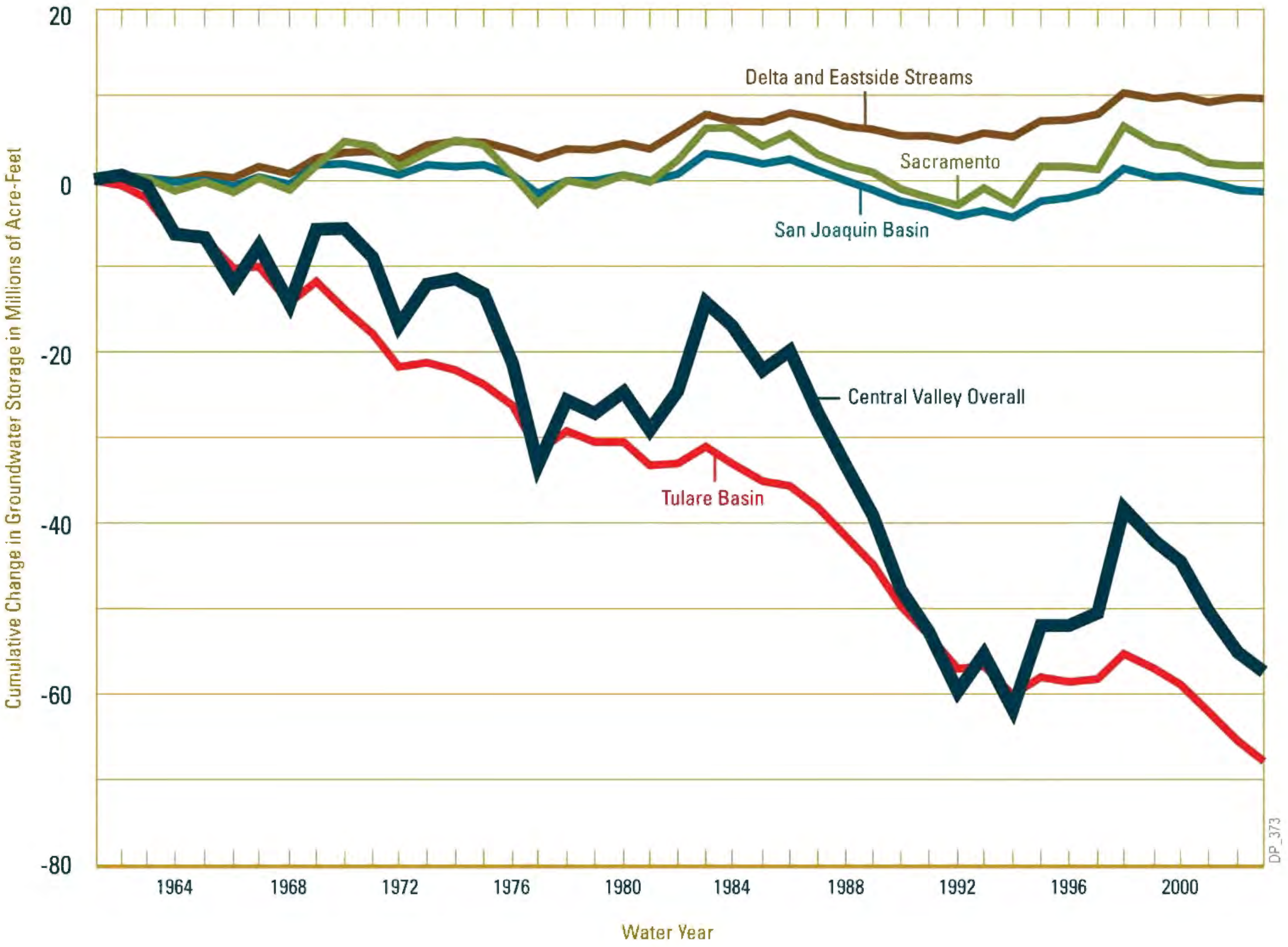

Figure 3-10 Estimated cumulative annual changes in groundwater storage in the Tulare Lake Basin due to over-pumping are more than 60 MAF since 1960. Serious land subsidence and loss of groundwater storage capacity impacts more than half of this region.

Source: Faunt 2009

Some regions appear to be making significant progress in developing sustainable groundwater management programs through regional water balances and voluntary groundwater management plans (known as AB 3030 plans), local ordinances, and court adjudications (Nelson 2011).[15] In 2009, the State created a mandatory statewide program for local reporting of groundwater elevation data, the California Statewide Groundwater Elevation Monitoring Program. This program will collect reported groundwater elevations and make the data available online.

Informed Decision Making Requires Information

One of the greatest challenges to California water management is the lack of consistent, comprehensive, and accurate estimates of actual water use by the type of use (agricultural, urban, and environmental) and by hydrologic region. The water use that is reported to the State is a combination of measured uses and estimated use that are not measured, with limited verification of actual water use. This means that California does not have a clear understanding of its water demands, the amount of water available to meet those demands, how water is being managed, and how that management can be improved to achieve the coequal goals for the Delta.

Key concerns include:

- Not all water uses are required to be monitored and measured. Many water rights were issued decades ago when water measurement was not required. Until reforms were approved by the California Legislature in 2009, water rights holders were not required to provide detailed information on water diversions and use. As a result, total diversion amounts are currently unknown and may be over-allocated in some locations or during dry periods (SWRCB 2008, SWRCB 2011, NRC 2012). Similarly, many groundwater withdrawals are not monitored or reported.
- Not all water users report data even when they are required to do so. A 2009 report prepared for the Legislature by the SWRCB on the development of a coordinated measurement database indicated that historically, about 67 percent of water permit and license holders actually report their water use information, and fewer than 35 percent of other water right claimants who are required to report actually do so (SWRCB 2009).
- SWP contractors are not required by DWR to provide data similar to that collected by Reclamation for CVP contractors. Reclamation has established best management practices for water efficiency, consistent with the federal Reclamation Reform Act and the Central Valley Project Improvement Act, and performs a “Water Needs Assessment” for each federal contractor with input from that contractor. Reclamation also requires contractors to submit an annual report that includes a full water balance (production from all sources, system losses, and changes in storage and water), and implement an effective water conservation and efficiency program based on the contractor’s approved water conservation plan (Reclamation 2011b).
- SWP contract amendments in the past have not always been developed and approved in a transparent manner, and have resulted in litigation over implications for the management of the state’s water supplies. In 2003, as part of a legal settlement, DWR adopted policies for how future contracts and contract amendments would be reviewed and adopted through an open and transparent process (DWR 2003b). Consistent application of this policy is important (see Appendix B).
- More detailed information on changes in groundwater levels, rates of groundwater extraction, and the location

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[15] The State encourages additional voluntary development of locally controlled groundwater monitoring programs and related management plans through AB 3030 (1992), AB 303 (2000), AB 599 (2001), and SB 1938 (2002); through the IRWMP Program (through funding provided by Propositions 13, 50, and 84); and by limiting availability of State funding for water infrastructure to those agencies that have adequate groundwater management plans in place. The State also provides technical assistance to help local agencies more efficiently and sustainably manage groundwater resources, and has identified 14 required and recommended components for groundwater plans. Prior to 2002, there were no required elements for groundwater plans.

of basins with severe and chronic overdraft is needed as a baseline for the State's water resource management efforts. Basic groundwater management data (estimates of safe yield, monitoring of changes in storage in the aquifers and water quality conditions, and identification of replenishment sources and connections with surface water supplies) need to be quantified for many areas, but especially in those regions that rely upon water from the Delta watershed (DWR 2003a). The State's goal should be to sustainably maintain and maximize long-term reliability of these groundwater supplies, with a focus on preventing significant degradation of groundwater quality (DWR 2003a, ACWA 2011).

Recent legislation has resulted in significant improvements to the State's water monitoring and reporting requirements. However, time and resources will be necessary to assess the results from these improvements, which will also serve to inform future Delta Plan updates. For example, recently enacted provisions are now being implemented for:

- Groundwater monitoring (Water Code section 10920 et seq.)
- In-Delta and statewide water diversion reporting (Water Code section 5100 et seq.)
- In-Delta enforcement investigations under the authority of the Delta Watermaster (Water Code section 85230)
- Compliance with the State's goal of achieving a 20 percent reduction in statewide urban per capita water use by 2020 (Water Code section 10608 et seq.)
- Improved reporting on agricultural water use efficiency measures (Water Code section 10608 et seq. and 10800 et seq.)

In late 2010, the SWRCB also adopted regulations requiring online reporting of water use by all water rights holders, including appropriative, riparian, and pre-1914 surface water users, and groundwater users. Since 2008, DWR, SWRCB, and the California Department of Public Health have been working to develop a coordinated database to track the urban and agricultural water use data that are provided to each agency. This tool is central to the development of a statewide integrated system for streamlined data collection and analysis that will support improved water management in California.

POLICIES AND RECOMMENDATIONS

Policies and recommendations for providing a more reliable water supply for California are based on four core strategies:

- Increase water conservation and expand local and regional supplies
- Improve groundwater management
- Improve conveyance and expand storage
- Improve water management information

Increase Water Conservation and Expand Local and Regional Supplies

Approximately 84 percent of California's water supplies come from local and regional sources, including surface runoff, groundwater, recycled water, and water made available through advanced treatment. Improved management of these resources, including water conservation and efficiency, is central to the state's ability to better match its demands to the amount of supply that is available. Over the next 30 years, the *California Water Plan Update 2009* estimates that, with the use of existing technology, the state can reduce its demands and increase its water supplies in the range of 5 to 10 MAF. This is more than enough water to meet California's projected water demands beyond 2050 and to sustain its economic vitality.

The State's constitutional principle of reasonable use and the Public Trust Doctrine form the legal foundation for California's water management policies. Importantly, along with the coequal goals, the Delta Reform Act also established a new policy for California of reducing reliance on the Delta and improving regional self-reliance in meeting California's future water supply needs. The Delta Reform Act mandates many strategies that the Delta Plan must address to improve water supply reliability for California including water efficiency and conservation, wastewater reclamation and recycling, desalination and advanced water treatment technologies, improved water conveyance, surface and groundwater storage, improved water quality, and implementation of local and regional water supply projects and coordination (see Water Code sections 85004(b), 85020(d) and (f), 85201, 85023, 85303, and 85304).

An assessment of future water supply reliability is now required in urban water management and agricultural water management plans, as well as in voluntary regional water planning documents known as IRWMPs. In areas that rely upon water from the Delta watershed, water suppliers will need to identify, evaluate, and implement locally cost-effective and technologically feasible measures that reduce their reliance on the Delta and improve regional self-reliance.

Problem Statement

The lack of participation by some water suppliers throughout California to implement laws, programs, and projects that improve water efficiency, expand local and regional water supplies, and reduce reliance on the Delta and the Delta watershed contributes to higher water demands, less water supply to meet these demands, greater pressure on the Delta ecosystem for its water, and more vulnerability to the impacts of climate change and catastrophic events. Given the Delta Reform Act mandates to improve water supply reliability for California, reduce reliance on the Delta, and improve regional self-reliance, at a minimum, all water suppliers should demonstrate full compliance with State water efficiency and management laws, goals, and regulations to demonstrate reasonable and beneficial use of the state's water resources. California's success in achieving the policy of reduced reliance on the Delta and improving regional self-reliance will be demonstrated through a significant reduction in the amount of water used or in the percentage of water used from the Delta watershed. See Appendix G for additional information regarding how to achieve reduced reliance on the Delta and improved regional self-reliance.

Policies

WR P1. Reduce Reliance on the Delta through Improved Regional Water Self-Reliance

(a) Water shall not be exported from, transferred through, or used in the Delta if all of the following apply:

(1) One or more water suppliers that would receive water as a result of the export, transfer, or use have failed to adequately

contribute to reduced reliance on the Delta and improved regional self-reliance consistent with all of the requirements listed in paragraph (1) of subsection (c);

(2) That failure has significantly caused the need for the export, transfer, or use; and

(3) The export, transfer, or use would have a significant adverse environmental impact in the Delta.

(b) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers a proposed action to export water from, transfer water through, or use water in the Delta, but does not cover any such action unless one or more water suppliers would receive water as a result of the proposed action.

(c) (1) Water suppliers that have done all of the following are contributing to reduced reliance on the Delta and improved regional self-reliance and are therefore consistent with this policy:

(A) Completed a current Urban or Agricultural Water Management Plan (Plan) which has been reviewed by the California Department of Water Resources for compliance with the applicable requirements of Water Code Division 6, Parts 2.55, 2.6, and 2.8;

(B) Identified, evaluated, and commenced implementation, consistent with the implementation schedule set forth in the Plan, of all programs and projects included in the Plan that are locally cost effective and technically feasible which reduce reliance on the Delta; and

(C) Included in the Plan, commencing in 2015, the expected outcome for measurable reduction in Delta reliance and improvement in regional self-reliance. The expected outcome for measurable reduction in Delta reliance and improvement in regional self-reliance shall be reported in the Plan as the reduction in the amount of water used, or in the percentage of water used, from the Delta watershed. For the purposes of reporting, water efficiency is considered a new source of water supply, consistent with Water Code section 1011(a).

(2) Programs and projects that reduce reliance could include, but are not limited to, improvements in water use efficiency, water recycling, stormwater capture and use, advanced water technologies, conjunctive use projects, local and regional water supply and storage projects, and improved regional coordination of local and regional water supply efforts.

23 CCR Section 5003
NOTE: Authority cited: Section 85210(i), Water Code.
Reference: Sections 10608, 10610.2, 10610.4, 10801, 10802, 85001(c), 85004(b), 85020(a), 85020(d), 85020(h), 85021, 85022(d)(1), 85022(d)(5), 85023, 85054, 85300, 85302(d), 85303, and 85304, Water Code.

Recommendations

WR R1. Implement Water Efficiency and Water Management Planning Laws

All water suppliers should fully implement applicable water efficiency and water management laws, including urban water management plans (Water Code section 10610 et seq.); the 20 percent reduction in statewide urban per capita water usage by 2020 (Water Code section 10608 et seq.); agricultural water management plans (Water Code section 10608 et seq. and 10800 et seq.); and other applicable water laws, regulations, or rules.

WR R2. Require SWP Contractors to Implement Water Efficiency and Water Management Laws

The California Department of Water Resources should include a provision in all State Water Project contracts, contract amendments, contract renewals, and water transfer agreements that requires the implementation of all State water efficiency and water management laws, goals, and regulations, including compliance with Water Code section 85021.

WR R3. Compliance with Reasonable and Beneficial Use

The State Water Resources Control Board should evaluate all applications and petitions for a new water right or a new or changed point of diversion, place of use, or purpose of use that would result in new or increased long-term average use of water from the Delta watershed for consistency with the constitutional principle of reasonable and beneficial use. The State Water Resources Control Board should conduct its evaluation consistent with Water Code sections 85021, 85023, 85031, and other provisions of California law. An applicant or petitioner should submit to the State Water Resources Control Board sufficient information to support findings of consistency, including, as applicable, its urban water management plan, agricultural water management plan, and environmental documents prepared pursuant to the California Environmental Quality Act.

WR R4. Expanded Water Supply Reliability Element

Water suppliers that receive water from the Delta watershed should include an expanded water supply reliability element, starting in 2015, as part of the update of an urban water management plan, agricultural water management plan, integrated water management plan, or other plan that provides equivalent information about the supplier's planned investments in water conservation and water supply development. The expanded water supply reliability element should detail how water suppliers are reducing reliance on the Delta and improving regional self-reliance consistent with Water Code section 85201 through investments in local and regional programs and projects, and should document the expected outcome for a measurable reduction in reliance on the Delta and improvement in regional self-reliance. At a minimum, these plans should include a plan for possible interruption of water supplies for up to 36 months due to catastrophic events impacting the Delta, evaluation of the regional water balance, a climate change vulnerability assessment, and an evaluation of the extent to which the supplier's rate structure promotes and sustains efficient water use.

WR R5. Develop Water Supply Reliability Element Guidelines

The California Department of Water Resources, in consultation with the Delta Stewardship Council, the State Water Resources Control Board, and others, should develop and approve, by December 31, 2014, guidelines for the preparation of a water supply reliability element so that water suppliers can begin implementation of WR R4 by 2015.

WR R6. Update Water Efficiency Goals

The California Department of Water Resources and the State Water Resources Control Board should establish an advisory group with other State agencies and stakeholders to identify and implement measures to reduce impediments to achievement of statewide water conservation, recycled water, and stormwater goals by 2014. This group should evaluate and recommend updated goals for additional water efficiency and water resource development by 2018. Issues such as water distribution system leakage should be addressed. Evaluation should include an assessment of how regions are achieving their proportional share of these goals.

WR R7. Revise State Grant and Loan Priorities

The California Department of Water Resources, the State Water Resources Control Board, the California Department of Public Health, and other agencies, in consultation with the Delta Stewardship Council, should revise State grant and loan ranking criteria by December 31, 2013, to be consistent with Water Code section 85021 and to provide a priority for water suppliers that includes an expanded water supply reliability element in their adopted urban water management plans, agricultural water management plans, and/or integrated regional water management plans.

WR R8. Demonstrate State Leadership

All State agencies should take a leadership role in designing new and retrofitted State-owned and -leased facilities, including buildings and California Department of Transportation facilities, to increase water efficiency, use recycled water, and incorporate stormwater runoff capture and low-impact development strategies.

Improve Groundwater Management

Groundwater is the source, on average, of 20 percent of California's urban and agricultural water supplies. The state's most significant groundwater use occurs in regions that also rely upon water from the Delta watershed. In many of these groundwater basins, more water is pumped than is recharged, and groundwater levels are declining over the long term. The ***California Water Plan Update 2009*** estimates that the state, on average, overdrafts its groundwater basins by about 1 to 2 MAF per year and that the level of unsustainable groundwater pumping is increasing.

Problem Statement

The continued existence of major California groundwater basins in a chronic condition of overdraft combined with key regions of the state that depend on water from the Delta watershed and have poor groundwater practices, including unsustainable groundwater pumping, water quality contamination, irreversible loss of groundwater storage, and no groundwater plan for addressing these problems, is a major impediment to the achievement of the coequal goals.

Policies

No policies with regulatory effect are included in this section.

Recommendations

WR R9. Update Bulletin 118, California's Groundwater Plan

The California Department of Water Resources, in consultation with the Bureau of Reclamation, U.S. Geological Survey, the State Water Resources Control Board, and other agencies and stakeholders, should update Bulletin 118 information using field data, California Statewide Groundwater Elevation Monitoring (CASGEM), groundwater agency reports, satellite imagery, and other best available science by December 31, 2014, so that this information can be included in the next California Water Plan Update and be available for inclusion in 2015 urban water management plans and agricultural water management plans. The Bulletin 118 update should include a systematic evaluation of major groundwater basins to determine sustainable yield and overdraft status; a projection of California's groundwater resources in 20 years if current groundwater management trends remain unchanged; anticipated impacts of climate change on surface water and groundwater resources; and recommendations for State, federal, and local actions to improve groundwater management. In addition, the Bulletin 118 update should identify groundwater basins that are in a critical condition of overdraft.

WR R10. Implement Groundwater Management Plans in Areas that Receive Water from the Delta Watershed

Water suppliers that receive water from the Delta watershed and that obtain a significant percentage of their long-term average water supplies from groundwater sources should develop and implement sustainable groundwater management plans that are consistent with both the required and recommended components of local groundwater management plans identified by the California Department of Water Resources Bulletin 118 (Update 2003) by December 31, 2014.

WR R11. Recover and Manage Critically Overdrafted Groundwater Basins

Local and regional agencies in groundwater basins that have been identified by the California Department of Water Resources as being in a critical condition of overdraft should develop and implement a sustainable groundwater management plan, consistent with both the required and recommended components of local groundwater management plans identified by the California Department of Water Resources Bulletin 118 (Update 2003), by December 31, 2014. If local or regional agencies fail to develop and implement these plans, the State Water Resources Control Board should take action to determine if the continued overuse of a groundwater basin constitutes a violation of the State's Constitution Article X, Section 2, prohibition on unreasonable use of water and whether a groundwater adjudication is necessary to prevent the destruction of or irreparable injury to the quality of the groundwater, consistent with Water Code sections 2100 and 2101.

Improve Conveyance and Expand Storage

The greatest conflicts between the water needs of people and fish within the Delta occur during dry years. That is when the least amount of water is flowing into the Delta and, historically, when exports have been a much larger percentage of Delta inflows compared with wet years. The timing and pattern of Delta diversions must be shifted so that more water can be exported during wet years, when there is significantly more water available for diversion, and less is taken in dry years, when the water is needed for in-Delta water quality and ecosystem protections.

The ability to export larger amounts of water from the Delta during wet years will require improved conveyance to increase operational flexibility as well as more storage both north and south of the Delta so that this water can be captured, stored, and ultimately delivered to meet the water needs of both people and fish. With these improvements, Delta operations and, importantly, Delta export deliveries will become more predictable.

As an interim step toward increasing California's water supply reliability, the State should identify, prioritize, and implement smaller and more incremental operational, conveyance, and storage improvements (such as expanding existing facilities or constructing new ones) that can be accomplished quickly, preferably within the next 5 to 10 years.

Problem Statement

The state's interconnected network of surface and groundwater storage is insufficient in volume, conveyance capacity, and flexibility to achieve the coequal goals. The completion of the BDCP and the implementation of major new surface and groundwater storage facilities are needed but may take many years to implement, which will require more near-term actions to improve Delta operations and reduce the state's vulnerability to potential disruptions in water exports from the Delta due to floods and earthquakes or the need for additional regulatory protections for the environment.

Policies

No policies with regulatory effect are included in this section. See Appendix A, The Delta Stewardship Council's Role Regarding Conveyance.

Recommendations

WR R12. Complete Bay Delta Conservation Plan

The relevant federal, State, and local agencies should complete the Bay Delta Conservation Plan, consistent with the provisions of the Delta Reform Act, and receive required incidental take permits by December 31, 2014.

WR R13. Complete Surface Water Storage Studies

The California Department of Water Resources should complete surface water storage investigations of proposed off-stream surface storage projects by December 31, 2012, including an evaluation of potential additional benefits of integrating operations of new storage with proposed Delta conveyance improvements, and recommend the critical projects that need to be implemented to expand the state's surface storage.

WR R14. Identify Near-term Opportunities for Storage, Use, and Water Transfer Projects

The California Department of Water Resources, in coordination with the California Water Commission, Bureau of Reclamation, State Water Resources Control Board, California Department of Public Health, the Delta Stewardship Council, and other agencies and stakeholders, should conduct a survey to identify projects throughout California that could be implemented within the next 5 to 10 years to expand existing surface and groundwater storage facilities, create new storage, improve operation of existing Delta conveyance facilities, and enhance opportunities for conjunctive use programs and water transfers in furtherance of the coequal goals. The California Water Commission should hold hearings and provide recommendations to the California Department of Water Resources on priority projects and funding.

WR R15. Improve Water Transfer Procedures

The California Department of Water Resources and the State Water Resources Control Board should work with stakeholders to identify and recommend measures to reduce procedural and administrative impediments to water transfers and protect water rights and environmental resources by December 31, 2016. These recommendations should include measures to address potential issues with recurring transfers of up to 1 year in duration and improved public notification for proposed water transfers.

Improved Water Management Information

One of the greatest challenges to improved management of California's water supplies is the lack of consistent, comprehensive, and accurate estimates of actual water use in the state, both by sector of use (agricultural, urban, and environmental) and by regions within the state. The sheer number of water management agencies in California is a key logistical factor. Current data reported to various State agencies is a combination of measured uses and estimated uses, with limited verification of actual water use. This means that California does not have a clear understanding of its water demands, the amount of water available to meet those demands, how water is being managed, and how that management can be improved to achieve the coequal goals.

Problem Statement

Accurate, timely, consistent, and transparent information on the management of California water supplies and beneficial uses is an important tool used in the achievement of the coequal goals. The State needs sufficient information to assess the current reliability of its water supplies or to meaningfully measure progress toward achievement of more reliable water supplies for California.

Policies

The appendices referred to in the policy language below are included in Appendix B of the Delta Plan.

WR P2. Transparency in Water Contracting

(a) The contracting process for water from the State Water Project and/or the Central Valley Project must be done in a publicly transparent manner consistent with applicable policies of the California Department of Water Resources and the Bureau of Reclamation referenced below.

(b) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers the following:

  (1) With regard to water from the State Water Project, a proposed action to enter into or amend a water supply

or water transfer contract subject to California Department of Water Resources Guidelines 03-09 and/or 03-10 (each dated July 3, 2003), which are attached as Appendix 2A; and

(2) With regard to water from the Central Valley Project, a proposed action to enter into or amend a water supply or water transfer contract subject to section 226 of P.L. 97-293, as amended or section 3405(a)(2)(B) of the Central Valley Project Improvement Act, Title XXXIV of Public Law 102-575, as amended, which are attached as Appendix 2B, and Rules and Regulations promulgated by the Secretary of the Interior to implement these laws.

23 CCR Section 5004
NOTE: Authority cited: Section 85210(i), Water Code.
Reference: Sections 85020, 85021, 85300, and 85302, Water Code.

Recommendations

WR R16. Supplemental Water Use Reporting

The State Water Resources Control Board should require water rights holders submitting supplemental statements of water diversion and use or progress reports under their permits or licenses to report on the development and implementation of all water efficiency and water supply projects and on their net (consumptive) use.

WR R17. Integrated Statewide System for Water Use Reporting

The California Department of Water Resources, in coordination with the State Water Resources Control Board, California Department of Public Health, California Public Utilities Commission, California Energy Commission, Bureau of Reclamation, California Urban Water Conservation Council, and other stakeholders, should develop a coordinated statewide system for water use reporting. This system should incorporate recommendations for inclusion of data needed to better manage California's water resources. The system should be designed to simplify reporting; reduce the number of required reports where possible; be made available to the public online; and be integrated with the reporting requirements for the urban water management plans, agricultural water management plans, and integrated regional water management plans. Water suppliers that export water from, transfer water through, or use water in the Delta watershed should be full participants in the database.

WR R18. California Water Plan

The California Department of Water Resources, in consultation with the State Water Resources Control Board and other agencies and stakeholders, should evaluate and include in the next and all future California Water Plan updates information needed to track water supply reliability performance measures identified in the Delta Plan, including an assessment of water efficiency and new water supply development, regional water balances, improvements in regional self-reliance, reduced regional reliance on the Delta, and reliability of Delta exports, and an overall assessment of progress in achieving the coequal goals.

WR R19. Financial Needs Assessment

As part of the California Water Plan Update, the California Department of Water Resources should prepare an assessment of the state's water infrastructure. This should include the costs of rehabilitating/replacing existing infrastructure, an assessment of the costs of new infrastructure, and an assessment of needed resources for monitoring and adaptive management for these projects. The California Department of Water Resources should also consider a survey of agencies that may be planning small-scale projects (such as storage or conveyance) that improve water supply reliability.

Timeline for Implementing Policies and Recommendations

Figure 3-11 lays out a timeline for implementing the policies and recommendations described in the previous section. The timeline emphasizes near-term and intermediate-term actions.

Timeline for Implementing Policies and Recommendations

TIMELINE CHAPTER 3: Reliable Water Supply

	ACTION (REFERENCE #)	LEAD AGENCY(IES)	NEAR TERM 2012–2017	INTERMEDIATE TERM 2017–2025
POLICIES	Reduce reliance on the Delta through improved regional water self-reliance (WR P1)	Water suppliers	●	●
	Transparency in water contracting (WR P2)		●	●
RECOMMENDATIONS	Implement water efficiency and water management planning laws (WR R1)	Water suppliers	●	●
	Require State Water Project contractors to implement water efficiency and water management laws (WR R2)	DWR	●	●
	Compliance with reasonable and beneficial use (WR R3)	SWRCB	●	●
	Expanded water supply reliability element (WR R4)	Water suppliers receiving Delta water	●	
	Develop water supply reliability element guidelines (WR R5)	DWR	●	
	Update water efficiency goals (WR R6)	DWR and SWRCB	●	●
	Revise State grant and loan priorities (WR R7)	DWR, SWRCB, and DPH	●	
	Demonstrate State leadership (WR R8)	State agencies	●	●
	Update Bulletin 118, California's Groundwater Plan (WR R9)	DWR	●	●
	Implement groundwater management plans in areas that receive water from the Delta watershed (WR R10)	Water suppliers receiving Delta water and uses groundwater	●	
	Recover and manage critically overdrafted groundwater basins (WR R11)	Local and regional agencies	●	●
	Complete Bay Delta Conservation Plan (WR R12)	Federal, State, and local agencies	●	●
	Complete surface water storage studies (WR R13)	DWR	●	
	Identify near-term opportunities for storage, use, and water transfer projects (WR R14)	DWR	●	
	Improve water transfer procedures (WR R15)	DWR	●	
	Supplemental water use reporting (WR R16)	SWRCB	●	
	Integrated statewide system for water use reporting (WR R17)	DWR	●	●
	California Water Plan (WR R18)	DWR	●	
	Financial needs assessment (WR R19)	DWR	●	●

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Agency Key:

Council: Delta Stewardship Council
DPH: California Department of Public Health
DWR: California Department of Water Resources
RWQCB: Regional Water Quality Control Board(s)
SWRCB: State Water Resources Control Board
Water suppliers: refers to both urban and agricultural water suppliers

Figure 3-11

Science and Information Needs

An improved understanding of the state's hydrologic systems, patterns of water use, and effects of climate change, especially within the Delta watershed and areas that receive water from the Delta, is essential to improving the management of California's water supplies to achieve the coequal goals. Key areas of needed research include:

- Improved projections for and measurement of surface water flows (amounts, timing, quality) and how they may be impacted by environmental regulations, changing land uses, and climate change
- Improved water supply and demand forecasting models that incorporate vulnerability to extreme events (droughts, floods, earthquakes) and account for the impacts of climate change
- Improved methods for downscaling climate change models (including dynamic downscaling) and improved models for water scenario planning that incorporates these data
- Improved information on effective watershed management actions to restore and enhance capacity of rural and urban landscapes to process stormwater for water quality and water supply benefits
- Improved models for assessing the interaction between water management scenarios in the Delta and ecosystem function, including implications of revised instream flow requirements on inflows to the Delta and revised wet year/dry year export scenarios
- Improved information on changing water use patterns in response to urban and agricultural water efficiency measures, including water pricing, and implications for future water demands
- Improved characterization of groundwater basins and subbasins, and improved estimates of groundwater supplies (amounts, quality)
- Improved models of aquifer and surface-groundwater relationships, which include the effects of climate change on evaporation, runoff, groundwater recharge, subsurface interactions, and the implications of these effects for safe yield and implementation of conjunctive use and water transfer programs

Issues for Future Evaluation and Coordination

Additional areas of interest and concern related to water supply and the Delta may deserve consideration in the development of future Delta Plan updates, including:

- **Delta water delivery predictability.** A Delta Delivery Predictability Index should be developed that depicts, by hydrologic year types, the estimated streamflows entering the Delta and suggested levels of water exports that would be consistent with in-Delta and ecosystem protections. As part of the index, a system for tracking the use of stored Delta water also should be developed. The index will lead to a better understanding of how water exported and stored during wet years would be available to urban and agricultural users during dry years to offset reduced exports. This information is key to better understanding how investments in new storage and improved conveyance contribute to improved reliability of California's water supplies.
- **Performance measures for reduced reliance on the Delta.** The Delta Plan identifies two core measures for assessing progress in reducing reliance on the Delta: (1) a significant reduction in the amount of water used from the Delta watershed, or (2) a significant reduction in the percentage of water used from the Delta watershed. The Council will collaborate with DWR, SWRCB, and stakeholders to develop a standardized method or methods by which progress to reduce reliance on the Delta and improve regional self-reliance should be reported (1) in the urban and agricultural water management plans; (2) in IRWMPs; and (3) in the California Water Plan. Potential additional measures should be identified and evaluated that will benefit the amount of water, quality of water, and timing of flows in and

through the Delta, and contribute to reduced reliance on the Delta and improving regional self-reliance consistent with Water Code section 85021.

- **Evaluation of urban and agricultural water management plans.** The Council will work with DWR and the State Legislature to identify resources and secure authority, if necessary, to conduct further evaluation of water management information contained in urban and agricultural water management plans. The goal of these actions is to improve knowledge about water management in California and, specifically, to facilitate the aggregation and evaluation of water management data over time to gauge success toward reducing reliance on the Delta, increasing regional self-reliance, and achieving the coequal goals.
- **Integrated water resource management.** The value of integrated regional water management planning is widely recognized, but information on how to implement effective integrated water management projects is not well understood. The number of conjunctive management programs that combine green urban design, flood control, stormwater infiltration, water conservation, recycled water, and groundwater elements are increasing. Information about the successful integration of water management infrastructure needs to be shared and consideration given as to how to effectively promote implementation of these integrated strategies.
- **Agricultural and urban water efficiency.** Improved demand management through urban and agricultural water conservation and efficiency is the fastest and least expensive strategy for making more water available to the Delta through inflows and reducing the pressure to export more water from the Delta. Additional best management practices should be identified and promoted, including evaluation of new water conservation-based rate structures and how they contribute to water savings while maintaining more stable revenue for water suppliers.
- **Delta Watermaster.** The Delta Watermaster is in the process of completing an assessment of potential illegal water diversions within the Delta. This assessment should be expanded to evaluate illegal water diversions throughout the Delta watershed.
- **Reoperation of upstream reservoirs.** DWR is working with USACE and other agencies to develop a coordinated proposal for the reoperation of reservoirs above the Delta to address the impacts of climate change on flood protection and water supply operations. This proposal should include consideration of improved watershed management actions that will also help attenuate flood flows as well as improve ecosystem functions and water supply availability.

Performance Measures

Development of informative and meaningful performance measures is a challenging task that will continue after adoption of the Delta Plan. Performance measures need to be designed to capture important trends and to address whether specific actions are producing expected results. Efforts to develop and track performance measures in complex and large-scale systems like the Delta are commonly multiple-year endeavors. The recommended output and outcome performance measures listed below are provided as examples and subject to refinement as time and resources allow. Final administrative performance measures are listed in Appendix E and will be tracked as soon as the Delta Plan is completed.

Output Performance Measures

- Water suppliers that receive water from the Delta watershed have documented the expected outcome for a measureable reduction in reliance on the Delta and improvement in regional self-reliance. (WR R1, WR R4)
- Progress made in achieving existing water conservation and water supply performance goals, and setting expanded future goals for local, regional, and statewide

water conservation, water use efficiency, and water supply development. (WR R6)

- Information in updated Bulletin 118 is included in the next (2013) California Water Plan Update and in the 2015 urban water management plans and agricultural water management plans. (WR R9)

Outcome Performance Measures

- Progress toward increasing local and regional water supplies, measured by the amount of additional supplies made available (reported in 5-year increments from 2000). (WR P1)
- Progress toward meeting California's conservation goal of achieving a 10 percent reduction in statewide urban per capita water usage by 2015 and a 20 percent reduction by 2020. (WR R1)
- Progress toward improved reliability of Delta water exports and reductions in the vulnerability of Delta exports to disruption. (WR R12, ER P1, RR P1)
- Progress toward increasing the predictability of water deliveries from the Delta in a variety of water year types. (WR R12, WR R14)
- Progress toward achieving California's goal for the increased use of stormwater runoff of at least 500,000 acre-feet per year by 2020 and by at least 1 MAF per year by 2030. (WR R6)

References

ACWA (Association of California Water Agencies). 2011. *Sustainability from the Ground Up, Groundwater Management in California – A Framework*. Sacramento, CA.

AGWA (Association of Groundwater Agencies). 2000. *Groundwater and Surface Water in Southern California: A Guide to Conjunctive Use*. Sacramento, CA.

BDCP (Bay Delta Conservation Plan). 2012a. 2011 Accomplishments. February 2012.

BDCP (Bay Delta Conservation Plan). 2012b. Draft BDCP Chapter 1. February 2012.

BDCP (Bay Delta Conservation Plan). 2012c. *State and Federal Principals Joint Recommendations Regarding Key Elements of the Bay Delta Conservation Plan*. July 16.

California Data Exchange Center. 2011. WSIHIST. Department of Water Resources. Site accessed July 2011. http://cdec.water.ca.gov/cgi-progs/iodir/wsihist.

California Environmental Protection Agency. 2006. Climate Action Team Report to Governor Schwarzenegger and the Legislature. March.

California Natural Resources Agency. 2008. *Managing an Uncertain Future: Climate Change Adaptation Strategies for California's Water*. Sacramento, CA.

California Natural Resources Agency. 2010. *Bay Delta Conservation Plan: Highlights of the BDCP*. Sacramento, CA.

CARB (California Air Resources Board). 2008. *Climate Change Scoping Plan*, Appendices Volume I. 2008. Pursuant to AB 32 The California Global Warming Solutions Act of 2006.

Carlisle, D. M., D. M. Wolock, and M. R. Meador. 2010. "Alteration of streamflow magnitudes and potential ecological consequences: a multiregional assessment." *Frontiers in Ecology and the Environment* 9(5):264-270.

City of Santa Monica. 2012. Sustainable Water Master Plan. http://www01.smgov.net/cityclerk/council/agendas/2011/20110308/s2011030804-A.htm.

Contra Costa Water District. 2011. East Contra Costa County Prop 84 Round 1 Implementation Grant Application.

Dettinger, M. D., F. M. Ralph, T. Das, P. J. Neiman, and D. R. Cayan. 2011. Atmospheric rivers, floods, and the water resources of California. *Water* 3(2):445-478.

DWR (California Department of Water Resources). 2003a. *California's Groundwater*. Bulletin 118, Update 2003. Sacramento, CA.

DWR (California Department of Water Resources). 2003b. Policy 03-10, Principles Regarding Public Participation Process in SWP Contract Negotiations. Sacramento, CA.

DWR (California Department of Water Resources). 2005. *California Water Plan Update 2005*. Sacramento, CA.

DWR (California Department of Water Resources). 2006. Summary of the Status of 2005 Urban Water Management Plans. Prepared by Dave Todd, Chief, Technical Assistance and Outreach Branch. Submitted to the Legislature pursuant to Section 10644(b) of the California Water Code. December 31.

DWR (California Department of Water Resources). 2007a. Status and Trends of Delta-Suisun Services. May.

DWR (California Department of Water Resources). 2008. *Management of the California State Water Project*, Bulletin 132-07. Page xxvii, 150.

DWR (California Department of Water Resources). 2009. *California Water Plan Update 2009*. Sacramento, CA. http://www.waterplan.water.ca.gov/cwpu2009/index.cfm.

DWR (California Department of Water Resources). 2010a. *CALFED Surface Storage Investigations Progress Report*. Sacramento, CA.

DWR (California Department of Water Resources). 2010b. *The State Water Project Delivery Reliability Report, 2009*. Sacramento, CA.

DWR (California Department of Water Resources). 2010c. Proposition 84 and Proposition 1E, Integrated Regional Water Management (IRWM) Grant Program Guidelines for IRWM Implementation and Planning Grants, and Addendum to the IRWM Implementation Grant Round 1. Division of Integrated Regional Water Management. August.

DWR (California Department of Water Resources). 2010d. *Climate Change Characterization and Analysis in California Water Resources Planning Studies*, Final Report. December.

DWR (California Department of Water Resources), SWRCB (State Water Resources Control Board), California Bay-Delta Authority, California Energy Commission, California Department of Public Health, California Public Utilities Commission, and California Air Resources Board. 2010. *20 X 2020 Water Conservation Plan*. With assistance from California Urban Water Conservation Council and Bureau of Reclamation. February.

DWR (California Department of Water Resources). 2011a. Division of Safety of Dams. Site accessed July 2011. http://www.water.ca.gov/damsafety/damlisting/index.cfm.

DWR (California Department of Water Resources). 2011b. Comments on the Fourth Staff Draft Delta Plan dated June 13, 2011. Dale Hoffman-Floerke, DWR, to Joe Grindstaff, Delta Stewardship Council. June 24.

DWR (California Department of Water Resources). 2011c. *The State Water Project Draft Delivery Reliability Report*.

DWR (California Department of Water Resources). 2012a. Dayflow data. Site accessed 2012. http://www.water.ca.gov/dayflow.

DWR (California Department of Water Resources). 2012b. A Summary of 2010 Legislative Report on the Status of the 2010 Urban Water Management Plans. April.

Famiglietti, J. S., M. Lo, S. L. Lo, J. Bethune, K. J. Anderson, T. H. Syed, S. C. Swenson, C. R. de Linage, and M. Rodell. 2011. Satellites measure recent rates of groundwater depletion in California's Central Valley. *Geophysical Research Letters* Vol. 38, L03403.

Faunt, C. C., editor. 2009. *Groundwater Availability of the Central Valley Aquifer, California*. U.S. Geological Survey Professional Paper 1766.

Grimaldo, L. F., T. Sommer, N. V. Ark, G. Jones, E. Holland, P. B. Moyle, B. Herbold, and P. Smith. 2009. Factors affecting fish entrainment into massive water diversions in a tidal freshwater estuary: can fish losses be managed? *North American Journal of Fisheries Management* 29:1253-1270.

Hanak, E., J. Lund, A. Dinar, B. Gray, R. Howitt, J. Mount, P. Moyle, and B. Thompson. 2011. *Managing California's Water: From Conflict to Reconciliation*. San Francisco, CA. Public Policy Institute of California.

Knowles, N. and D. Cayan. 2004. Elevational dependence of projected hydrologic changes in the San Francisco estuary and watershed. *Climatic Change* 62:319-336.

Knowles, N., Dettinger, M., and Cayan, D. 2006. Trends in snowfall versus rainfall for the Western United States. *Journal of Climate* 19(18):4545-4559.

LADWP (Los Angeles Department of Water and Power) 2012. "LADWP Reminds Customers to Conserve Water: Reduced Snowpack and Increased Water Use Call for Increased Conservation." May 8.

LAEDC (Los Angeles Economic Development Corporation). 2008. *Where Will We Get the Water? Assessing Southern California's Future Water Strategies*.

LAO (California Legislative Analyst's Office). 2008. *California's Water: An LAO Primer*. October 22.

LAO (California Legislative Analyst's Office). 2009. *Resources and Environmental Protection*. 2009 – 10 Budget Analysis Series. February 3.

LAO (California Legislative Analyst's Office). 2011. Cal Facts. http://www.lao.ca.gov/reports/2011/calfacts/calfacts_010511.aspx

Littleworth, Arthur, and E. L. Garner. 2007. *California Water II*. (2nd edition). Solano Press Books.

MMWD (Marin Municipal Water District). 2010. http://www.marinwater.org/documents/2010_uwmp_mmwd.

Nelson, Rebecca. 2011. *Uncommon Innovation: Developments in Groundwater Management Planning in California*. The Woods Institute for the Environment/The Bill Lane Center for the American West. Palo Alto, CA.

NRC (National Research Council of the National Academies). 2012. *Sustainable Water and Environmental Management in the California Bay-Delta*. Washington D.C. http://www.nap.edu/catalog.php?record_id=13394.

Null, S. E., J. H. Viers, J. F. Mount. 2010. Hydrologic response and watershed sensitivity to climate warming in California's Sierra Nevada. *PLoS ONE* 5(4).10.1371/journal.pone.0009932.

OPC (California Ocean Protection Council). 2011. *Resolution of the California Ocean Protection Council on Sea-Level Rise*. March. http://www.opc.ca.gov/webmaster/ftp/pdf/docs/ OPC_SeaLevelRise_Resolution_Adopted031111.pdf.

Reclamation (Bureau of Reclamation). 2011a. SECURE Water Act Section 9503(c). Reclamation Climate Change and Water. Report to Congress. April.

Reclamation (Bureau of Reclamation). 2011b. 3404(c) CVPIA Contract Renewal Process. Site accessed April 21, 2011. http://www.usbr.gov/mp/cvpia/3404c/index.html.

Reclamation (Bureau of Reclamation). 2011c. Summary of water supply allocations. Site accessed 2012. http://www.usbr.gov/mp/cvo/vungvari/water_allocations_historical.pdf.

Regional Water Authority. 2011. *American River Basin IRWM Implementation Program*. January.

RMC Water and Environment. 2011. *2010 Urban Water Management Plan*. Prepared for West Basin Municipal Water District. May.

Robie, Ronald B. 2012. Effective implementation of the Public Trust Doctrine in California water resources decision-making: A view from the bench. 45 U.C. Davis L. Rev. 1155, 1176.

San Francisco Public Utilities Commission. 2011. *2010 Urban Water Management Plan for the City and County of San Francisco*. June.

Semitropic Water Storage District. 2011. *Poso Creek IRWMP Implementation Grant Proposal*. January.

SWRCB (State Water Resources Control Board). 2008. State Water Resources Control Board and Regional Water Quality Control Board (Water Boards) Response to Second Round of Delta Vision Questions. Letter to Delta Vision Task Force, June 12, 2008.

SWRCB (State Water Resources Control Board). 2009. Legislative Report. Coordinated Water Measurement Data Base: Developed Pursuant to the Requirements of Chapter 675, Statutes of 2007. May 2009.

SWRCB (State Water Resources Control Board). 2010. Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem. August 3. http://www.waterboards.ca.gov/waterrights/ water_issues/programs/bay_delta/deltaflow/docs/final_rpt080310.pdf.

SWRCB (State Water Resources Control Board). 2011. Email from Tom Howard to Joe Grindstaff, responding to request for information pertaining to the allocation of water in California and the Delta watershed, prepared by SWRCB staff. August 9.

USEPA and DWR (U.S. Environmental Protection Agency, Region 9, and California Department of Water Resources). 2011. *Climate Change Handbook for Regional Water Planning*. In partnership with U.S. Army Corps of Engineers South Pacific Division, Resources Legacy Fund and U.S. EPA Office of Research and Development. November 2011.

USGS (U.S. Geological Survey). 2010. *Water Data Report 2010*.

WBMWD (West Basin Municipal Water District). 2010. Urban Water Management Plan. http://www.westbasin.org/files/uwmp

Western Regional Climate Center. 2011a. California climate tracker database query. Statewide annual precipitation by water year from 1896-2010. Site accessed July 2011. http://www.wrcc.dri.edu/monitor/cal-mon/ frames_version.html.

Western Regional Climate Center. 2011b. Climate of California. National Oceanic and Atmospheric Administration Narrative Summaries, Tables, and Maps for Each State with Overview of State Climatologist Programs, 3rd ed., Vol. 1. Site accessed July 2011. http://www.wrcc.dri.edu/narratives/CALIFORNIA.htm.

Willis, A. D., J. R. Lund, E. S. Townsley, and B. A. Faber. 2011. Climate change and flood operations in the Sacramento Basin, California. *San Francisco Estuary and Watershed Science* 9(2).

Zone 7. 2010. Zone 7 Water Agency. 2010 Urban Water Management Plan. December 15, 2010.

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CHAPTER 4

Protect, Restore, and Enhance the Delta Ecosystem

ABOUT THIS CHAPTER

This chapter describes the Sacramento-San Joaquin Delta (Delta) ecosystem and the factors that affect and too often degrade it. It proposes policies and recommendations for restoring the Delta ecosystem organized into five core strategies to achieve the coequal goals of the Delta Reform Act:

- Create more natural functional flows
- Restore habitat
- Improve water quality to protect the ecosystem
- Prevent introduction of and manage nonnative species impacts
- Improve hatcheries and harvest management

These core strategies form the basis of the five policies and nine recommendations found at the end of the chapter.

RELEVANT LEGISLATION

The coequal goals for the Delta (Water Code section 85054) are relevant to ecosystem restoration:

> *"Coequal goals" means the two goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem. The coequal goals shall be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place.*

Eight objectives in Water Code section 85020 are inherent in the coequal goals. Section 85020(a), (c), and (e) are relevant to this chapter:

> *85020 The policy of the State of California is to achieve the following objectives that the Legislature declares are inherent in the coequal goals for management of the Delta:*
>
> > *(a) Manage the Delta's water and environmental resources and the water resources of the state over the long term.*
> >
> > *(c) Restore the Delta ecosystem, including its fisheries and wildlife, as the heart of a healthy estuary and wetland ecosystem.*
> >
> > *(e) Improve water quality to protect human health and the environment consistent with achieving water quality objectives in the Delta.*

The coequal goals and inherent objectives seek broad protection of the Delta. Achievement of these broad goals and objectives requires implementation of specific strategies. Water Code sections 85022 and 85302 provide direction on the implementation of specific measures to promote the coequal goals and inherent objectives related to the Delta ecosystem restoration.

> *85022(d)(5) Develop new or improved aquatic and terrestrial habitat and protect existing habitats to advance the goal of restoring and enhancing the Delta ecosystem.*
>
> > *(6) Improve water quality to protect human health and the environment consistent with achieving water quality objectives in the Delta.*

85302(c) The Delta Plan shall include measures that promote all of the following characteristics of a healthy Delta ecosystem.

> *(1) Viable populations of native resident and migratory species.*
>
> *(2) Functional corridors for migratory species.*
>
> *(3) Diverse and biologically appropriate habitats and ecosystem processes.*
>
> *(4) Reduced threats and stresses on the Delta ecosystem.*
>
> *(5) Conditions conducive to meeting or exceeding the goals in existing species recovery plans and state and federal goals with respect to doubling salmon populations.*

85302(d) The Delta Plan shall include measures to promote a more reliable water supply that address all of the following:

> *(1) Meeting the needs for reasonable and beneficial uses of water.*
>
> *(3) Improving water quality to protect human health and the environment.*

85302(e) The following subgoals and strategies for restoring a healthy ecosystem shall be included in the Delta Plan.

> *(1) Restore large areas of interconnected habitats within the Delta and its watershed by 2100.*
>
> *(2) Establish migratory corridors for fish, birds, and other animals along selected Delta river channels.*
>
> *(3) Promote self-sustaining, diverse populations of native and valued species by reducing the risk of take and harm from invasive species.*
>
> *(4) Restore Delta flows and channels to support a healthy estuary and other ecosystems.*
>
> *(5) Improve water quality to meet drinking water, agriculture, and ecosystem long-term goals.*
>
> *(6) Restore habitat necessary to avoid a net loss of migratory bird habitat and, where feasible, increase migratory bird habitat to promote viable populations of migratory birds.*

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CHAPTER 4

Protect, Restore, and Enhance the Delta Ecosystem

In the Delta Reform Act, the goal of protecting, restoring, and enhancing the Delta ecosystem is coequal to the goal of providing a more reliable water supply for California. Both must be accomplished while protecting and enhancing the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place.

Some past land and water uses have put these goals in conflict. For example, reliable water supplies have been associated with artificially stabilized flows and a complex human-made system of infrastructure that includes dams, levees, and channelized rivers and sloughs. Yet healthy rivers and estuaries, and the native species that live in them depend on naturally variable water flows and a dynamic landscape. Many native species also depend on wetlands that have been drained for farming and other human uses.

Despite these conflicts, the Delta Stewardship Council (Council) must work to achieve the goal of protecting, restoring, and enhancing the Delta ecosystem. Inherent in that goal is the objective to "restore the Delta ecosystem, including its fisheries and wildlife, as the heart of a healthy estuary and wetland ecosystem" (Water Code section 85020(c)). (See sidebar, What Does It Mean to Achieve the Goal of Protecting, Restoring, and Enhancing the Delta Ecosystem?)

The Council envisions a future in which the Delta ecosystem has the following characteristics:

- Native species, including algae and other plants, invertebrates, fish, birds, and other wildlife, are self-sustaining and persistent.
- The tidal channels and bays in the Delta and Suisun Marsh connect with freshwater creeks, upland grasslands, and woodlands.
- The Sacramento and San Joaquin rivers and other Delta tributaries include reaches where streams are free to meander and connect seasonally to functional floodplains.
- Habitats for resident and rearing migratory fish, birds, and upland wildlife are connected by migratory corridors, including areas with high-quality cover and feeding opportunities.
- More natural variations in water flows and conditions make aquatic habitats, tidal marshes, and floodplains more dynamic, encourage survival of native species, and resist invasions by weeds and animal pests.
- The ecosystem is resilient enough to absorb and adapt to current and future effects of multiple stressors without significant declines in ecosystem services.
- The Delta will provide more reliable water supplies, in part because survival of its wildlife, fish, and plants do not require extraordinary regulatory protection.
- Californians recognize and celebrate the Delta's unique natural resource values through wildlife observation, angling, waterfowl hunting, and other outdoor recreation.

This future Delta will differ from the Delta that greeted the first Californians and will probably be different from the current ecosystem. Not every species or natural area now found in the Delta may persist through the changes ahead, including climate change, but Californians' use and management of the Delta will be directed and coordinated to sustain conditions that make species' survival more likely while maintaining the many other benefits provided by the Delta ecosystem.

WHAT DOES IT MEAN TO ACHIEVE THE GOAL OF PROTECTING, RESTORING, AND ENHANCING THE DELTA ECOSYSTEM?

Achieving the coequal goal of ecosystem protection, restoration, and enhancement means successfully establishing a resilient, functioning estuary and surrounding terrestrial landscape capable of supporting viable populations of native resident and migratory species with diverse and biologically appropriate habitats, functional corridors, and ecosystem processes.

For this purpose, the term "restoration" is defined in Water Code section 85066 as follows:

> *"the application of ecological principles to restore a degraded or fragmented ecosystem and return it to a condition in which its biological and structural components achieve a close approximation of its natural potential, taking into consideration the physical changes that have occurred in the past and the future impact of climate change and sea level rise."*

Restoration actions may include restoring interconnected habitats within the Delta and its watershed, restoring more natural Delta flows, or improving ecosystem water quality.

"Protection" means preventing harm to the ecosystem, which could include preventing the conversion of existing habitat, the degradation of water quality, irretrievable conversion of lands suitable for restoration, or the spread of invasive nonnative species.

"Enhancement" means improving existing desirable habitat and natural processes. Enhancement might include flooding the Yolo Bypass more often to support native species, or to expand or better connect existing habitat areas. Enhancement includes many fish and wildlife management practices, such as managing wetlands for waterfowl production or shorebird habitat, installing fish screens to reduce entrainment of fish at water diversions, or removing barriers that block migration of fish to upstream spawning habitats.

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A Restored Delta Ecosystem Is Key to a Reliable Water Supply

Delta water supplies can be more reliable only when the Delta ecosystem is restored. The water projects that rely on the Delta were developed without contemporary understanding of the Delta's ecology or anticipation of the value that Californians now place on a healthy environment. As the effects of the projects on the Delta ecosystem became apparent, a series of adjustments in their operation has been put in place. Each adjustment affected the water diversions, altering volume and timing to reduce damage, but without fully mitigating harm to the Delta ecosystem. The perilous condition of salmon, delta smelt, and other species remains a key limit on project operations. Only as these populations recover will water project operations become more flexible and reliable.

To restore the Delta ecosystem, Californians will need to use water management facilities in new ways. Reservoirs will need to hold and release water for ecosystem purposes as well as for water users. Storage and the development of alternative supplies will be needed to help reduce reliance on the Delta and improve regional self-reliance. Multipurpose bypasses and levees will need to provide habitat while also controlling flooding. Channels and water controls will need to be able to deliver water for habitats as well as for farms and cities. Modern water diversions will need to protect fish while providing reliable water supplies. For these reasons, restoring the Delta ecosystem will require new investment in water facilities and alternative supplies, not just regulation of water project operations or restoration of habitats for fish and wildlife. Other actions undertaken to protect the ecosystem can also benefit water users; for example, vigilance in preventing invasive species introduction can avoid future costs to manage mussel infestations in pipelines or other water structures. Tradeoffs may be necessary as we better match demands to the supply available, consistent with ecosystem protection, and match our expectations about the ecosystem to the changing climate.

A restored Delta ecosystem is also important to the Delta's future as an attractive place to live, work, and recreate. Water flows are important not just to water exporters, fish, and aquatic environments, but also to the Delta's municipal, industrial, and agricultural waters users, who will need consideration as system changes are planned and implemented. Restoration actions will require careful design so they are attuned to local needs: locating habitats to minimize conflicts with existing and planned uses; working with farmers by promoting wildlife-friendly farming; providing buffers between wildlife areas and farms; working with landowners regarding how to manage restored wildlife populations on or near their lands; and improving opportunities for outdoor recreation, including boating, angling, and hunting, that are enjoyed by residents and also attract visitors. Integrating habitat improvements when levees are rebuilt or flood channels are improved can draw new sources of funds to strengthen the Delta flood control system. In essence, a systems approach that recognizes tradeoffs and the value of balance will be necessary for California to achieve the coequal goals.

The Delta Ecosystem, Past and Present

In the Delta, the Central Valley's great rivers—the Sacramento from the north and San Joaquin from the south—join the Cosumnes, Mokelumne, and Calaveras here in a vast and complex estuary influenced by tides and river currents (see Figure 4-1).

Before the early 1800s, the rivers flowed through approximately 400,000 acres of tidal wetlands and other aquatic habitats that connected with several hundred thousand acres of nontidal wetlands and riparian forest. Flows of the Delta's rivers and tidal channels varied by season and year-to-year, sometimes pouring from the Sierra in great floods whose fresh waters overflowed wetlands and floodplains, and at other times declining as droughts shriveled rivers and brackish tidewaters pushed inland. To the west, the rivers joined to discharge through marsh-fringed Suisun Bay to the Carquinez Straight, San Francisco Bay, and the Pacific Ocean.

The Delta's historical landscape also varied from north to south (see Figure 4-2). In the north Delta, flood basins occurred where the Sacramento River intertwined with tidal channels. A vast area of freshwater wetlands dominated by tules transitioned into tidal wetlands. Shallow perennial ponds and lakes, broad riparian forests along natural levees, and seasonal wetlands at the upland edge were also common. The central Delta was characterized by large, tidal islands that flooded during spring tides (or more frequently) intersected by networks of branching tidal channels. Channel banks were low and covered by the willows, grasses, sedges, shrubs, and ferns that also grew in island interiors. The south Delta contained a complex network of channels formed predominantly by riverine processes. The floodplain comprised emergent wetlands, perennial and seasonal ponds, willow thickets, and seasonal wetlands. Driftwood and other woody debris filled some channels, likely from riparian forest along the San Joaquin River's natural levees.

Historical records show a rich and complex Delta with habitats supporting diverse and abundant native plants and animals (Grossinger et al. 2010, Whipple et al. 2010, Whipple 2011). Some fish, including smelt, schooled in the open waters of the western Delta's bays and channels, moving east when brackish water intruded from San Francisco Bay. Other resident wildlife and plants also prospered: rails in tidal and tule marshes, giant garter snakes in freshwater wetlands and ponds, and riparian brush rabbits and wood rats in willow thickets and riparian forests. Each fall, salmon and steelhead, drawn by the swelling Sacramento and San Joaquin rivers, migrated inland from the ocean and navigated upstream to spawning areas in their tributaries. As river flows receded, their young, emerging from these tributaries' spawning gravel, would return downstream and shelter in driftwood-lined eddies or undercut riverbanks and feed in Delta sloughs, marshes, and floodplains before returning to the sea. Waterfowl, cranes, and shorebirds migrated through the Delta along a north-south route that stretched from the Arctic to Mexico or beyond. Songbirds followed a similar path through riparian woodlands that connected from the Sacramento Valley through the Delta to the San Joaquin Valley.

To immigrants arriving in the nineteenth century, the Delta and Central Valley appeared a wild and dangerous place that had to be "reclaimed" to support the agricultural way of life they had inherited from their ancestors. The rapid transformation of the historical Delta over 160 years involved many changes. Over 1,000 miles of levees were constructed to drain wetlands and protect islands from damaging floods. Channels were cut between sloughs or through islands to ease navigation and encourage drainage without regard to effects on the estuary. Forests were cut and land leveled for farming (Hanak et al. 2011). This transformation produced the rich agricultural economy and rural culture of the Delta described in Chapter 5. But it came at a cost: loss of the original estuarine ecosystem and its species, and native people.

Comparison of Historical (early 1800s) and Modern Delta Waterways

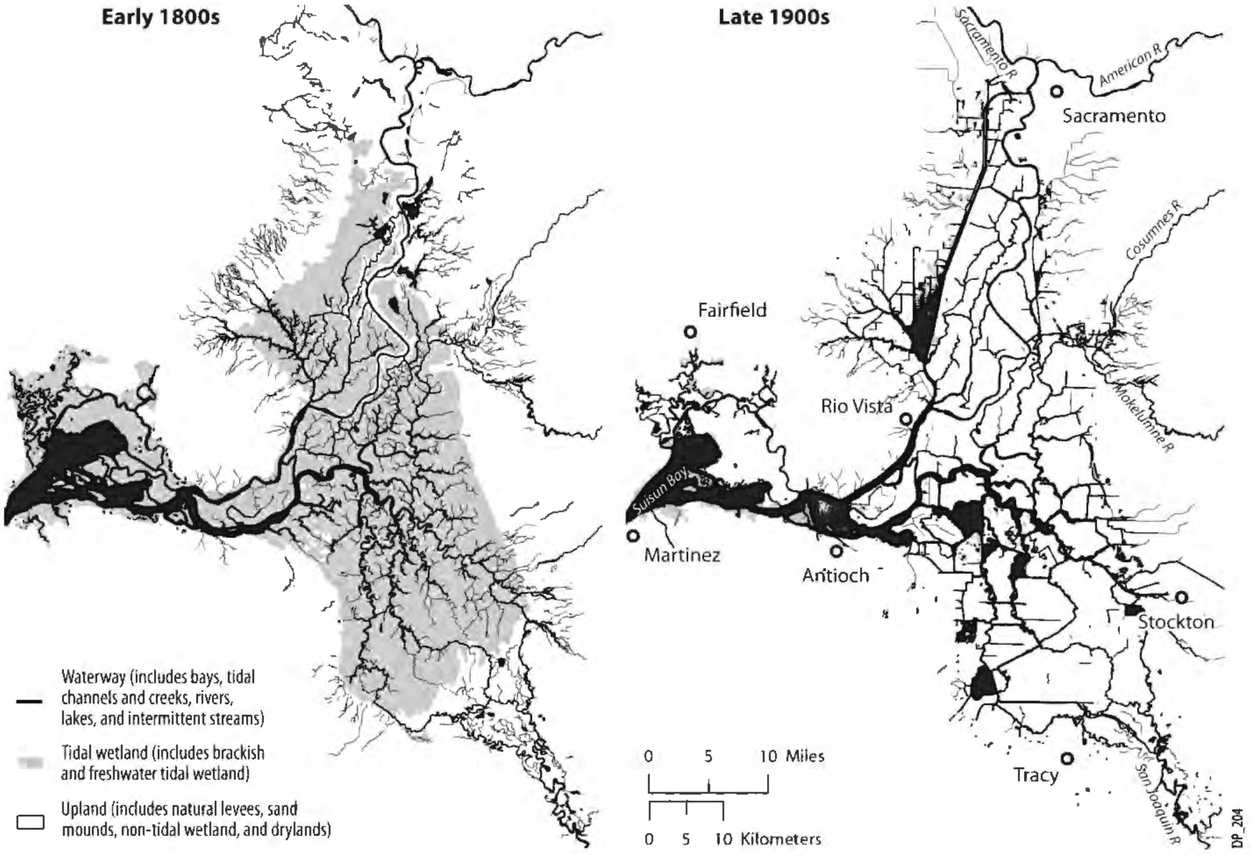
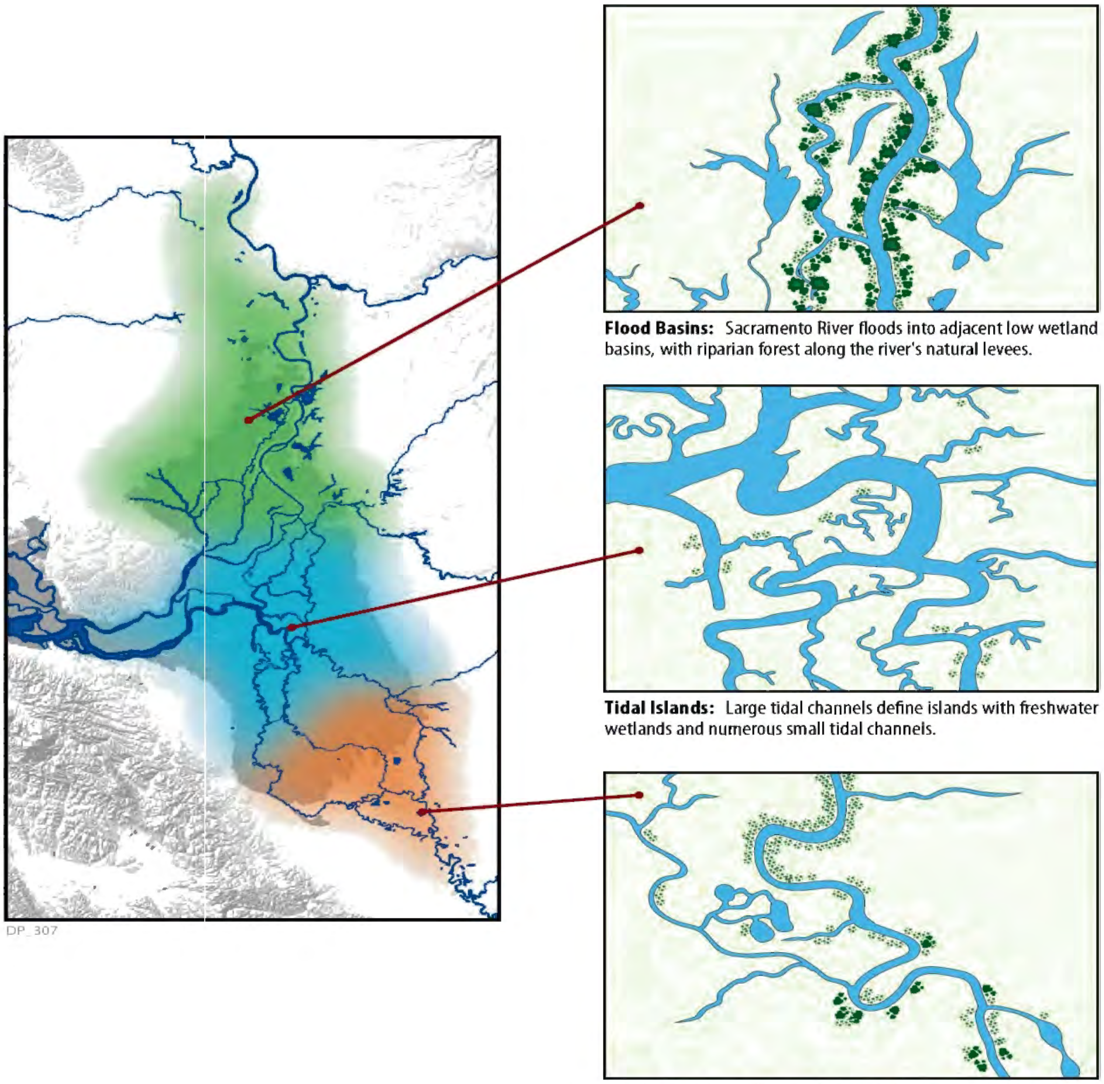

Early 1800s
Late 1900s
Sacramento R
American R
Sacramento
Cosumnes R
Fairfield
Rio Vista
Mokelumne R
Suisun Bay
Martinez
Antioch
Stockton
Tracy
San Joaquin R
Waterway (includes bays, tidal channels and creeks, rivers, lakes, and intermittent streams)
Tidal wetland (includes brackish and freshwater tidal wetland)
Upland (includes natural levees, sand mounds, non-tidal wetland, and drylands)
0 5 10 Miles
0 5 10 Kilometers
DP_204

Figure 4-1 The map at left shows the complexity of early 1800s Delta hydrography (black) within tidal wetland (gray). The modern hydrography at right shows major differences such as channel widening, meander cuts, cross levees, and loss of within-island channel networks and tidal wetland.

Source: San Francisco Estuary Institute 2012

Primary Landscapes in the Historical Delta



Flood Basins: Sacramento River floods into adjacent low wetland basins, with riparian forest along the river's natural levees.

Tidal Islands: Large tidal channels define islands with freshwater wetlands and numerous small tidal channels.

Distributary Rivers: San Joaquin River branches merge into tidal wetlands within a floodplain with a wide mix of habitats.

Figure 4-2

The historical Delta can be divided into three primary landscapes: flood basins in the north Delta, tidal islands in the central Delta, and distributary rivers (rivers with multiple branches flowing away from main channels) in the south Delta. Transitions between these landscapes occurred gradually, across broad areas. Though these landscapes held many habitat types in common, characteristics and spatial patterns varied greatly—these large-scale patterns are what helped define the landscapes, which in turn provided different functions for native species. Understanding these major landscape types is a valuable framework for evaluating current and future restoration strategies in the Delta, providing a baseline between the current landscapes and the long-established historical patterns.

Source: Whipple 2011

Nearly all the rivers historically flowing to the Delta were dammed, creating Shasta, Folsom, Millerton, and Oroville lakes and other impoundments described in Chapter 3. These dams, together with levees constructed to prevent flooding, blocked access to spawning areas and other habitats critical to salmon, splittail, and other fish. The once pronounced seasonal and year-to-year variability of river flows has given way to more stable, artificially regulated conditions. The formerly complex Delta sloughs have been replaced by a simplified grid of straightened channels, cuts, and often rock-lined rivers fixed in space and time, and used for water conveyance and shipping. Pumps to divert water for irrigation or municipal use south or west of the Delta further disrupted the estuary (see Figure 4-3).

Ecosystem restoration cannot restore the historical Delta. Its alteration is too complete to reverse and could not occur without damage to other beneficial uses of its water and land. The Delta Reform Act recognizes these limitations and defines restoration as a "...close approximation of its natural potential..." (Water Code section 85066).

Ecosystem Stressors

Many factors stress the Delta's ecosystem (Baxter et al. 2010). Stressors are actions or factors, whether caused by humans or nature, that negatively affect the ecosystem processes and functions. Stressors include altered flows, habitat loss, entrainment in Delta diversions, degraded water quality, harmful nonnative species, migration barriers, and impacts from hatcheries. Reducing one stressor, or even several stressors, is unlikely to solve all environmental problems in the Delta (Delta ISB 2011, see Appendix I). Many restoration projects fail because multiple stressors have been insufficiently considered (Palmer et al. 2005). Because of uncertainty over cause and effect, ecosystem restoration must address as many stressors as possible through adaptive management, as described in Chapter 2 and Appendix C.

Organizing stressors into categories, such as those developed by the Delta Independent Science Board (ISB), helps resource managers to think about, assess, and manage them. (See sidebar, Stressor Categories to Help with Management Options.) Ecosystem stressors and their effects can be categorized by what causes them (sources of stress) or by what can be done about them. The Delta Plan's ecosystem restoration strategies address the following current stressors:

- Delta flows
- Habitat
- Ecosystem water quality
- Nonnative species
- Hatcheries and harvest management

STRESSOR CATEGORIES TO HELP WITH MANAGEMENT OPTIONS

The Delta ISB developed categories that put Delta stressors into broad context to help assess management options (for example, what can be done about them) (Delta ISB 2011). Management options are stressor reduction, elimination, or mitigation. When this is not possible, adaptation to stressors must be promoted. The Delta ISB has proposed the following categories:

- **Current stressors** result from ongoing human activities that at least in some cases can be eliminated (for example, fish entrainment at water diversions and pollution from point sources).
- **Legacy stressors** result from past actions that cannot be undone, but their impact can sometimes be reduced or mitigated (for example, mercury pollution from historical gold mining and past introductions of nonnative species).
- **Globally determined stressors** result from large-scale human activities or natural processes that cannot be eliminated or mitigated within the purview of the Delta Plan and require larger-scale planning and adaptation (for example, global climate change and human population growth).
- **Anticipated future stressors** require preparation (for example, future land subsidence, urban expansion, and new invasions by nonnative species).

These categories have some overlap; for example, a globally determined stressor such as sea level rise also can be an anticipated future stressor.

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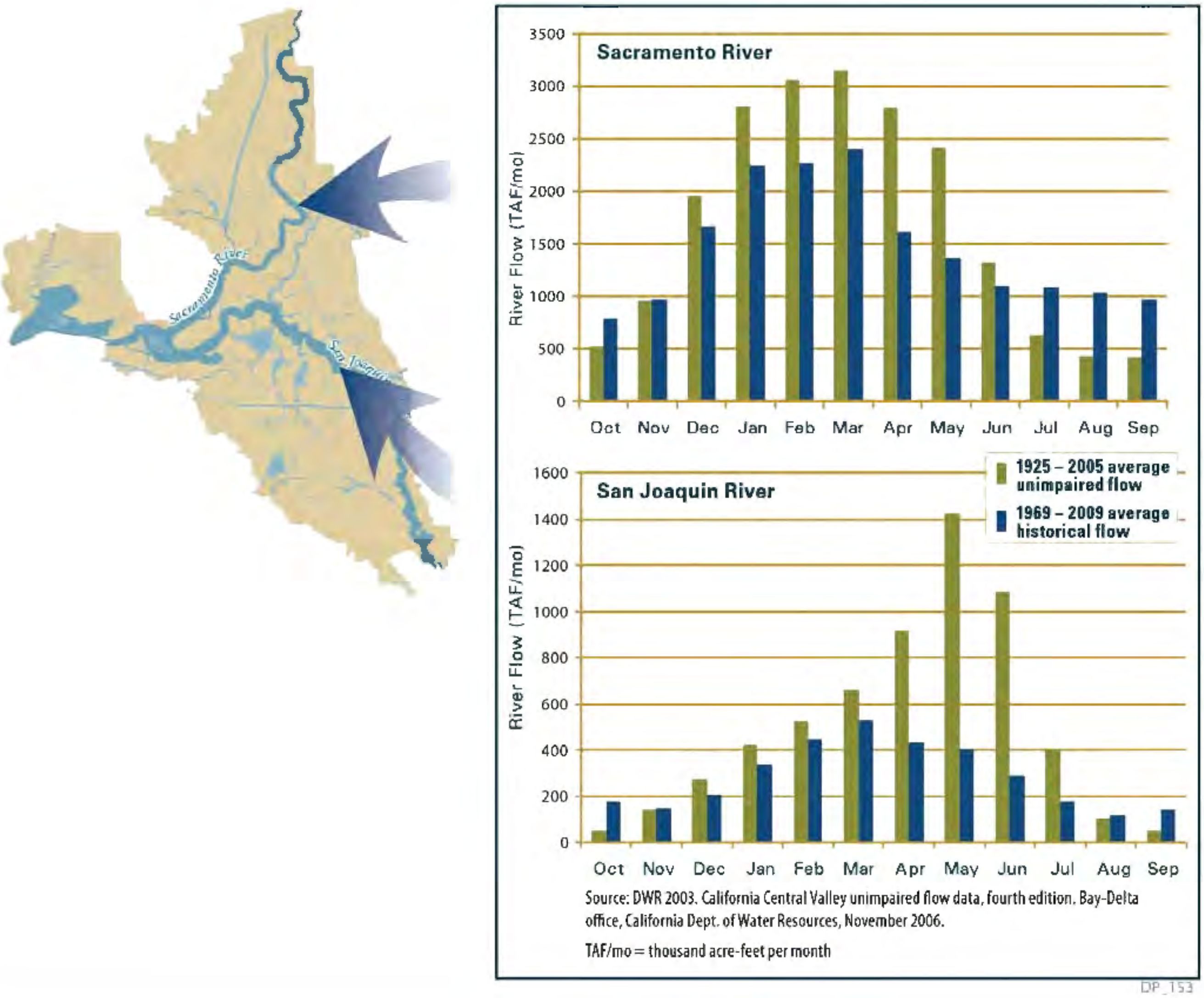
Changes in Historical Flows Challenge Delta Ecology



Source: DWR 2003. California Central Valley unimpaired flow data, fourth edition. Bay-Delta office, California Dept. of Water Resources, November 2006.

TAF/mo = thousand acre-feet per month

Figure 4-3

Habitat for native species has been shaped in the past by natural cycles of river flows.* Since the 1960s, our water system, with its upstream reservoirs, diversions, and other management facilities, has changed these patterns in two ways. First, seasonal flows are much less variable and encourage nonnative fish and vegetation, which can crowd out native species that thrive in a more varied environment. Second, peak flows now come at lower magnitudes and occur earlier on the San Joaquin; this shift affects water temperatures, salinity, and access to habitat, causing stress on native species.

** Natural flow is runoff that would have occurred had the landscape and waterways remained unaltered. Our best estimate of natural Delta inflow is "unimpaired flow," the flow that would be expected if reservoirs were removed but the contemporary watershed and valley land uses remained. However, natural and unimpaired Delta inflow are not the same, and the difference between them could be substantial at times.*

Climate Change

Climate change will cause major stresses on the Delta ecosystem. Rising sea level could inundate freshwater marshes and other freshwater aquatic habitats, potentially with brackish water, reducing habitat for native plants, fish, and wildlife. In addition to rising sea level, the amount of ideal low-salinity habitat for native fish such as the delta smelt will be affected by changes in runoff timing and intensity, which will also affect erosion and sedimentation patterns, again altering fish habitat. Increased water temperature will negatively affect smelt, salmon, and other coldwater-dependent fish, and will likely increase the range of invasive species (Healey et al. 2008, Villamanga and Murphy 2010). In terrestrial habitats, warming could create soil moisture deficits, change plant community composition, and even disrupt timing between pollinators and plants (California Natural Resource Agency 2009). Overall climate change will exacerbate current challenges to the protection and restoration of Delta ecosystems.

Ecosystem Restoration

Restoration of the Delta ecosystem does not mean a return to predevelopment conditions with only its native plants and animals. That is beyond human ability. Instead, restoration seeks to return areas to a close approximation of their natural potential, including re-establishing natural habitat and ecosystem functions, as feasible, within the context of the current configuration of the Delta, the current biological communities, and the permanent modifications to Delta land forms and hydrology. Successful ecosystem restoration rehabilitates key elements—the living and nonliving features such as soils, elevation, waterways, species, populations, and habitats—and the structure and processes that connect them. This section summarizes the principles of and considerations for ecosystem restoration in the Delta.

Much work has been done to develop ecological principles specific to the Delta. (See sidebar, Delta Ecological Principles.) Restoration projects that adhere to these principles are more likely to achieve their goals and objectives.

The Delta Reform Act's definition of restoration recognizes that the ecosystem will be dynamic, changing in response to restoration actions and future climate change (Healey et al. 2008, Delta ISB 2011). The desired future condition is an evolving ecosystem that supports communities of both native and nonnative species, and continues to provide value such as clean water, flood storage, or recreational fishing. A dynamic, restored Delta ecosystem can be a natural complement to the Delta as an "evolving place" described in Chapter 5.

To increase the likelihood of ecosystem restoration success, plans and actions must incorporate the principles of adaptive management (see Chapter 2 and Appendix C for a detailed discussion). This begins with a clear, practical vision of what will be achieved for the ecosystem, together with human need for water supply reliability and flood risk reduction. Additional examples are provided in the sidebar, Current Delta Ecosystem Restoration Efforts.

DELTA ECOLOGICAL PRINCIPLES

The following are ecological principles for the Delta adapted from those developed for the Delta Vision Blue Ribbon Task Force by former CALFED Lead Scientist Michael Healey (2007a, 2007b) and for the Bay Delta Conservation Plan (BDCP) Steering Committee by the BDCP Independent Science Advisors (2007).

Principle 1: Humans are part of the Delta ecosystem. Human activities over the past 160 years have produced a Delta ecosystem that is different from the historical ecosystem, and will remain so even as human-induced stressors are modified.

Management implications: Strategic management of human activities, and uses of the landscape and water in the Delta will be integral to the successful protection, restoration, and enhancement of the Delta ecosystem.

Principle 2: The Delta ecosystem is part of larger ecosystems. The Delta ecosystem affects and is affected by surrounding ecosystems. High year-to-year variability in precipitation and river flows are, in part, caused by climate patterns that span the entire Pacific Ocean. In addition, many animals that use the Delta do so for only part of their life cycles, spending other parts upstream in the rivers, in the ocean, or as far as away as South America and northern Canada.

Management implication: Management of the Delta cannot occur independently of structures and events upstream and in the ocean, in regional and state economies, or in the wider governance context.

Principle 3: The Delta ecosystem is a mosaic of smaller terrestrial and aquatic ecosystems. These ecosystems interact in important ways (for example, exchange of material, energy, and species). This landscape mosaic determines overall performance of the ecosystem. The size, shape, arrangement, and connections within the mosaic are critical to the way the Delta functions.

Management implication: Management plans and decisions need to be informed by a landscape perspective that recognizes interrelationships among patterns of land and water use, patch size, location and connectivity, and species success. The landscape perspective needs to be developed at several physical and temporal scales.

Principle 4: The Delta ecosystem is naturally dynamic. This includes disturbances and extreme events such as very wet and very dry years. Changes in one part of the Delta may have far-reaching effects in space and time.

Management implication: The Delta cannot be managed as a homogenous or static system.

Principle 5: Native Delta species are adapted to a naturally dynamic Delta ecosystem. The natural Delta is dynamic and variable, and the organisms living there are adapted to that variability.

Management implication: In order to successfully protect, restore, and enhance the Delta, management needs to include actions that mimic, to some extent, the historical natural variability.

Principle 6: Each native Delta species has particular tolerances for habitat variables such as temperature, dissolved oxygen, salinity, turbidity, and toxic substances. Species distributions may shift if conditions change and exceed these tolerances. Increase of air and water temperature by even 2 degrees may make the Delta uninhabitable for some local species and also make it potentially inhabitable for species from warmer regions.

Management implication: Loss of some species from the ecosystem may be inevitable. For local species, refugia may have to be located in cooler regions if extinction is to be prevented. Additional actions may be necessary to alleviate a potential increase in nonnative invasive species.

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CURRENT DELTA ECOSYSTEM RESTORATION EFFORTS

Several significant ecosystem restoration planning and implementation efforts are worth noting:

- The draft Ecosystem Restoration Program (ERP) Conservation Strategy was released by the California Department of Fish and Wildlife (DFW) in 2011 (DFG 2011) to update the CALFED ERP plans from 2000. DFW collaborates with its federal fish agency partners, the U.S. Fish and Wildlife Service and National Marine Fisheries Service, to implement the ERP, including providing grants for Delta and Suisun Marsh restoration research and implementation.
- DFW and the California Department of Water Resources (DWR) are continuing to implement and plan for ecosystem restoration projects begun under the CALFED Bay-Delta Program located in Suisun Marsh, at Dutch Slough, at Cache Slough, in the Yolo Bypass, and at the Cosumnes Preserve's North Delta project.
- The *Suisun Marsh Habitat Management, Preservation, and Restoration Plan* is a comprehensive approach to restoring 5,000 to 7,000 acres of tidal wetlands and maintaining managed wetlands and their functions consistent with the CALFED program, the Suisun Marsh Preservation Agreement, applicable species recovery plans, and other interagency goals.
- The Bay Delta Conservation Plan (BDCP) is an overarching approach to large-scale ecosystem restoration now in the planning process (see sidebar, Bay Delta Conservation Plan and Delta Ecosystem Restoration).
- Several Habitat Conservation Plans (HCP) and Natural Community Conservation Plans (NCCP) for parts of the Delta are in place or under development in the Delta. These plans' purpose is to minimize and mitigate the impact of authorized incidental take of the endangered or rare species and their habitats. Completed HCPs and NCCPs in the Delta include the San Joaquin HCP and East Contra Costa County HCP/NCCP. The BDCP, Yolo County HCP/NCCP, South Sacramento HCP, and Solano Multispecies HCP are under development.
- The State Water Resources Control Board (SWRCB) is updating its Bay-Delta Water Quality Control Plan (Bay-Delta Plan). The first phase focuses on objectives to protect water quality for south Delta agriculture and San Joaquin River flow objectives to protect fish and wildlife. The second phase focuses on other changes to its Bay-Delta Plan to protect fish and wildlife, including Delta outflow objectives, Sacramento River flow objectives, export/inflow objectives, Delta Cross Channel Gate closure objectives, Suisun Marsh objectives, potential new reverse flow objectives for Old and Middle rivers, potential new floodplain habitat flow objectives, potential changes to the monitoring and special studies program, other potential changes to the program of implementation, and issues identified through the BDCP process. As part of the SWRCB's review of its Bay-Delta Plan, it will consider information developed as part of its 2010 staff technical report *Development of Flow Criteria for the Sacramento–San Joaquin Delta Ecosystem* (SWRCB 2010) along with information about other factors, such as coldwater pool requirements and other water uses.
- In 2009, the Legislature established the Sacramento–San Joaquin Delta Conservancy (Delta Conservancy) as a primary State agency to implement ecosystem restoration in the Delta, along with supporting efforts that advance environmental protection and the economic well-being of Delta residents. The Delta Conservancy adopted a strategic plan to guide its planning and implementation efforts in March 2012.
- DWR's Delta Levees Special Flood Control Projects program provides funding to local agencies in the Delta for habitat projects linked to flood management improvements. Similarly, DWR's *2012 Central Valley Flood Protection Plan* proposes new or enhanced flood bypasses, levee setbacks, and fish passage improvements that provide both flood risk reduction and habitat. This effort is discussed in more detail in Chapter 7.

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Delta Flows

The Delta is the upstream portion of the San Francisco Estuary, where ecosystems dominated by the Central Valley's rivers transition to the more ocean-influenced ecosystem of the downstream portions of the estuary. Water flow is a "master variable," driving the ecological health of rivers and their ability to support valued environmental services (Poff et al. 1997, Postel and Richter 2003). In estuaries, the interaction of river flows and ocean tides produces a salinity gradient from fresh water to brackish and salty water. River flows and ocean tides also deposit and erode sediment to shape the estuarine landscape and its habitats. Estuarine species are adapted to the complex natural flow, salinity, and sediment dynamics in their native estuaries.

Delta flows can be divided into three categories: (1) river and floodplain flows, (2) in-Delta net channel flows, and (3) net Delta outflows (SWRCB 2010). Each category has different ecological effects. (See sidebar, Flow Is More than Just Volume.)

BAY DELTA CONSERVATION PLAN AND DELTA ECOSYSTEM RESTORATION

The parties seeking permits pursuant to the Bay Delta Conservation Plan (BDCP) are attempting to formulate a 50-year plan that, if successful, would ultimately contribute to the recovery of priority species, restoration of a more naturally functioning Delta ecosystem, and establishment of a secure and reliable water supply from the Delta for human use.

As discussed in the Chapter 3 sidebar, BDCP and Water Supply Reliability, the BDCP is a planning process intended to result in the issuance of permits from the California Department of Fish and Wildlife (DFW) under the Natural Community Conservation Planning Act and from the U.S. Fish and Wildlife Service and the National Marine Fisheries Service pursuant to Section 10 of the federal Endangered Species Act (ESA). In addition, the Bureau of Reclamation will use the information developed from this process to obtain incidental take authorization through an ESA Section 7 process. The BDCP proposes to contribute to the restoration of the health of the Delta's ecological systems by contributing to a more natural flow pattern than existing conditions within the Delta and by implementing a comprehensive restoration program.

As currently proposed, the BDCP takes an approach to supporting landscape-level processes by creating a reserve system consisting of a mosaic of natural communities that would be adaptable to changing conditions (including sea level rise) to sustain populations of covered species and maintain or increase native biodiversity (BDCP 2012). The proposal considers protection of at least 31,000 acres of existing natural communities, and restoration or creation of at least 72,809 acres of natural communities, including at least 65,000 acres of tidally influenced natural communities. In addition, the BDCP is intended to improve the Delta ecosystem by taking actions such as:

- Protecting and improving habitat linkages to promote the movement of native species
- Accommodating future sea level rise by providing transitional areas that allow future upslope establishment of tidal wetlands
- Allowing natural flooding to promote the regeneration of vegetation and related ecosystem processes
- Connecting rivers and their floodplains to recharge groundwater, provide fish spawning and rearing habitat, and increase food supply
- Managing the distribution and abundance of nonnative predators to reduce predation on native special-status species

Examples of elements of the BDCP strategy to support natural communities include:

- Controlling invasive nonnative plant species
- Restoring or creating 5,000 acres of riparian forest
- Restoring corridors of riparian vegetation along 20 miles of channel margin
- Restoring 2,000 acres of grassland
- Protecting at least 20,000 acres of cultivated land to support suitable habitat for native species

The BDCP also plans to propose comprehensive programs for monitoring, research, and adaptive management.

If the process is successful and DFW approves the BDCP as a natural community conservation plan pursuant to Chapter 10 (commencing with Section 2800) of Division 3 of the Fish and Game Code, and determines that the BDCP meets the requirements of this section, and the BDCP has been approved as a habitat conservation plan pursuant to the federal ESA (16 United States Code section 1531 et seq.), the Council shall incorporate the BDCP into the Delta Plan (Water Code section 85320(e)). The Council has a potential appellate role regarding the inclusion of the BDCP in the Delta Plan.

As of this publication, the final public draft of the BDCP and the related environmental impact report/environment impact statement are expected to be released in late 2013. The Council is a Responsible Agency for California Environmental Quality Act purposes.

DP-311

1. **River and floodplain flows.** The Sacramento and San Joaquin rivers and their tributaries provide fresh water into the Delta. Along the margins of the Delta, these rivers seasonally inundate floodplains. Inundated floodplains stimulate the food web by enhancing plant growth, triggering aquatic invertebrate production, exporting food that becomes available to animals downstream, and providing spawning and rearing habitat on the floodplain for fish such as salmon and splittail. In recent decades, floodplains like the Yolo Bypass are flooded primarily by very high flows that flood the Yolo Basin about one year in three. Floodplain restoration could re-establish topographic connections that flood the bypass more often and at lower flows.

2. **In-Delta net channel flows.** Delta flows are primarily driven by tides affected by the moon's cycles, river inflows, in-Delta agricultural diversions, and water exports through the Central Valley Project (CVP) and the State Water Project (SWP). Averaging these influences in any Delta channel over about 1 day gives the "net flow." Locations near the CVP and SWP export pumps, such as parts of Old River and Middle River in the south Delta, experience net "reverse" flows when export pumping by the water projects exceeds these channels' normal downstream flows. The average flow in these channels actually runs backward at times, which affects the Delta's aquatic ecosystems both directly and indirectly (see Figure 4-4). Reverse flow in the southern Delta is associated with increased entrainment of some fish species (Grimaldo et al. 2009) and disruption of migration cues for migratory fish (see the Migratory Corridors for Native Species section for more detail). Reverse and otherwise altered flows caused by upstream reservoir operations, the constraints of artificially connected Delta channels, plus water exports affect Delta habitat largely through effects on water residence time, water temperature, and the transport of sediment, nutrients, organic matter, and salinity (Monsen et al. 2007). These reverse flows could, in turn, affect the behavior of migrating fish, and habitat suitability for resident and migratory fish and other species. Finally, aquatic organisms often get drawn (entrained) into water pumping facilities, as described later in this chapter.

3. **Net Delta outflows.** Net Delta outflow is the sum of all inflows to, and diversions from, the Delta. It is the flow out of the Delta that would occur in the absence of tides (Oltmann 1988). During dry periods, outflow is a low percentage of the instantaneous tidal flow in the western Delta. Nevertheless, over periods longer than 2 weeks, Delta outflow transports river-derived organic matter to Suisun Bay (Jassby and Cloern 2000) and controls the location of the salinity gradient (Jassby et al. 1995). Delta outflow objectives are based on the monthly average location of the low-salinity zone in the western Delta. Outflow variability is recognized as a key factor promoting diverse native fish communities (Moyle and Mount 2007, Moyle et al. 2010).

FLOW IS MORE THAN JUST VOLUME

Flow is not simply the volume of water, but also the direction of flow, the timing of flow, the frequency of specific flow conditions, the duration of various flows, and the rate of change in flows.

Bunn and Arthington (2002) present four key principles underlying the links between hydrology and aquatic biodiversity and the impacts of altered flow regimes: (1) flow determines physical habitat, (2) aquatic species have evolved life history strategies based on natural flow regimes, (3) upstream-downstream and lateral connectivity are essential to organism viability, and (4) invasion and success of nonnative species is facilitated by flow alterations. Altered flow regimes have been shown to be a major source of degradation to aquatic ecosystems worldwide (Petts 2009).

DP-169

Flow Direction in South Delta

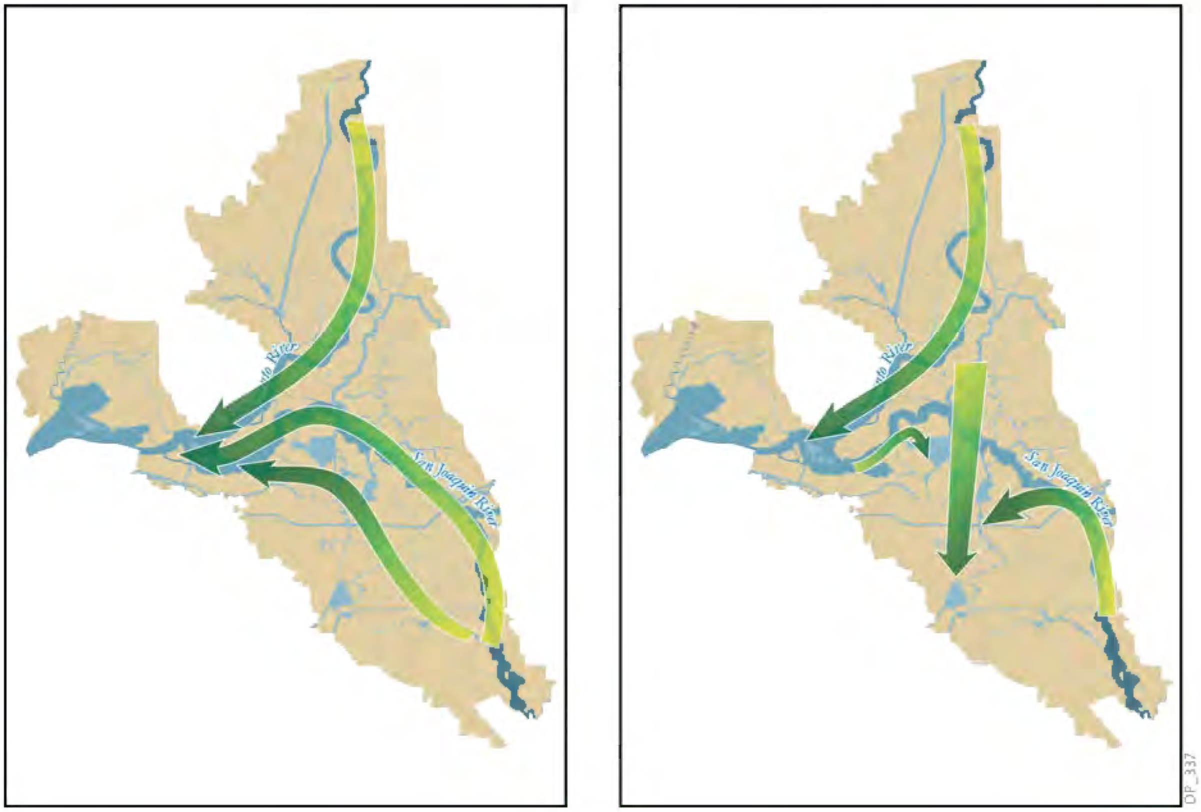
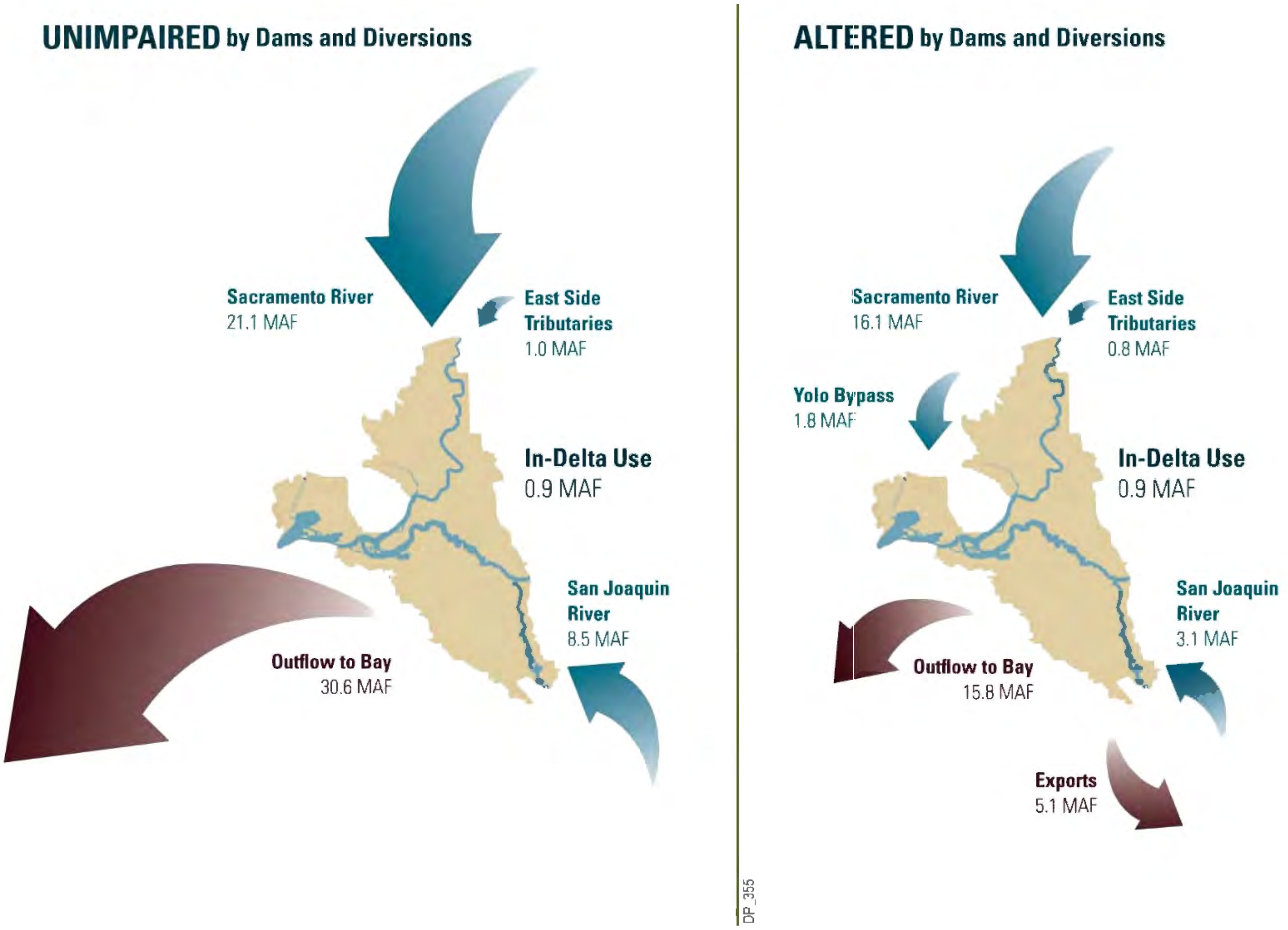


Figure 4-4 The left panel depicts the tidally averaged flow direction in the absence of export pumping. The right panel depicts reversal of tidally averaged flows that occurs during times of high exports (pumping) and low inflows to the Delta.

Present-day Delta flows are very different from historical, natural flows. Water flows have been altered by water supply and flood control infrastructure, including dams on the Sacramento and San Joaquin rivers and their tributaries; levees along these rivers and the Delta's channels; and draining of floodplains, wetlands, and groundwater basins (see Figure 4-5). Flows sometimes have not reflected the Fish and Game Code section 5937 requirement that dam owners should allow sufficient water at all times to pass through a fishway, or in the absence of a fishway, to pass over, around, or through the dam, to keep in good condition any fish that may have been planted or that exist below the dam (DFG 2012). Flows are now closely managed by releases from reservoirs to supply water for agricultural and urban uses, control salinity, and reduce floods. In the Delta, flows have also been rerouted through artificial channels. Flow management and modified Delta channel geometry have altered the salinity and sediment regimes in the Delta (Enright and Culberson 2010, Wright and Schoellhamer 2004), managing salinity for human uses rather than for fish and wildlife. Low winter-spring flows disrupt turbidity and salinity cues for migrating fish (Grimaldo et al. 2009), reduce access to spawning and rearing habits in tributaries and floodplains (Sommer et al. 1997, Feyrer 2004, Feyrer et al. 2007), and limit success for young fish trying to follow natural migration patterns (Feyrer and Healy 2003). Current flow management regulations provide some protection for ecological functions and native species, but the current Delta flow regime is generally harmful to many native aquatic species while encouraging nonnative aquatic species (SWRCB 2010).

Effects of Dams and Diversions on Delta Inflows and Outflows



Data presented as a long-term average. Information based on DWR CALSIM II modeling, which includes projected conditions to protect fisheries.

Delta-Suisun in-Delta use includes water to the Contra Costa Canal and to the Mokelumne and Hetch Hetchy aqueducts.

MAF = millions of acre-feet

Figure 4-5

Water flows more closely approximating the timing, frequency, duration, volume, and rate of change of flow produced naturally by a region's climate are best for native aquatic communities (Poff et al. 1997, Bunn and Arthington 2002, Carlisle et al. 2010). Flow is a major environmental input that shapes ecological processes, habitat, and biotic composition in riverine and estuarine ecosystems such as the Delta. Returning to a more naturally variable hydrograph is a key component of ecosystem restoration because the hydrograph works hand-in-hand with habitat restoration to produce diverse and interconnected food webs, refuge options, spawning habitat, and regional food supplies (Carlisle et al. 2010). Flows should provide species benefits and water supply reliability in the context of current hydrological conditions and degraded habitat. In some cases, flows to benefit the ecosystem will deviate from historical "natural" flows, because the channel geometry, land-water connectivity, and infrastructure limits our ability to mimic historical conditions. Flows will also need to be modified as habitat areas are restored. The Delta Plan, therefore, calls for "more natural functional flows" in the Delta as an important aspect of ecosystem restoration. (See sidebar, More Natural Functional Flow, for a description.)

Flow-related stressors can be reduced or mitigated through improved flow management and concurrent reduction of other stressors. Improved flow management comes from better use of current or improved water infrastructure. The challenge in managing flows is to both restore the Delta ecosystem and improve water supply reliability. Flow-related stressors are likely to increase as population grows and the climate changes. Preparation for these changes must start now.

The State Water Resource Control Board's (SWRCB's) Bay-Delta Water Quality Control Plan (Bay-Delta Plan) identifies water quality objectives to protect beneficial uses of the Bay and Delta, and an implementation program including control of salinity (caused by saltwater intrusion, municipal discharges, and agricultural drainage) through water projects operations. This is a contentious issue of public policy, and the Delta Reform Act directed the SWRCB to develop its new flow criteria using the best available science (Water Code section 85086).

The SWRCB is updating the 2006 Bay-Delta Plan with these steps: (1) review and update water quality objectives, including flow objectives, and the program of implementation in the 2006 Bay-Delta Plan, and (2) make any needed changes to water rights and water quality regulation consistent with the program of implementation. Updating the water quality objectives for the Delta, including an update of flow objectives, is important to protect the Delta ecosystem and the reliability of the Delta's water supplies. The sooner these objectives are set, the earlier the ecosystem can be protected and restored, the greater the possibility that a successful Bay Delta Conservation Plan (BDCP) will be approved, the earlier a more reliable water supply can be improved, and, therefore, the earlier the coequal goals can be achieved. That is why the Delta Plan calls upon the SWRCB to complete its work by specified deadlines. A more detailed explanation of the SWRCB's development of water quality objectives, including flow objectives, is included in Chapter 6.

Entrainment Is One Effect of Altered Flows

Entrainment occurs when fish and other aquatic life are drawn into a water diversion intake and are unable to escape. In the Delta, entrainment occurs primarily at the CVP facilities (Tracy Fish Facility and the nearby Delta-Mendota Canal) and the SWP facilities (including Clifton Court Forebay and the Skinner Fish Facility), as well as other smaller Delta intakes.

Much of the time, net channel flows in most of the south Delta are toward the pumps. This increases the probability that small, weak-swimming young smelt or salmon will be entrained. Depending on the type and size of the fish, the closer a fish is to the pumps, the more likely it is to be entrained. Greater reverse flows caused by pumping in the south Delta increase the numbers of fish entrained.

Some of the entrained fish are "salvaged," meaning they are caught in facilities at the pumps and then trucked and released to an area beyond the pumps' influence. The salvage process decreases the mortality of entrained fish (including salmon). Unfortunately, however, many fish, including delta smelt, are not able to survive the collection, handling, transport, and release.

MORE NATURAL FUNCTIONAL FLOW

What is natural Delta flow? Natural Delta flow is the historical (before 1849) pattern of watershed flows that eventually arrived in the Delta. Historical Delta flows resulted from rainfall in the watershed and the pattern of water storage and release from mountain snowpack, forest and valley soil and vegetation, and the natural topography of creeks, rivers, natural levees, and valley floodplains. These landscape patterns have been modified since 1849, and will largely not be returned to their former state.

Why is natural flow important? Native species are adapted (by natural selection) to the seasonal, interannual, and spatial variability of the historical flow pattern and the functions that come with it. Flows interact with land to create physical habitats and connections where species find food, refuge, and reproduction space. Through a variety of mechanisms, native species can survive, grow, and reproduce better when flows occur in more natural historical patterns.

What does natural flow look like? There were no measurements of natural Delta flow before the watershed was modified by gold mining, agriculture, and water storage. In general, natural flows rise in concert with precipitation patterns and fall slowly as the natural water storage capacity of the watershed is released. Natural flows are not simply water volumes but also include the seasonal timing, magnitude, frequency, duration, and rate-of-change in flows. It is often asserted that "unimpaired Delta inflow" is a good approximation of natural flow. For the Delta, unimpaired flow is the inflow that would be expected if reservoirs were removed but contemporary watershed and valley land uses remained. Unimpaired Delta inflow may overestimate the magnitude of natural Delta inflow and abridge the timing of seasonal peaks.

Will more natural flow work to meet ecosystem goals? Not by itself. Natural flows exist only in the context of natural landscape patterns. The pattern of historical natural flow reflected seasonal and interannual interaction with the historical landscape. For example, historical high flows in winter and spring were intercepted and stored by natural floodplains and then released slowly to the Delta through the summer. Much of the ecosystem functional value of natural flows occurs in these seasonal land and water interactions.

We do not have natural landscapes, so now what? Until large-scale restoration is in place, we can meet ecosystem goals in the interim by using the best available scientific understanding of the *functions* that flows provide to native species. For example, winter-run salmon historically survived low summer flows by finding cold-spring creeks in the watershed for spawning. These creeks are now blocked by dams, but cold water can be released from reservoirs to improve spawning habitat farther down. Another example is using Delta outflow to position the low salinity zone ("X2") in Suisun Bay at key times of the year when the salinity, refuge, and food resources there can benefit native fish. More natural flow is therefore understood to emphasize more natural *functions* rather than the shape of the hydrograph. More natural functional flows could include diverting more flow in wet years and less flow in dry years, as described in Chapter 3. With landscape restoration over time, managing water for functional natural flows should be adaptively managed as ecosystem conditions change. The Delta Plan call for "more natural functional flow" suggests that we can adaptively manage the *functions* that flows provide to the life history needs of native species. Therefore, managing for more natural functional flows protects, restores, and enhances the Delta ecosystem.

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Alteration of water flows also leads to losses of fish from predation. High rates of predation occur at the pumps, and the sloughs and channels near the pumps. Small fish drawn into this part of the Delta have a very low chance of survival. Juvenile salmon drawn into the central Delta through the Delta Cross Channel or Georgiana Slough also have a lower chance of survival than fish staying in the Sacramento River's mainstem. Whether the effects of flow on fish are direct through entrainment or indirect through increased mortality caused by altered flows and predation, the results are the same: fish lost as a result of Delta diversions.

Because of all these factors, managing flows within the Delta is a difficult but important tool for protecting fish. For example, the SWRCB requires reductions in diversions and increases in San Joaquin River inflows during springtime to increase the survival of outmigrating juvenile salmon. The biological opinions for salmon and smelt include measures to reduce entrainment and indirect loss of fish due to altered flows caused by the SWP and CVP diversions. These actions include restrictions on reverse flows in the Old River and Middle River channels in the south Delta and requirements for closing the Delta Cross Channel gates.

Entrainment does not just occur at the Delta pumps. It also can occur at other diversions upstream from the Delta. Larger diversions upstream and in the Delta are screened, but many smaller diversions are not. In-Delta unscreened diversions do not currently appear to entrain substantial numbers of salmon or smelt.

Habitat

Appropriate habitat is required for any organism to survive and reproduce (Hall et al. 1997). Because no two species have exactly the same requirements, habitats are species-specific components of ecosystems.

Expanding habitats for native species is an essential part of restoring the Delta's ecosystem. Recent biological opinions controlling long-term operations of the CVP and SWP require restoration of at least 8,000 acres of intertidal and associated subtidal habitats in the Delta, including Suisun Marsh (USFWS 2008). They also require restoration of 17,000 to 20,000 acres of floodplain rearing habitat for salmon in the Yolo Bypass and lower Sacramento River, including side channels and re-created floodplain terrace areas (NMFS 2009). Some of the tidal marsh acreage may also fulfill requirements for restored floodplains, depending on its location.

Habitat restoration, like water flow, is not just about quantity (or extent), but also about quality, connectivity, and diversity. Land cover types, such as open-water and riparian vegetation, vary greatly and are only one element of habitat (Lindenmayer et al. 2008); an organism's habitat is much more than just land cover. For example, the area of the Delta covered by open water has not changed substantially during the last few decades, but several open-water fish have declined steeply (Sommer et al. 2007, Baxter et al. 2010). This suggests that some of the Delta's open waters have become inhospitable to these certain fish species. The functional habitat available to these open-water fish has shrunk even though the area covered by open water has remained fairly stable. This means that simply changing land cover (for example, increasing riparian habitat) does not automatically increase target species. Other stressors such as poor water quality, predation, or entrainment may make these areas unsuitable.

Habitat loss and fragmentation resulting from human land use causes species loss worldwide (Foley et al. 2005). In estuaries and coastal areas, habitat destruction, coupled with exploitation such as overfishing, are the leading causes of species declines and extinctions (Lotze et al. 2006). Habitat restoration can help recover native species, particularly when other stressors such as altered flows, degraded water quality, or predation by introduced species are also reduced (Carlisle et al. 2010, Lotze et al. 2006).

Taking a large view of an ecosystem, habitats are species-specific "patches" in spatially varied landscapes. The survival and success of organisms is closely associated with the total amount of usable habitat, as well as with habitat patch sizes, shapes, and arrangements (Hannon and Schmiegelow 2002). Habitats that are too small, fragmented, or isolated may not provide long-term support for specific organisms. In general, more, larger, and better-connected patches of a specific habitat create the conditions for persistence or recovery of the species associated with that habitat (Lindenmayer et al. 2008). (See sidebar, Landscape Ecology: A Fundamental Tool for Restoration Planning.)

Much of the original habitat for the Delta's native fish, wildlife, and plants has been urbanized or converted to agriculture over the past 160 years (Healey et al. 2008, Moyle et al. 2010, Baxter et al. 2010). This habitat loss is one of the largest legacy stressors to the Delta ecosystem. The current Delta ecosystem continues to be productive, but its habitat types and conditions support a much different mix of species than the historical Delta. Many of the thriving species are nonnative, such as largemouth bass and the Brazilian water weed *Egeria densa*. Some consider a few nonnative species, such as bass prized by anglers, to be desirable. But too many nonnative plants and animals can upset an ecosystem's balance, creating conditions unsuitable for native aquatic and terrestrial species (Sommer et al. 2007, Healey et al. 2008, Baxter et al. 2010). This conflict and the inadequate habitat for native species that reside in and migrate through the Delta is an important current ecosystem stressor that must be addressed.

LANDSCAPE ECOLOGY: A FUNDAMENTAL TOOL FOR RESTORATION PLANNING

Landscape ecology examines the influence of spatial patterns on ecological processes (Wiens 2002) and considers the ways that species use the landscape for finding food and refuge, and for adapting to change (Simenstad et al. 2000, Lindenmayer et al. 2008). The mosaic of landscape features—or "patches"—and the connections between patches affect species' locations, food and cover, the energy required to obtain those resources, and, ultimately, survival. The landscape perspective considers connections and exchanges between uplands; riversides and wetland edges; and the sloughs, channels, and bays that make up estuarine aquatic habitats. The food webs of these adjacent systems exchange organisms and energy that, in turn, can increase the productivity of each (Cloern 2007). Native estuarine species—terrestrial, semiaquatic, and aquatic—are adapted to the rhythms of the landscape's mosaic of connected habitats and its dynamic processes.

From a landscape perspective, "form begets function." Therefore, correct spatial structure and patterns are prerequisites for restoring and maintaining desired ecosystem processes and functions, and for providing appropriate habitat for native species. In the long term, restoring spatial patterns at ecologically appropriate scales can promote the "self-repair" of ecosystem processes and functions (Teal et al. 2009) and increase resilience to stressors. Consequently, this approach could reduce the operating and maintenance costs of restoration in an era of limited resources. Planning for ecosystem restoration should always consider appropriately large spatial scales (regional or larger), but restoration actions can proceed at smaller scales to optimize the benefits that can be achieved with the often limited opportunities and resources available for restoration (Hermoso et al. 2012).

Additionally, landscape ecology considers people's role in shaping landscape patterns and processes (Turner 1989). Restored landscapes often have agricultural and urban neighbors. Each land use affects the other because they are connected by air, land, and water. Yet humans often want conflicting things (nature areas nearby with abundant wildlife, but also with convenient recreation facilities, no mosquitoes, and no impacts on adjoining farms). A functioning ecosystem depends on many things, including understanding and dealing with its relationship to human activities. The current regulatory and political framework for restoration projects often puts short-term benefits, such as low acquisition cost or immediacy of land availability, before long-term benefits of connectivity and appropriateness of scale. Landscape ecology provides a set of tools for assessing and prioritizing limited restoration opportunities. For example, using the principles of landscape ecology, decisions about land acquisitions for restoration must address how small parcels that become available for restoration might be connected and combined to maximize ecological benefits over the long term.

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The Importance of Land Elevation in Habitat Restoration

Opportunities for habitat restoration in the Delta are constrained first and foremost by the elevation of land, which determines the potential of an area to be restored. As described in Chapter 5, much of the Delta has subsided too deeply to restore its original ecological functions (see Figure 4-6).

Deeply subsided Delta lands can provide terrestrial and wetland habitat for native species only at great cost and with intensive management. They offer few opportunities to recover native ecosystem forms and functions. However, deeply subsided islands could include seasonal wetlands for waterfowl and wildlife-friendly agriculture. Actions that promote carbon sequestration, subsidence reversal, and improved migratory bird habitat are especially valuable.

The most promising restoration opportunities are found in the less-subsided flood basins, river corridors, and brackish tidal marshes on the Delta's perimeter, leading the Council to recommended six priority habitat restoration areas:

- **Yolo Bypass, from the Fremont Weir south toward the Delta.** Winter and spring flooding of the Yolo Bypass provides substantial benefits for spawning and rearing of Sacramento splittail and rearing of salmon (Sommer et al. 2001, Moyle et al. 2007). Projects in the planning stage include fish passage improvements and various approaches, such as notching the Fremont Weir to increase the frequency and duration of inundation during times of the year critical for spawning and rearing of native fish. Restoration of the Yolo Bypass can create conditions that promote enhanced growth and survival of juvenile spring- and winter-run salmon, among other species, and can benefit other migrating salmon.

Habitat Types Based on Elevation, Shown with Developed Areas in the Delta and Suisun Marsh

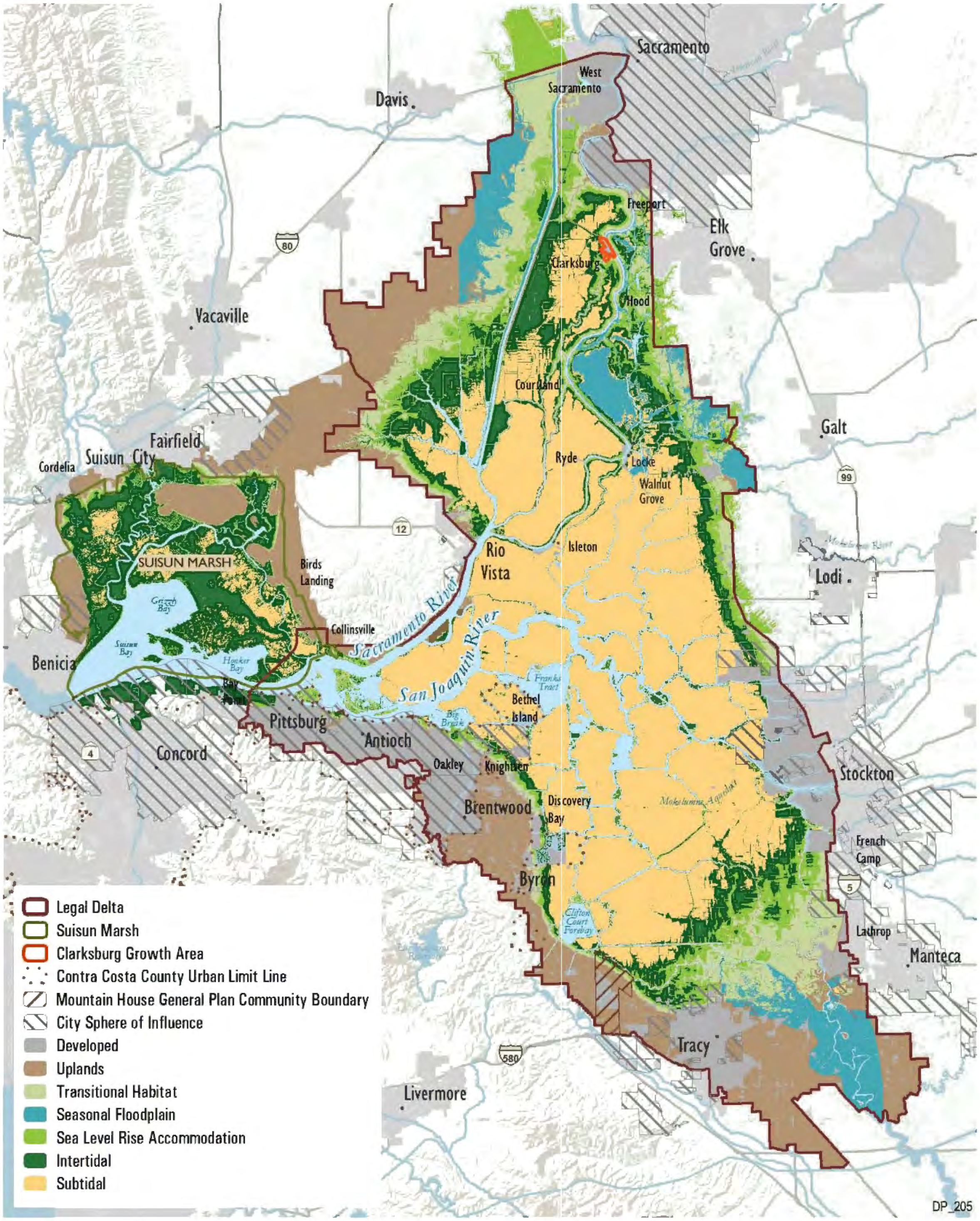

Figure 4-6 *Source: Adapted from DFG 2011*

- **Cache Slough Complex, southwest of the Yolo Bypass.** The flood basins entering the Cache Slough Complex are at the interface between river and tidally influenced portions of the Delta. A restoration project in this area is Liberty Island, which is being allowed to passively restore to marsh after floods breached the island's levees in 1997. Projects in the planning stage include California Department of Water Resource's (DWR's) Prospect Island restoration project. Habitat restoration at Cache Slough can create conditions that help recover delta smelt and that benefit migrating salmon. See the sidebar, Applying Adaptive Management to Ecosystem Restoration, for a hypothetical example implementing principles of adaptive management in projects such as these.
- **Cosumnes River–Mokelumne River confluence.** An existing restoration project is the Cosumnes River Preserve floodplain. Projects in the planning stage include DWR's North Delta Flood Control and Ecosystem Restoration Project on McCormack-Williamson Tract. Restoration here can benefit migrating salmon and contribute to the Delta's food webs.
- **Lower San Joaquin River floodplain between Stockton and Manteca.** Historically, the south Delta and its connection to the lower San Joaquin River contained a complex network of channels with low natural berms, large woody debris, willows, and other shrubs with upland areas supporting open oak woodlands. Projects in the planning stage include the Lower San Joaquin Flood Bypass proposed by the South Delta Levee Protection and Channel Maintenance Authority and its partners. Restoration to a mix of tidal marsh, riparian habitats, and wildlife-friendly agriculture could create conditions to recover riparian brush rabbits and Swainson's hawks, benefit migrating salmon, and serve to reduce the risks from flooding for urban areas.
- **Suisun Marsh.** This is the largest wetland area on the West Coast of the contiguous United States. Suisun Marsh is mostly managed for waterfowl, with levees that disconnect its wetlands from the estuary. An ongoing restoration project is DWR's Blacklock Restoration Project. Projects in the planning stage include California Department of Fish and Wildlife's (DFW's) Hill Slough Restoration Project. Restoration of tidal marsh and associated habitats here can create conditions that contribute to food webs in Suisun and Honker bays, and aid the recovery of longfin smelt and spring- and winter-run salmon.

  Unique local benefited species would also include Suisun song sparrows, saltmarsh harvest mice, and plants such as soft bird's-beak and Suisun thistle. Enhanced management of wetlands can reduce impacts on water quality while still maintaining or improving habitat for waterfowl of other wildlife.
- **Western Delta/Eastern Contra Costa County.** Some islands and tracts at appropriate elevations may be desirable sites for restoration of tidal marsh and channel margins to support food webs and provide habitat for native species. Decker Island is a recent restoration project in this area, and restoration at Dutch Slough is planned. Additional restoration of other islands or tracts may be considered in the BDCP or in local Natural Community Conservation Plans/Habitat Conservation Plans.

These six regions have been highly altered by more than a century of human use and exposure to multiple stressors. Returning a portion of these altered regions to habitat for native species requires a careful assessment of opportunities and challenges. Recommendations provided later in this chapter include actions to prevent or mitigate adverse impacts on opportunities for habitat restoration in these priority restoration areas.

Applying Adaptive Management To Ecosystem Restoration

An adaptive management approach to ecosystem restoration should be used to plan for and assess the ecological outcomes of the restoration action. The following is a hypothetical example of how the Council's three-phase and nine-step adaptive management frame-work (see Appendix C) could be applied to an ecosystem restoration project in the Cache Slough Complex.

Adaptive Management Step			Hypothetical Cache Slough Ecosystem Restoration Project
Plan	1	Define/redefine the problem	The Cache Slough Complex includes high biodiversity; however, ecological processes and habitat that benefit native species in the Cache Slough Complex are degraded.
	2	Establish goals, objectives, and performance measures	**Goal:** Re-establish natural ecological processes and habitats to benefit native species in the Cache Slough Complex. **Objective:** Re-establish the hydrologic, geomorphic, and ecological processes necessary for the long-term sustainability of native habitats, and the plant and animal communities that depend upon them. Improve floodplain connectivity and aquatic habitat quality for native estuarine species, including delta smelt, longfin smelt, Sacramento splittail, and Chinook salmon, by offering a suite of natural habitats and improving the food web fish require.
	3	Model linkages between objectives and proposed action(s)	The Cache Slough Complex provides high potential for restoration success because of its physical and biological attributes (such as tidal range, elevation, high amounts of suspended sediment, abundant zooplankton, and observed use by delta smelt). It is hypothesized that improved vernal pool and grassland habitats along with broad nontidal, freshwater, emergent-plant-dominated wetlands that grade into tidal freshwater wetland, shallow subtidal, and deep open-water habitat will increase the amount and quality of food for native species in the estuary. It is hypothesized that restoring tidal channel, wetland, and upland networks will improve conditions for native fishes. It is hypothesized that increases in the quality and quantity of food for native species will lead to increases in native species populations in the estuary. Native species expected to benefit from this restoration include delta smelt, juvenile Chinook salmon, Sacramento splittail, and longfin smelt.
	4	Select action(s) (research, pilot, or full-scale) and develop performance measures	Pilot-scale restoration project in the Cache Slough Complex: restore a subset of the processes supporting the creation of tidal channel, wetland, and upland networks to support native fishes. Performance measures: ▪ Administrative – Properties are identified for the pilot study. Funding sources and budgets for the project and monitoring are in place. Properties are acquired. Restoration planning and design is completed. Environmental compliance permits are obtained. Restoration contractors are selected. ▪ Output – Pilot-scale Delta habitat restoration project is implemented. Progress toward restoring diverse and interconnected habitats for native resident and migratory species in the Cache Slough Complex. ▪ Outcome – Progress toward achieving viable populations of native resident and migratory species. Trends in native Delta species are upward over the next decade.
Do	5	Design and implement action(s)	Design and implement the pilot-study restoration project.
	6	Design and implement monitoring plan	Design and implement the monitoring plan, including baseline monitoring of food abundance for pelagic organisms. Monitor the extent and quality of targeted habitats, connectivity of habitats, and abundance and diversity of species.
Evaluate and Respond	7	Analyze, synthesize, and evaluate	Analyze, synthesize, and evaluate the status and trends of changes in habitats, connectivity of habitats, abundance, and species health and diversity.
	8	Communicate current understanding	Provide project manager(s) and decision makers with annual reports of synthesized information learned. For example, provide a score card of the status and trends of species abundance and diversity, habitat connectivity, and so on.
	9	Adapt	The managers and implementers of the restoration project reconsider their understanding of the problem statement and conceptual model, and decide whether or not to expand from a pilot-study project to a larger-scale restoration effort.

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Migratory Corridors for Native Species

Habitat restoration often targets resident species that use the restored habitat year-round. Successful restoration, however, must also consider species that only periodically use particular habitat patches and corridors. The historical Delta provided migration corridors and rearing habitat for many migratory bird and fish species, including the threatened greater sandhill crane, many species of ducks and geese, salmon, sturgeon, and the introduced striped bass.

In the past, the Delta was a migration route and also an important nursery area for young salmon (or "smolts"). Much of the Delta today presents real risks to migrating salmon; it is no longer a suitable nursery for salmon smolts (Williams 2006). Some Delta channels do provide a greater chance of fish survival than others. For example, salmon leaving the Sacramento River and entering the interior Delta through the Delta Cross Channel have significantly lower survival than fish that stay in the river (Newman 2008), demonstrating that the central Delta has become a gauntlet of risk instead of a viable migratory corridor.

Entrainment at the CVP and SWP southern Delta pumps and increased predation kill salmon smolts. Toxic contaminants and periods of low dissolved oxygen can be harmful. Important factors for route selection and survival of salmon smolts on their way to the ocean include differences in flows through different channels, feeding opportunities, growth rates, and vulnerability to predation (Perry et al. 2009).

On their way back from the ocean to spawn, adult salmon must navigate a maze of Delta waterways where water from many different sources is mixed in artificially connected channels, and where rivers sometimes flow backward (reverse net flows in Old and Middle rivers; see the Delta Flows section) (Monsen et al. 2007). A unique problem is presented by the San Joaquin River, whose polluted and reduced flows are often drawn to the SWP and CVP pumps as a result of reverse flows. During these times, almost no water from the San Joaquin River reaches the confluence with the Sacramento River. Instead, water from the Sacramento River and its tributaries fills most of the Delta, obscuring and confusing the chemical and flow cues that salmon and other migratory fish depend on to find their destinations.

In addition to altered water flow and chemical disruption, migratory fish encounter dams, reservoirs, and other physical barriers that hinder their historical migration. The most formidable barriers are upstream on the Sacramento and San Joaquin rivers and their tributaries, especially the many large and small dams associated with reservoirs, including Shasta, Folsom, and Millerton lakes and Lake Oroville. In the Central Valley, less than one-fifth of the historical spawning habitat is still accessible to Chinook salmon and steelhead (Reynolds et al. 1993, Yoshiyama et al. 1996).

Physical barriers in the Delta help maintain water supplies for agriculture but interrupt fish migration; structures with ledges and drops, such as bridge pilings, boat docks, narrow channels with riprapped edges, or the intakes of the SWP and CVP pumps, create attractive spots for predatory fish to feed on migrating species. The Delta Cross Channel is an example. Sometimes, a barrier can have positive effects. Federal, State, and local officials have recently tested novel bio-acoustic fish fences (BAFFs) at Old River and Georgiana Slough that use light, sound, and air bubbles to steer migrating fish into channels that are thought to provide better habitat and a greater chance of survival.

Some high-quality migratory fish rearing and migration habitat remains at the margins of the Delta, if not in its core. The Yolo Bypass and Cosumnes River floodplains provide good migratory and rearing habitat for salmon, and important habitat for other native fish, birds, and bats. DFW manages the Vic Fazio Yolo Wildlife Area, a 16,000-acre public-private restoration project in the Yolo Bypass, to promote waterfowl and other bird populations. The 46,000-acre Cosumnes River Preserve is jointly owned and operated by The Nature Conservancy, Ducks Unlimited, the Bureau of Land

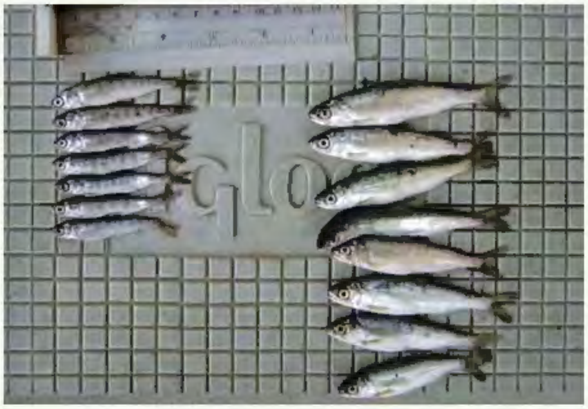
Management, DFW, DWR, Sacramento County, and private owners to create, enhance, and protect a variety of habitats. These are good illustrations of ecosystem and flood risk reduction projects working together. Wildlife-friendly agriculture also occurs in these floodplain preserve areas and their surroundings. During winter and early spring floods, these floodplains provide plentiful food for migrating salmon and native fish such as splittail, prickly sculpin, and Sacramento sucker (Sommer et al. 2001, Crain et al. 2004). Salmon migrating through these floodplains grow faster and have greater survival. (See sidebar, Better Habitat Equals Greater Growth.) Native fish do particularly well when flows through these floodplains follow more natural patterns. Early February through April, strong flood flows with cool water temperatures benefit many young native fish. Nonnative fish benefit more from later and lower flows with higher temperatures. Floodplain restoration should thus focus on early flooding followed by careful draining. This provides important migration and nursery habitat for native species while keeping nonnative species, including predators, at bay.

Actions above and below the Delta also complement actions in the Delta to restore migratory corridors for fish and wildlife. The Bureau of Reclamation, U.S. Fish and Wildlife Service, and DFW have modified Shasta Dam to release colder water for salmon and trout, removed barriers to fish migration such as the Red Bluff Diversion Dam, screened water diversions to reduce entrainment, restored riparian habitats at the Sacramento River National Wildlife Refuge (NWR) and San Joaquin River NWR, and improved habitats in Sacramento and San Joaquin river tributaries where salmon spawn. Efforts to restore flows in the San Joaquin River also can rebuild these migratory corridors.

For example, on Battle Creek, actions to remove multiple dams and fish ladders are being implemented through the Battle Creek Salmon and Steelhead Restoration Project. The primary objective of the restoration project is to restore the ecological processes that would allow the recovery of steelhead and Chinook salmon populations in Battle Creek while minimizing the loss of clean and renewable hydroelectric power through modifications to the hydroelectric project. This project is among the largest coldwater anadromous fish restoration efforts in North America and will restore approximately 42 miles of habitat in Battle Creek and an additional 6 miles of habitat in its tributaries. It will also help restore critically imperiled winter- and spring-run Chinook salmon and Central Valley steelhead. Additional restoration actions are planned for other Sacramento River tributaries including Clear Creek, Deer Creek, and Mill Creek.

On the mainstem of the San Joaquin River between Friant Dam and its confluence with the Merced River, the San Joaquin Settlement Agreement will increase flows, expand channel capacity, and remove barriers to migration to restore spring-run Chinook salmon runs. This long-term action is expected to occur in stages over 20 years. On the Tuolumne River, the largest tributary of the San Joaquin River, the Central Valley Project Improvement Act (CVPIA)

BETTER HABITAT EQUALS GREATER GROWTH



This comparison illustrates faster growth in floodplain habitat compared to river habitat. Salmon on the left were reared within Cosumnes River channel habitat, and the salmon on the right were reared within Cosumnes River floodplain habitat. All salmon shown are the same age.

Source: Jeffres et al. 2008

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Restoration Plan actions focus on restoring spawning, rearing, and floodplain habitat. The Bobcat Flat Restoration Project includes excavation of 48,500 cubic yards of gravel and coarse material that will be used to restore 1.6 miles of fall-run Chinook salmon and Central Valley steelhead spawning and rearing habitat. Similar habitat restoration projects have been implemented or are planned on other tributaries of the San Joaquin River and the Delta, including the Merced, Stanislaus, Calaveras, and Mokelumne rivers. However, 16 years after the creation of the CVPIA restoration fund, a panel of independent scientists issued a report on the CVPIA Fisheries Program (Reclamation and USFWS 2008) concluding that more could be done to effectively address the most serious impediments to survival and recovery of salmonids.

Wetlands bordering San Pablo Bay downstream of the Delta are home to a host of native and nonnative fish, waterfowl, shorebirds, other wildlife, and endangered plants and important stopping points on the Pacific Flyway. Uncommon species found in and around San Pablo Bay wetlands include longfin smelt, delta smelt, salt marsh harvest mouse, California clapper rail, San Pablo song sparrow, and black rail. All Central Valley anadromous fish migrate through the bay and depend on its open water and marshes for some critical part of their life cycle. The bay and its adjacent marshes are also important nursery grounds for many marine, estuarine, and anadromous fish. More than 40,000 acres of diked baylands and wetlands bordering the San Pablo Bay have been protected and are being restored.

In the Sacramento and San Joaquin valleys, actions to protect, restore, and enhance wetlands carried out by the Central Valley Joint Venture have significantly increased wildlife habitat resources for migratory waterfowl, shorebirds, waterbirds, and riparian songbirds in accordance with conservation actions identified in the Joint Venture's Implementation Plan. The Joint Venture establishes population objectives for these migratory birds then determines the appropriate amount of food, habitat, and water supply necessary to meet the objectives. Wetland restoration becomes a priority when habitat and forage needs for population objectives are not being met.

Successful recovery of native species requires effective habitat restoration. In addition to restoring physical habitat and corridors for movement, reducing other stressors is important too. Together, they help in achieving the coequal goal of a healthier Delta ecosystem.

Riparian and Shaded Riverine Aquatic Habitat

Fish and birds migrating through the Delta need abundant floodplains and appropriate water flows; but they also need streamside trees and shrubs that shade and cool the rivers; undercut riverbanks where smolts and other small fish rest and hide; and trees that drop insects and leaves that contribute to the food web and provide cover, food, and nest sites for songbirds and other wildlife. Unfortunately, along most of the Sacramento and San Joaquin rivers, levees are near the water's edge, not set back from rivers, leaving little room for these habitat features, which often are provided only by trees growing immediately adjacent to or even on the levees themselves.

Because of the importance of these streamsides, water supply or flood risk policies and projects that affect the Delta's rivers and other channels should consider the impact on remaining riparian and shaded riverine habitat. Setting back levees can create additional area for habitat and increased capacity for flood flows. Setting back levees, however, can be expensive and difficult. At the same time, there is considerable controversy over the current policy of the U.S. Army Corps of Engineers (USACE) to require removal of trees and most shrubs from levees under their jurisdiction. A technical manual issued by the Federal Emergency Management Agency (FEMA) for earthen dams has been relied upon heavily to support this vegetation removal policy (FEMA 2005). There is little riverine habitat left. If implemented as proposed, the USACE's order would destroy much of what remains. The Delta Plan calls for the

USACE to reconsider and change its policy in order to protect riverine habitat.

Safe Harbor Agreements

Voluntary safe harbor agreements between wildlife agencies and landowners can contribute to the recovery of species protected by the State or federal Endangered Species Acts. These agreements assure the landowners that the presence of endangered species on their property will not result in restrictions on other activities undertaken on their land. Facilitating and creating standard rules for these agreements with Delta landowners may encourage more landowners to participate in conservation programs.

Suisun Marsh and the Bay Conservation and Development Commission

The Suisun Marsh is one of the Delta Plan's priority habitat restoration areas. It is one of the largest contiguous estuarine wetlands in North America; an important nursery for fish; a wintering and nesting area for waterfowl and waterbirds; and an essential habitat for plants, fish, and wildlife, including several scarce and sensitive species. Suisun Marsh offers unique restoration opportunities because of its position in the Delta ecosystem and the diversity of physical processes it hosts. Suisun Marsh harbors a greater percentage of native fish than the remainder of the Delta, in part because its brackish water limits nonnative species. Additionally, the marsh has many diverse tidal sloughs that provide options for food and refuge (Moyle et al., 2010).

Unlike the deeply subsided Delta, much of the Suisun Marsh is still at elevations suitable for restoration of intertidal habitat, including tidal marsh and shallow water habitat. This area provides the brackish portion of the estuary with the potential to support productive and complex food webs, and with space to adapt to sea level rise. State and local land use policies should reflect the unique role that Suisun Marsh can play.

The San Francisco Bay Conservation and Development Commission (BCDC) is responsible for protecting San Francisco Bay and its shoreline, including Suisun Marsh, through the San Francisco Bay Plan, as described in Chapter 5. It is developing regional strategies to address the impacts of sea level rise and climate change on the Bay. BCDC provides special protection of the Suisun Marsh under the Suisun Marsh Preservation Act through the Suisun Marsh Protection Plan (SMPP). BCDC recently amended the San Francisco Bay Plan to address climate change and sea level rise. The climate change policy, among other things, incorporates sea level rise projection ranges consistent with those developed by the California Ocean Protection Council (2011) and calls for development of a long-term regional strategy to address sea level rise and storm activity. The SMPP and the Suisun Marsh Local Protection Program should also be amended to address climate change and rising sea level.

Ecosystem Water Quality

Chapter 6 deals with water quality issues and contains many recommendations for action. Impaired water quality makes it much harder to restore a healthy Delta ecosystem. Recommendations in Chapter 6 regarding salinity and environmental water quality cover key linkages between ecosystem restoration and water quality.

Consistently good water quality is crucial for successful restoration of aquatic habitats, sustenance of native plants and animals, and other beneficial uses of Delta water. Salinity should be more consistent, with a naturally variable estuarine hydrograph with high-quality river inflows. Nutrient composition and concentrations should not cause excessive growth of nuisance aquatic plants or blooms of harmful algae, and should support diverse and productive aquatic food webs. Dissolved oxygen levels, water temperatures, turbidity, and other attributes should meet the needs of native species. At all times the Delta should be free of substances that exceed toxic concentrations. Discharge of treated wastewater, urban runoff, or agricultural return flows should not adversely affect the Delta.

Chapter 6 focuses on four key areas where the best available science shows the need to protect and improve water quality to achieve the coequal goals (see Chapter 6 for a complete discussion):

- Requiring Delta-specific water quality protection
- Protecting beneficial uses by managing salinity
- Improving drinking water quality
- Improving environmental water quality

Nonnative Species

Among the world's estuaries, the Delta and San Francisco Bay are among the most invaded by nonnative species (Cohen and Carlton 1998). Some nonnative species have been in the Delta for more than a century and seem to be a permanent feature of the Delta ecosystem. Because it is nearly impossible to eradicate nonnative species once they are established, many can be considered legacy stressors that can be managed but not eliminated.

However, the introduction of any new nonnative species has consequences, particularly for native species. Nonnatives can take over habitat space, compete for food and nutrients, alter food webs, modify the physical habitat structure, or prey upon native species (DFG 2011). In wetlands and riparian areas, nonnative vegetation often crowds out native plants and reduces diversity used by resident and migrating birds and other animals (PRBO CalPIF 2008). The result is that nonnative plants, invertebrates, and fish may replace native species, and that change on their native counterparts is often combined with the other stressors such as altered flow, impaired habitat, and poor water quality.

Significant nonnative species in the Delta include (DFG 2008):

- **Overbite clam.** The overbite clam, a bottom-dwelling filter feeder, entered the Delta in the late 1980s and adapted well to its brackish areas. Overbite clams contribute to the reduction of algae and some invertebrates in the Delta, especially in Suisun Bay (Kimmerer 2006), causing loss at the base of the food web, which contributes to the decline of delta smelt and other open-water fish (Sommer et al. 2007).
- **Asian clam.** The Asian clam was first found in the Delta in 1946 (USGS 2001). This clam does not tolerate saline water, but is abundant in freshwater parts of the Delta and in the mainstems of the Sacramento and San Joaquin rivers. Ecologically, this species can alter channel bottoms and competes with native freshwater mussels for food and space (Claudi and Leach 2000). Overbite and Asian clams cannot be effectively controlled, according to many experts (Healey et al. 2008), but they may be managed by manipulating environmental conditions such as flow or salinity to seasonally control their distribution.
- **Zooplankton.** Surveys of Delta waters reveal that introduced zooplankton, probably discharged in ocean ship ballast water in the San Francisco Bay and Delta, have almost completely replaced the original native zooplankton (Winder and Jassby 2011). The success of nonnative zooplankton species was accompanied by an overall decline in zooplankton biomass and size that suggests a decrease in their nutritional value for fish (Winder and Jassby 2011).
- **Nonnative invasive aquatic plants.** The floating water hyacinth, imported as a landscaping plant, proliferated in the Delta in the early 1980s. The Brazilian waterweed was introduced in the 1960s, probably from home aquariums, but did not reach nuisance levels until after the 1987-1992 drought (Jassby and Cloern 2000). These and other nonnative aquatic weeds in the Delta, including water pennywort, Eurasian water milfoil, and parrot feather, pose serious problems to native plants and animals, and hinder boating. The weeds flourish in a wide area where they act as powerful "ecosystem engineers" (Jones et al. 1994, Breitburg et al. 2010) through alteration of habitats, sometimes creating dense mats or thickets that displace native plants, reduce the food web

productivity, reduce turbidity, and interfere with water conveyance and flood control facilities. These invasive plants benefit nonnative predatory fish like largemouth bass. Areas of dense, submerged aquatic vegetation (SAV) may reduce the abundance of native fish larvae and adults (Grimaldo et al. 2004, Nobriga et al. 2005, Brown and Michniuk 2007). Restoration of aquatic habitats must be designed and managed to reduce nonnative SAV if conservation goals are to be met (Nobriga and Feyrer 2007).

- **Bass and sunfish.** Several species of nonnative fish have been introduced in the Delta. Largemouth and smallmouth bass, sunfish including bluegills and warmouth, crappies, and other fish in the centrarchid family are the best examples. They prey on salmon smolts, smelt, and other native fish. The increase in SAV, especially in and around "flooded islands" in the central Delta, enhances bass and bluegill populations (Brown and Michniuk 2007) and possibly populations of other nonnative predators (Grimaldo et al. 2009). Centrarchids harm native fish through predation and competition (Nobriga and Feyrer 2007, Brown and Michniuk 2007). The distribution of centrarchids may be modified by managing conditions such as water velocity, nutrients, salinity, and turbidity to reduce SAV.

The invasion of nonnative species is in the category of globally determined stressors because these species' arrival in the Delta is the result of large-scale natural processes and human activities that are beyond the purview of the Delta Plan. Nonnative species have persisted because they found favorable environments in which to live. Native species are adapted to the varied, complex floodplains, marshes, and other habitats of the historical Delta, with its tidal currents and river flows that constantly change physical, chemical, and biological conditions. In contrast, the stabilized flow pattern, altered habitats, and impaired water quality of the modern Delta often favor nonnative species. Reducing the impacts of nonnative species in the Delta will require addressing flow alterations, pollution (especially nutrients), and physical habitat characteristics.

Future invasions by zebra and quagga mussels are likely and will require considerable preparation, followed by interagency coordination and action. These mussels are an example of an "anticipated stressor" under the Delta ISB's classification of stressor types. Neither has been observed in the Delta yet, but they have proven to be highly invasive when conditions are right. They pose threats comparable to threats from the overbite and Asian clams. They can colonize hard and soft surfaces, often in large densities (greater than 2,800 individuals per square foot) that impede the flow of water through canals and pipes. These mussels also remove particulates in the water, unnaturally enhancing water clarity.

Once introduced, nonnative species are difficult and expensive to control, and often impossible to eradicate. The California Department of Boating and Waterways supports programs to control Brazilian waterweed and water hyacinths where they hinder boating, but only where conditions create the worst nuisances. The best way to prevent new infestations is to avoid the introduction of new species. Improvements in managing ballast water by shipping companies have been instituted recently, but likely more needs to be done.

There is no agreement about the value—or lack of value—of nonnative species. Opinions vary depending on the species and the interest of Delta users. Striped bass are nonnative but prized for their sport and economic value. Introduced to the Delta in the nineteenth century, they prey on native open-water fish such as delta smelt, longfin smelt, and juvenile salmon and steelhead. Striped bass are at the center of an ongoing debate about whether fishing regulations for introduced species should conserve the fish or should be less restrictive to reduce their abundance (DFG 2011).

The draft Ecosystem Restoration Program (ERP) Conservation Strategy acknowledges that many nonnative species will likely remain in the Delta, and emphasizes prevention and adaptation strategies such as public education, preventing establishment of additional nonnative species, and reducing the impacts of established nonnative species. DFW issued its *California Aquatic Invasive Species Management Plan* in 2008, which aims to coordinate the various State efforts to minimize harmful ecological, economic, and human health impacts from aquatic invasive species (DFG 2008).

Hatcheries and Harvest Management

In the Delta, people have harvested fish and shellfish for millennia. Today, fishing, crabbing, crawdadding, and clamming are important recreation activities. Central Valley salmon—most raised in hatcheries—migrate through the Delta and support an economically and culturally important coastal fishery. In the Delta and its tributary rivers, recreational fishing for salmon, sturgeon, striped bass, largemouth bass, shad, and other fish attracts anglers from throughout California and the world. Fishing in the Delta is a centerpiece of the unique cultural, recreational, and natural heritage that makes the Delta a special place (see Chapter 5).

The use of hatcheries to breed fish and regulations to limit overfishing have long been important tools for aquatic resource management. But they carry their own risk. Hatcheries can allow interbreeding, weakening the genetic fitness of a fish species (Israel et al. 2011). Harvest of hatchery-enhanced fish stocks can pose additional risks to native species. Overfishing itself reduces genetic diversity. Fishing regulations generally protect fish from overharvest, but regulations can also help or hurt other fish species. For example, DFW recently proposed changes to striped bass sport fishing regulations to allow greater harvest of striped bass in the hopes of reducing bass predation on native fish, especially salmon. These changes were rejected by the Fish and Game Commission, but it is likely other regulations will be recommended, particularly as the emphasis on saving native fish from nonnative invasives continues. Future proposals should be based on an improved understanding of anglers' behavior as well as a better understanding of the likely response in populations of striped bass and other predators. Harvest regulations and management practices must consider broader effects on nontarget species, including other predators, and the ecosystem.

Striped bass, for example, are not the only animals that prey on salmon. Predators are natural parts of any ecosystem, and predation is a basic ecosystem process. Fish predators in the Delta include many water birds, mammals, and fish such as native pikeminnows and introduced largemouth bass, smallmouth bass, striped bass, catfish, and other species. Nonnative fish consume salmon and other species of concern in the Delta and its tributaries (Lindley and Mohr 2003). Acoustic tagging studies in the San Joaquin River and southern Delta suggest significant predation on hatchery-reared salmon smolts. Survival of tagged salmon smolts released in the lower San Joaquin River was estimated to be only 5 percent in 2010, with much of the loss attributed to predation (San Joaquin River Group Authority 2010). However, despite the evidence of locally high predation, the overall contribution of predation to the decline of salmon, steelhead, and smelt populations is not clear, and the effect of predator controls will remain uncertain without additional study.

Hatchery Management

Another important tool for harvest management is raising fish in hatcheries, later to be released into natural waterways.

In California, hatcheries are particularly important to compensate for dams that block migration routes for salmon and steelhead (see previous Ecosystem Restoration section). The first salmon hatchery in the state was on the McCloud River. Today, California hosts two federal and twenty-one State hatcheries for salmon, steelhead, or trout. In recent years, "conservation hatcheries" for various threatened and endangered species were considered to prevent extinction of a species while restoration and stressor reduction activities are under way.

Hatcheries are important tools, but they involve genetic and ecological risks:

- **Genetic risks.** Human intervention in the rearing of wild animals has the potential to cause genetic change in fish such as salmon (Israel et al. 2011). These changes can impact fish diversity and the health of fish populations. Inbreeding in a fish hatchery can occur when a limited stock is used at the hatchery. Inbreeding can affect the survival, growth, and reproduction of fish. Ironically, conditions in the hatchery may favor fish that best survive in hatchery, not natural, environments. When released, hatchery-produced fish mix with naturally spawned fish, resulting in a lower survival rate once fish are released into rivers and streams. Finally, loss of genetic diversity is a documented effect of overfishing (Holmes 2011), which some have suggested is encouraged by the use of hatchery fish.

- **Ecological risks.** Wild and hatchery fish of the same species often compete in nature. For example, wild and hatchery-reared Chinook salmon share the same habitat and diet. Hatchery-released salmon are larger than wild salmon, resulting in possible predation on wild salmon of the same age. Hatchery production of salmon masks the decline of wild salmon, contributes to the genetic dilution and loss of wild salmon, and increases competition for limited freshwater and ocean resources on which wild salmon depend (McGinnis 1994). Throughout the world, overfishing has led to collapsing fish stocks and food web disruptions (Pauly et al. 1998). Hatchery and harvest effects often also interact. Harvest of salmon from waters where both hatchery and wild fish occur has put wild salmon and steelhead at risk (Lackey 2003). Wild salmon mortalities occur even with controlled fishing regulations. A portion of all fish released after being hooked and caught do not survive. Capture methods such as use of barbless hooks and use of landing nets can help reduce mortality of released fish.

Hatcheries and harvest are not the root problem of species declines in the Delta and Central Valley (DFG and NMFS 2001). Despite considerable fishing pressure in the first part of the twentieth century, striped bass, salmon, and steelhead remained abundant in California. Large declines followed the construction of dams on almost all Central Valley rivers, which greatly reduced access to spawning and rearing habitat. Once fish populations are low and habitat is damaged, their harvest can be an especially important control factor. Hatcheries were intended to substitute for lost spawning and rearing habitat, but nature cannot be so easily mimicked. Artificial propagation can provide abundant fish for restocking, but it cannot replace the abundance, productivity, life history diversity, and broad distribution of viable populations. Successful hatchery propagation will work best if it goes hand in hand with habitat restoration. Ultimately, fish produced in hatcheries must thrive and naturally reproduce once they have left the hatchery (Israel et al. 2011). Accordingly, close attention needs to be paid to genetic management to reduce genetic risks.

Hatchery and harvest regulations, and management practices related to those regulations must be based on the best available science and follow adaptive management protocols for monitoring and evaluating the results. Evaluations of hatchery fish impacts would be aided by better hatchery fish-marking techniques and more extensive marking.

POLICIES AND RECOMMENDATIONS

Policies and recommendations for restoring the Delta ecosystem include the following core strategies to reduce the impact of ecosystem stressors:

- Create more natural functional Delta flows
- Restore habitat
- Improve water quality to protect the ecosystem
- Prevent introduction of and manage nonnative species impacts
- Improve hatcheries and harvest management

Success of Delta ecosystem restoration depends on considering and addressing all stressor categories as well as completing and implementing the BDCP described in Chapter 3. Because reducing or eliminating some stressors, especially the globally determined and legacy stressors, will be difficult, adaptation to unmitigable stressors is also imperative.

Create More Natural Functional Flows

Water flow in the Delta is critically important because flow affects the reliability of water supplies and the health of the Delta ecosystem. The best available science demonstrates that flow management is essential to restoration of the Delta ecosystem. Several important ecosystem stressors, including entrainment, are linked to altered water flows. Greater reverse flows in the south Delta increase the numbers of fish entrained.

Problem Statement

Altered flows in the Sacramento and San Joaquin rivers and their tributaries change flows within and out of the Delta, and affect salinity and sediment in the Delta. Fish and other aquatic species native to the Delta are adapted to natural flow, salinity, and sediment regimes. Current flow, salinity, and sediment regimes harm native aquatic species and encourage nonnative species. The best available science suggests that currently required flow objectives within and out of the Delta are insufficient to protect the Delta ecosystem (SWRCB 2010). Additionally, uncertainty regarding future flow objectives for the Delta impairs the reliability of water supplies that depend on the Delta or its watershed. The predictability of water exports cannot be improved, and the BDCP cannot be implemented without timely SWRCB action to update flow objectives.

Policy

ER P1. Delta Flow Objectives

(a) The State Water Resources Control Board's Bay Delta Water Quality Control Plan flow objectives shall be used to determine consistency with the Delta Plan. If and when the flow objectives are revised by the State Water Resources Control Board, the revised flow objectives shall be used to determine consistency with the Delta Plan.

(b) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, the policy set forth in subsection (a) covers a proposed action that could significantly affect flow in the Delta.

23 CCR Section 5005
NOTE: Authority cited: Section 85210(i), Water Code.
Reference: Sections 85020, 85054, 85086, 85087, 85300, and 85302, Water Code.

Recommendations

ER R1. Update Delta Flow Objectives

Development, implementation, and enforcement of new and updated flow objectives for the Delta and high-priority tributaries are key to the achievement of the coequal goals. The State Water Resources Control Board should update the Bay Delta Water Quality Control Plan objectives as follows:

(a) By June 2, 2014, adopt and implement updated flow objectives for the Delta that are necessary to achieve the coequal goals.

(b) By June 2, 2018, adopt, and as soon as reasonably possible, implement flow objectives for high-priority tributaries in the Delta watershed that are necessary to achieve the coequal goals. [1]

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[1] SWRCB staff should work with the Council and DFW to determine priority streams. As an illustrative example, priority streams could include the Merced River, Tuolumne River, Stanislaus River, Lower San Joaquin River, Deer Creek (tributary

Flow objectives could be implemented through several mechanisms including negotiation and settlement, Federal Energy Regulatory Commission relicensing, or adjudicative proceeding.[2]

Prior to the establishment of revised flow objectives identified above, the existing Bay Delta Water Quality Control Plan objectives shall be used to determine consistency with the Delta Plan. After the flow objectives are revised, the revised objectives shall be used to determine consistency with the Delta Plan.

Restore Habitat

Loss of habitat is one of the largest stressors to the Delta ecosystem. The Delta Plan adopts the approach of the multiagency ERP Conservation Strategy (DFG 2011), which includes a map and accompanying text identifying appropriate habitat restoration types within the Delta and Suisun Marsh based on land elevation, included in the Delta Plan within Appendix B. Delta Plan Figure 4-6 is based on the ERP Conservation Strategy map. Policy ER P3 requires habitat restoration actions to use this figure and accompanying text (see Appendix B for additional information). For example, restoring tidal marsh habitat would generally not be appropriate outside the areas labeled "intertidal" on Figure 4-6 unless they connect other tidal marshes into large habitat areas or can recover elevation over time by natural processes.

An integrated, adaptive approach to restoring habitat must address several issues. Each problem statement below highlights one of these issues, followed by specific policies and recommendations intended to address it.

Problem Statement

Features of the Delta landscape, particularly the condition of its waterways, the elevation of its land, and other environmental conditions, have changed dramatically over the past 160 years. Damage to the habitats that support native species in the Delta has led to declines in native animal and plant populations, affecting both resident and migratory species.

Policies

The appendices referred to in the policy language below are included in Appendix B of the Delta Plan.

ER P2. Restore Habitats at Appropriate Elevations

(a) *Habitat restoration must be carried out consistent with Appendix 3, which is Section II of the* Draft Conservation Strategy for Restoration of the Sacramento-San Joaquin Delta Ecological Management Zone and the Sacramento and San Joaquin Valley Regions *(California Department of Fish and Wildlife 2011). The elevation map attached as Appendix 4 should be used as a guide for determining appropriate habitat restoration actions based on an area's elevation. If a proposed habitat restoration action is not consistent with Appendix 4, the proposal shall provide rationale for the deviation based on best available science.*

(b) *For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers a proposed action that includes habitat restoration.*

23 CCR Section 5006
NOTE: Authority cited: Section 85210(i), Water Code.
Reference: Sections 85020, 85022, 85054, 85300, and 85302, Water Code.

ER P3. Protect Opportunities to Restore Habitat

(a) *Within the priority habitat restoration areas depicted in Appendix 5, significant adverse impacts to the opportunity to restore habitat as described in section 5006, must be avoided or mitigated.*

(b) *Impacts referenced in subsection (a) will be deemed to be avoided or mitigated if the project is designed and implemented so that it will not preclude or otherwise interfere with the ability to restore habitat as described in section 5006.*

(c) *Impacts referenced in subsection (a) shall be mitigated to a point where the impacts have no significant effect on the opportunity to restore habitat as described in section 5006. Mitigation shall be determined, in consultation with the California Department of Fish and Wildlife, considering the size of the area impacted by the covered action and the type and value of habitat that could be restored on that area, taking into account existing and proposed restoration plans, landscape attributes, the elevation map shown in Appendix 4, and other relevant information about habitat restoration opportunities of the area.*

(d) *For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers proposed actions in the priority habitat restoration areas depicted in Appendix 5. It does not cover proposed actions outside those areas.*

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to Sacramento River), Lower Butte Creek, Mill Creek (tributary to Sacramento River), Cosumnes River, and American River. Implementation through hearings is expected to take longer than the deadline shown here.

[2] Implementation through adjudicative proceedings or FERC relicensing is expected to take longer than the deadline shown here.

23 CCR Section 5007
NOTE: Authority cited: Section 85210(i), Water Code.
Reference: Sections 85020, 85022, 85054, 85300, 85302, and 85305, Water Code.

Figure 4-7 provides examples of ways a project can implement ER P3.

ER P4. Expand Floodplains and Riparian Habitats in Levee Projects

(a) Levee projects must evaluate and where feasible incorporate alternatives, including the use of setback levees, to increase floodplains and riparian habitats. Evaluation of setback levees in the Delta shall be required only in the following areas (shown in Appendix 8): (1) The Sacramento River between Freeport and Walnut Grove, the San Joaquin River from the Delta boundary to Mossdale, Paradise Cut, Steamboat Slough, Sutter Slough; and the North and South Forks of the Mokelumne River, and (2) Urban levee improvement projects in the cities of West Sacramento and Sacramento.

(b) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers a proposed action to construct new levees or substantially rehabilitate or reconstruct existing levees.

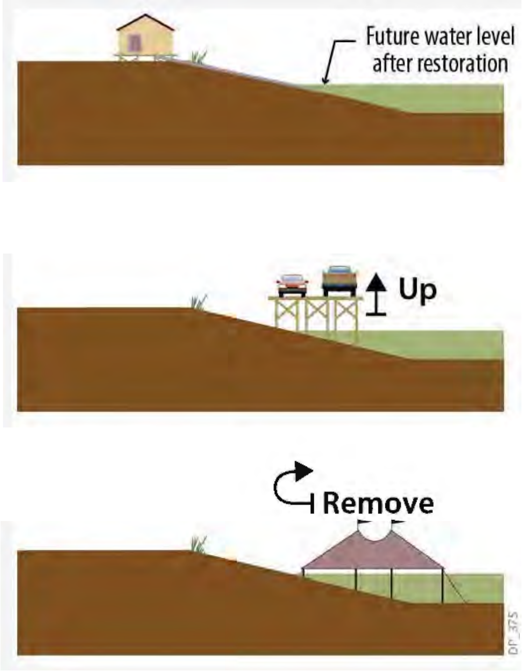
23 CCR Section 5008
NOTE: Authority cited: Section 85210(i), Water Code.
Reference: Sections 85020, 85022, 85054, 85300, 85302, and 85305, Water Code.

Recommendations

ER R2. Prioritize and Implement Projects that Restore Delta Habitat

Bay Delta Conservation Plan implementers, California Department of Fish and Wildlife, California Department of Water Resources, and the Delta Conservancy should prioritize and implement habitat restoration projects in the areas shown on Figure 4-8. Habitat restoration projects should ensure connections between areas being restored and existing habitat areas and other elements of the landscape needed for the full life cycle of the species that will benefit from the restoration project. Where possible, restoration projects should also emphasize the potential for improving water quality. Restoration project proponents should consult the California Department of Public Health's Best Management Practices for Mosquito Control in California.

How Projects Can Comply with ER P3



Locate structures at the edge of a habitat restoration area, rather than in the middle, to improve opportunities for restoring habitat connectivity.

Elevate structures so that water can flow underneath to allow for restoration of aquatic habitat dependent on tides or periodic flooding.

Allow temporary uses and require the removal of structures and cleanup afterward to protect opportunities for habitat restoration.

Figure 4-7

ER P3 requires projects located in the priority habitat restoration areas (shown on Figure 4-8) to protect opportunities to restore habitat. This figure shows conceptual examples of how to implement this policy.

Recommended Areas for Prioritization and Implementation of Habitat Restoration Projects

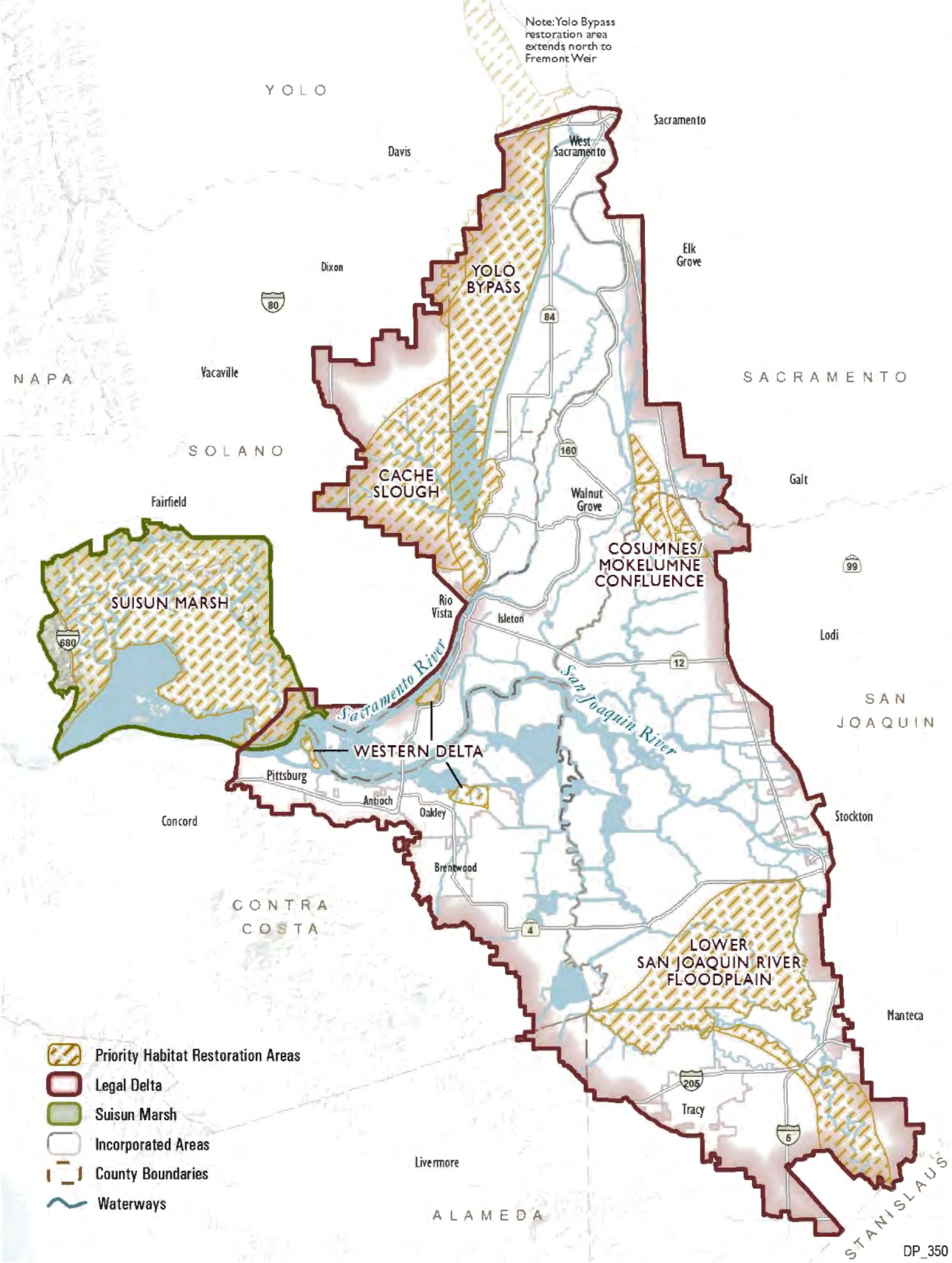


Figure 4-8 Priority habitat restoration areas are large areas within which specific sites may be identified for habitat restoration based on assessments of land use and other issues addressed through further feasibility analysis.

Source: DFG 2011

- ***Yolo Bypass.*** *Enhance the ability of the Yolo Bypass to flood more frequently to provide more opportunities for migrating fish, especially Chinook salmon, to use this system as a migration corridor that is rich in cover and food.*
- ***Cache Slough Complex.*** *Create broad nontidal, freshwater, emergent-plant-dominated wetlands that grade into tidal fresh-water wetlands, and shallow subtidal and deep open-water habitats. Also, return a significant portion of the region to uplands with vernal pools and grasslands.*
- ***Cosumnes River–Mokelumne River confluence.*** *Allow these unregulated and minimally regulated rivers to flood over their banks during winter and spring frequently and regularly to create seasonal floodplains and riparian habitats that grade into tidal marsh and shallow subtidal habitats.*
- ***Lower San Joaquin River floodplain.*** *Reconnect the floodplain and restore more natural flows to stimulate food webs that support native species. Integrate habitat restoration with flood management actions, when feasible.*
- ***Suisun Marsh.*** *Restore significant portions of Suisun Marsh to brackish marsh with land-water interactions to support productive, complex food webs to which native species are adapted and to provide space to adapt to rising sea level action. Use information from adaptive management processes during the* Suisun Marsh Habitat Management, Preservation, and Restoration Plan's *implementation to guide future habitat restoration projects and to inform future tidal marsh management.*
- ***Western Delta/Eastern Contra Costa County.*** *Restore tidal marsh and channel margin habitat at Dutch Slough and western islands to support food webs and provide habitat for native species.*

ER R3. Complete and Implement Delta Conservancy Strategic Plan

As part of its Strategic Plan and subsequent Implementation Plan or annual work plans, the Delta Conservancy should:

- *Develop and adopt criteria for prioritization and integration of large-scale ecosystem restoration in the Delta and Suisun Marsh, with sustainability and use of best available science as foundational principles.*
- *Develop and adopt processes for ownership and long-term operations and management of land in the Delta and Suisun Marsh acquired for conservation or restoration.*
- *Develop and adopt a formal mutual agreement with the California Department of Water Resources, California Department of Fish and Wildlife, federal interests, and other State and local agencies on implementation of ecosystem restoration in the Delta and Suisun Marsh.*
- *Develop, in conjunction with the Wildlife Conservation Board, the California Department of Water Resources, California Department of Fish and Wildlife, Bay Delta Conservation Plan implementers, and other State and local agencies, a plan and protocol for acquiring the land necessary to achieve ecosystem restoration consistent with the coequal goals and the Ecosystem Restoration Program Conservation Strategy.*
- *Lead an effort, working with State and federal fish agencies, to investigate how to better use habitat credit agreements to provide credit for each of these steps: (1) acquisition for future restoration; (2) preservation, management, and enhancement of existing habitat; (3) restoration of habitat; and (4) monitoring and evaluation of habitat restoration projects.*
- *Work with the California Department of Fish and Wildlife and the U.S. Fish and Wildlife Service to develop rules for voluntary safe harbor agreements with property owners in the Delta whose actions contribute to the recovery of listed threatened or endangered species.*

Problem Statement

Current USACE policy requires removal of vegetation from Delta levees, which would reduce already sparse riparian and shaded aquatic habitat along the channels.

Policies

No policies with regulatory effect are included in this section.

Recommendation

ER R4. Exempt Delta Levees from the U.S. Army Corps of Engineers' Vegetation Policy

Considering the ecosystem value of remaining riparian and shaded riverine aquatic habitat along Delta levees, the U.S. Army Corps of Engineers should agree with the California Department of Fish and Wildlife and the California Department of Water Resources on a variance that exempts Delta levees from the U.S. Army Corps of Engineers' levee vegetation policy where appropriate.

Problem Statement

The SMPP and the Local Protection Program components of the SMPP do not yet include climate change provisions. Without these amendments, it is unclear if and how Suisun Marsh will be managed to adapt to rising sea level.

Policies

No policies with regulatory effect are included in this section.

Recommendation

ER R5. Update the Suisun Marsh Protection Plan

The San Francisco Bay Conservation and Development Commission should update the Suisun Marsh Protection Plan *and relevant components of the Suisun Marsh Local Protection Program to adapt to sea level rise and ensure consistency with the Suisun Marsh Preservation Act, the Delta Reform Act, and the Delta Plan.*

Improve Water Quality to Protect the Ecosystem

Chapter 6 includes recommendations about salinity and ecosystem water quality. These recommendations support the protection of water quality for all beneficial uses of water and encourage the identification of water quality impacts of proposed actions. The recommendations also address acceleration of certain total maximum daily loads, low dissolved oxygen, implementation of a Delta Regional Monitoring Program, treatment of wastewater effluent and urban runoff, and Regional Water Quality Control Board engagement in Suisun Marsh.

Problem Statement

The Delta ecosystem is impaired by pollutants from municipal, industrial, agricultural, and other discharges and legacy pollutants flowing into the Delta and its tributaries, including pollutants that bioaccumulate and biomagnify in the food web.

Policies

No policies with regulatory effect are included in this section.

Recommendations

Recommendations for improving ecosystem water quality are included in Chapter 6.

Prevent Introduction of and Manage Nonnative Species Impacts

Problem Statement

Nonnative species are a major obstacle to successful restoration of the Delta ecosystem because they affect the survival, health, and distribution of native Delta wildlife and plants. There is little chance of eradicating most established nonnative species, but management can reduce the abundance of some. The resilience of native species is reduced by ongoing introductions of nonnative species and management actions that enhance conditions for nonnative species.

Policy

ER P5. Avoid Introductions of and Habitat Improvements for Invasive Nonnative Species

(a) The potential for new introductions of or improved habitat conditions for nonnative invasive species, striped bass, or bass must be fully considered and avoided or mitigated in a way that appropriately protects the ecosystem.

(b) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers a proposed action that has the reasonable probability of introducing or improving habitat conditions for nonnative invasive species.

23 CCR Section 5009
NOTE: Authority cited: Section 85210(i), Water Code.
Reference: Sections 85020, 85054, 85300, and 85302, Water Code.

Recommendations

ER R6. Regulate Angling for Nonnative Sport Fish to Protect Native Fish

The California Department of Fish and Wildlife should develop, for consideration by the Fish and Game Commission, proposals for new or revised fishing regulations designed to increase populations of listed fish species through reduced predation by introduced sport fish. The proposals should be based on sound science that demonstrates these *management actions are likely to achieve their intended outcome and include the development of performance measures and a monitoring plan to support adaptive management.*

ER R7. Prioritize and Implement Actions to Control Nonnative Invasive Species

The California Department of Fish and Wildlife and other appropriate agencies should prioritize and fully implement the list of "Stage 2 Actions for Nonnative Invasive Species" and accompanying text shown in Appendix J taken from the Conservation Strategy for Restoration of the Sacramento–San Joaquin Delta Ecological Management Zone and the Sacramento and San Joaquin Valley Regions *(DFG 2011). Implementation of the Stage 2 actions should include the development of performance measures and monitoring plans to support adaptive management.*

Improve Hatcheries and Harvest Management

Problem Statement

Hatcheries and harvest regulation are important tools in fisheries management, but they also pose genetic and ecological risks to native species and the Delta ecosystem. These practices need to employ adaptive management strategies to predict and evaluate outcomes, and minimize risks.

Policies

No policies with regulatory effect are included in this section.

Recommendations

ER R8. Manage Hatcheries to Reduce Genetic Risk

As required by the National Marine Fisheries Service, all hatcheries providing listed fish for release into the wild should continue to develop and implement scientifically sound Hatchery and Genetic Management Plans (HGMPs) to reduce risks to those species. The California Department of Fish and Wildlife should provide annual updates to the Delta Stewardship Council on the status of HGMPs within its jurisdiction.

ER R9. Implement Marking and Tagging Program

By December 2014, the California Department of Fish and Wildlife, in cooperation with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service, should revise and begin implementing its program for marking and tagging hatchery salmon and steelhead to improve management of hatchery and wild stocks based on recommendations of the California Hatchery Scientific Review Group, which considered mass marking, reducing hatchery programs, and mark selective fisheries in developing its recommendations.

Timeline for Implementing Policies and Recommendations

Figure 4-9 lays out a timeline for implementing the policies and recommendations described in the previous section. The timeline emphasizes near-term and intermediate-term actions.

Timeline for Implementing Policies and Recommendations

TIMELINE CHAPTER 4: Ecosystem Implementation

	ACTION (REFERENCE #)	LEAD AGENCY(IES)	NEAR TERM 2012–2017	INTERMEDIATE TERM 2017–2025
POLICIES	Delta flow objectives (ER P1)	SWRCB	●	●
	Restore habitats at appropriate elevations (ER P2)	DFW, DWR, Delta Conservancy	●	●
	Protect opportunities to restore habitat (ER P3)	DFW	●	●
	Expand floodplains and riparian habitats in levee projects (ER P4)	DWR, USACE	●	●
	Avoid introductions of and habitat improvements for invasive nonnative species (ER P5)	DFW, DWR, Delta Conservancy	●	●
RECOMMENDATIONS	Update Delta flow objectives (ER R1)	SWRCB	●	●
	Prioritize and implement projects that restore Delta habitat (ER R2)	DFW, DWR, and Delta Conservancy	●	●
	Complete and implement Delta Conservancy Strategic Plan (ER R3)	Delta Conservancy	●	
	Exempt Delta levees from U.S. Army Corps of Engineers' Vegetation Policy (ER R4)	USACE, DWR, DFW	●	●
	Update the Suisun Marsh Protection Plan (ER R5)	BCDC	●	
	Regulate angling for nonnative sport fish to protect native fish (ER R6)	DFW, CA Fish and Game Commission	●	
	Prioritize and implement actions to control nonnative invasive species (ER R7)	DFW	●	●
	Manage hatcheries to reduce genetic risk (ER R8)	DFW	●	●
	Implement marking and tagging program (ER R9)	DFW	●	●

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Agency Key:

BCDC: San Francisco Bay Conservation and Development Commission
BDCP: Bay Delta Conservation Plan
Delta Conservancy: Sacramento-San Joaquin Delta Conservancy
Council: Delta Stewardship Council
DFW: California Department of Fish and Wildlife
DWR: California Department of Water Resources
RWQCB: Regional Water Quality Control Board(s)
SWRCB: State Water Resources Control Board
USACE: U.S. Army Corps of Engineers

Figure 4-9

Issues for Future Evaluation and Coordination

Additional areas of interest and concern related to the Delta ecosystem may deserve consideration in the development of future Delta Plan updates:

- **Landscape-scale conceptual models.** The Delta Science Program will collaborate with other agencies, academic institutions, and stakeholders to develop landscape-scale conceptual models for the six priority restoration areas identified in ER R2.
- **Workshops to address stressor impacts.** The Delta Science Program, in collaboration with other agencies, academic institutions, and stakeholders, will hold workshops to develop additional recommendations to the Council for measures to reduce stressor impacts on the Delta ecosystem that would support and be consistent with the coequal goals. Recommended measures could be adopted as policies or recommendations by the Council into an amended Delta Plan.
- **Above-the-Delta migration corridors.** The Council will consult with fish and wildlife agencies and others as they complete or update plans to restore habitats for migratory species, such as anadromous fish or songbirds in the Sacramento and San Joaquin valleys above the Delta.

Science and Information Needs

The Delta ecosystem is not static; therefore, additional information is needed for decision making and adaptive management. Specifically, the following information is needed in the following areas:

- Landscape-scale conceptual models for Delta ecosystem restoration.
- Assessment of how flows benefit or harm native wildlife and plants.
- Effects of changing habitat quality and quantity on Delta fish and invertebrates. Examples might include (1) threadfin shad in the south and central Delta, (2) comparison of shallow shoal habitat and deep channel habitat to food resources of young striped bass, and (3) relationship between water turbidity and native fish migration, survival, growth, and/or reproduction.
- Hatchery, harvest, and/or predation impacts on natural fish populations.
- Tools to assess native fish response to restored habitats.
- Entrainment effects on fish populations.
- Tools to assess potential impacts of climate change and sea level rise to viability of species in intertidal habitats.

Performance Measures

Development of informative and meaningful performance measures is a challenging task that will continue after the adoption of the Delta Plan. Performance measures need to be designed to capture important trends and to address whether specific actions are producing expected results. Efforts to develop and track performance measures in complex and large-scale systems like the Delta are commonly multiyear endeavors. The recommended output and outcome performance measures listed below are provided as examples and subject to refinement as time and resources allow. Final administrative performance measures are listed in Appendix E and will be tracked as soon as the Delta Plan is completed.

The Delta Reform Act specifies some performance measures for large-scale ecosystem restoration within the Delta. Ecosystem performance measures should address progress in achieving the objectives set forth in Water Code sections 85302(c) and 85302(e).

Note that performance measures for ecosystem water quality are provided in Chapter 6.

Output Performance Measures

- The SWRCB adopts Delta flow objectives by June 2, 2014. (ER R1)
- The SWRCB adopts flow objectives for the major tributaries by 2018 (or soon as reasonably possible). (ER R1)
- Pilot-scale Delta habitat restoration projects are developed and initiated in the priority areas described in ER R2 by 2015. These projects include tidal brackish and freshwater marsh as well as floodplain restoration, and have clear adaptive management plans aimed at improving outcomes and providing lessons for the development of large-scale restoration projects. Metrics: acres restored by habitat type, and lessons learned. (ER R2)
- Progress, measured in acres of restored or enhanced habitat, is being made toward the biological opinions' targets of restoring 8,000 acres of tidal marsh and 17,000 to 20,000 acres of floodplain rearing habitat. (ER R2)
- The DFW and other appropriate agencies fully implement the list of "Stage 2 Actions for Nonnative Invasive Species." (ER R7)

Outcome Performance Measures

- Progress toward restoring in-Delta flows to more natural functional flow patterns to support a healthy estuary. Metrics: results from hydrological monitoring and hydrodynamic modeling. (ER R1)
- Progress toward decreasing annual trends in both the number of new and existing aquatic and terrestrial nonnative species, and the abundance and distribution of existing aquatic and terrestrial nonnative species in the Delta over the next decade. These trends will be derived from long-term animal and plant monitoring surveys conducted by the Interagency Ecological Program agencies, the California Department of Boating and Waterways, the U.S. Department of Agriculture, the San Francisco Estuary Institute, and others. (ER P5)
- Progress toward the documented occurrence and use of protected and restored habitats and migratory corridors by native resident and migratory Delta species. Trends in occurrence, use, and performance of native species in protected and restored habitats and corridors will be upward over the next decade. These trends will be derived from animal and plant monitoring surveys that are conducted as part of adaptive management strategies for the protection and restoration of these areas. (ER R2)
- Progress toward achieving the State and federal "doubling goal" for wild Central Valley salmonids relative to 1995 levels. Trends will be derived from long-term salmonid monitoring surveys conducted by the National Marine Fisheries Service, U.S. Fish and Wildlife Service, and others. (ER R2)

References

Baxter, R., R. Breuer, L. Brown, L. Conrad, F. Feyrer, S. Fong, K. Gehrts, L. Grimaldo, B. Herbold, P. Hrodey, A. Mueller-Solger, T. Sommer, and K. Souza. 2010. *Interagency Ecological Program 2010 Pelagic Organism Decline Work Plan and Synthesis of Results*. Interagency Ecological Program for the San Francisco Estuary.

BDCP (Bay Delta Conservation Plan). 2012. *Bay Delta Conservation Plan Administrative Draft*, Chapter 3 Conservation Strategy (Section 3.3). February 2012.

BDCP Independent Science Advisors. 2007. *Independent Science Advisor's Report*. November 16.

Breitburg, D. L., B. C. Crump, J. O. Dabiri, and C. L. Gallegos. 2010. Ecosystem engineers in the pelagic realm: Alteration of habitat by species ranging from microbes to jellyfish. *Integrative and Comparative Biology* 50: 188–200.

Brown, L. R., and D. Michniuk. 2007. Littoral fish assemblages of the alien-dominated Sacramento-San Joaquin Delta, California, 1980-1983 and 2001-2003. *Estuaries and Coasts* 30:186-200.

Bunn, S. E., and A. H. Arthington. 2002. Basic principles and ecological consequences of altered flow regimes for aquatic biodiversity. *Environmental Management* 30:492-507.

California Natural Resource Agency. 2009. *California Climate Adaptation Strategy*. 200 pp. http://resources.ca.gov/climate_adaptation/docs/Statewide_Adaptation_Strategy.pdf.

California Ocean Protection Council. 2011. *Resolution of the California Ocean Protection Council on Sea Level Rise*. Adopted March 11.

Carlisle, D. M., D. M. Wolock, and M. R. Meador. 2010. Alteration of streamflow magnitudes and potential ecological consequences: a multiregional assessment. *Frontiers in Ecology and the Environment* 9(5): 264-270.

Claudi, R., and H. Leach (eds.). 2000. *Nonindigenous Freshwater Organisms: Vectors, Biology, and Impacts*. Lewis Publishers. Boca Raton, Florida. pp. 127-147.

Cloern, J. E. 2007. Habitat connectivity and ecosystem productivity: implications from a simple model. *The American Naturalist* 169:E21-E33.

Cohen, A. N., and J. T. Carlton. 1998. Accelerating invasion rate in a highly invaded estuary. *Science* 279:555-558.

Crain, P. K., K. Whitener, and P. B. Moyle. 2004. Use of a restored central California floodplain by larvae of native and alien fishes. In Feyrer, F., L. R. Brown, R. L. Brown, and J. J. Orsi, (eds.), *Early Life History of Fishes in the San Francisco Estuary and Watershed*. American Fisheries Society Symposium 39. Bethesda, Maryland. pp. 125–140.

Delta ISB (Independent Science Board). 2011. Memorandum to Phil Isenberg, Chair, Delta Stewardship Council, and Members of the Delta Stewardship Council: Addressing Multiple Stressors and Multiple Goals in the Delta Plan. January 26. 15pp.

DFG and NMFS (California Department of Fish and Game and National Marine Fisheries Service). 2001. *Final Report on Anadromous Salmonid Fish Hatcheries in California*. Final Review Draft. December 3.

DFG (California Department of Fish and Game). 2008. *California Aquatic Invasive Species Management Plan*. January.

DFG (California Department of Fish and Game). 2011. *Conservation Strategy for Restoration of the Sacramento-San Joaquin Delta Ecological Management Zone and the Sacramento and San Joaquin Valley Regions*. Draft. July.

DFG (California Department of Fish and Game). 2012. Comment letter on Final Staff Draft Delta Plan. June 13.

DWR (California Department of Water Resources). 2003. California Central Valley unimpaired flow data, fourth edition. Bay-Delta office. November 2006.

Enright, C., and S. D. Culberson. 2010. Salinity trends, variability, and control in the northern reach of the San Francisco Estuary. *San Francisco Estuary and Watershed Science* 7(2). http://escholarship.org/uc/item/0d52737t.

FEMA (Federal Emergency Management Agency). 2005. *Technical Manual for Dam Owners, Impacts of Plants on Earthen Dams*. FEMA-534. pp. 115.

Feyrer, F. 2004. Ecological segregation of native and alien larval fish assemblages in the southern Sacramento-San Joaquin Delta. In Feyrer, F., L. R. Brown, R. L. Brown, and J. J. Orsi, (eds.), *Early Life History of Fishes in the San Francisco Estuary and Watershed*. American Fisheries Society Symposium 39. Bethesda, Maryland, pp.67–79.

Feyrer, F., and M. P. Healy. 2003. Fish community structure and environmental correlates in the highly altered southern Sacramento-San Joaquin Delta. *Environmental Biology of Fishes* 66:123–132.

Feyrer, F., M. L. Nobriga, and T. R. Sommer. 2007. Multidecadal trends for three declining fish species: habitat patterns and mechanisms in the San Francisco Estuary, California, USA. *Canadian Journal of Fisheries and Aquatic Sciences* 64:723–734.

Foley, J. A., R. DeFries, G. P. Asner, C. Barford, G. Bonan, S. R. Carpenter, et al. 2005. Global consequences of land use. *Science* 309:570–574.

Grimaldo, L. F., R. E. Miller, C. P. Peregrin, and Z. P. Hymanson. 2004. Spatial and temporal distribution of native and alien ichthyoplankton in three habitat types of the Sacramento-San Joaquin Delta. *American Fisheries Society Symposium* 39:81-96.

Grimaldo, L. F., T. Sommer, N. V. Ark, G. Jones, E. Holland, P. B. Moyle, B. Herbold, and P. Smith. 2009. Factors affecting fish entrainment into massive water diversions in a tidal freshwater estuary: can fish losses be managed? *North American Journal of Fisheries Management* 29:1253-1270.

Grossinger, R. M., A. A. Whipple, J. C. Collins, and D. Rankin. 2010. Historical Delta landscapes: Conceptual models for building a diverse and resilient future. Bay Delta Science Conference.

Hall, L. S., P. A. Krausman, and M. L. Morrison. 1997. The habitat concept and a plea for the use of standard terminology. *Wildlife Society Bulletin* 25:173–182.

Hanak, E., J. Lund, A. Dinar, B. Gray, R. Howitt, J. Mount, P. Moyle, and B. Thompson. 2011. *Managing California's Water: From Conflict to Reconciliation*. Public Policy Institute of California: San Francisco, California. 482 pp.

Hannon, S. J., and F. Schmiegelow. 2002. Corridors may not improve the conservation value of small reserves for most boreal birds. *Ecological Applications* 12:1457–1468.

Healey, Michael. 2007a. Delta Vision Context Memorandum: Delta Ecological Principles. http://deltavision.ca.gov/BlueRibbonTaskForce/July2007/PostMtg/Day_1_Item_5_Handout_2.pdf.

Healey, Michael. 2007b. Design Principles for a Sustainable Ecosystem in the Bay-Delta. http://deltavision.ca.gov/BlueRibbonTaskForce/Oct2007/PostMtg/Item_6_Handout1.pdf.

Healey, M. C., M. D. Dettinger, and R. B. Norgaard, eds. 2008. *The State of Bay-Delta Science, 2008*. Abstract. CALFED Science Program: Sacramento, California. 174 pp.

Hermoso, V., F. Pantus, J. Olley, S. Linke, J. Mugodo, and P. Lea. 2012. Systematic planning for river rehabilitation: integrating multiple ecological and economic objectives in complex decisions. *Freshwater Biology* 57:1–9.

Holmes, B. 2011. Overfishing eats away at genetic diversity of fish. *New Scientist*. http://www.newscientist.com/article/dn20699-overfishing-eats-away-at-genetic-diversity-of-fish.html. July 15.

Israel, J. A., K. M. Fisch, T. F. Turner, and R. S. Waples. 2011. Conservation of native fishes of the San Francisco Estuary: Considerations for artificial propagation of Chinook salmon, delta smelt, and green sturgeon. San Francisco Estuary and Watershed Science, John Muir Institute of the Environment, UC Davis.

Jassby, A. D., and J. E. Cloern. 2000. Organic matter sources and rehabilitation of the Sacramento-San Joaquin Delta (California, USA). *Aquatic Conservation: Marine and Freshwater Ecosystems* 10:323-352.

Jassby, A. D., W. J. Kimmerer, S. G. Monismith, C. Armor, J. E. Cloern, T. M. Powell, J. R. Schubel, and T. J. Vendlinski. 1995. Isohaline position as a habitat indicator for estuarine populations. *Ecological Applications* 5:272-289.

Jeffres, C. A., J. J. Opperman, and P. B. Moyle. 2008. Ephemeral floodplain habitats provide best growth conditions for juvenile Chinook salmon in a California river. E*nvironmental Biology of Fishes* 83(4): 449–458.

Jones, C. G., J. H. Lawton, and M. Shachak. 1994. Organisms as ecosystem engineers. *Oikos* 69:373–386.

Kimmerer, W. J. 2006. Response of anchovies dampens effects of the invasive bivalve *Corbula amurensis* on the San Francisco Estuary foodweb. *Marine Ecology Progress Series* 324:207–218.

Lackey, R. T. 2003. Pacific Northwest salmon: forecasting their status in 2100. *Reviews in Fisheries Science* 11(1): 35-88.

Lindenmayer, D., R. Hobbs, and J. Miller, et al. 2008. A checklist for ecological management of landscapes for conservation. *Ecology Letters* 11:78–91.

Lindley, S. T., and M. S. Mohr. 2003. Modeling the effect of striped bass (*Morone saxatilis*) on the population viability of Sacramento River winter-run Chinook salmon (*Oncorhynchus tshawytscha*). National Marine Fisheries Service. Fish Bulletin 101:321–331.

Lotze, H. K., H. S. Lenihan, B. J. Bourque, R. H. Bradbury, R. G. Cooke, M. C. Kay, S. M. Kidwell, M. X. Kirby, C. H. Peterson, and J. B. C. Jackson. 2006. Depletion, degradation, and recovery potential of estuaries and coastal seas. *Science* 312:1806–1809.

McGinnis, M.V. 1994. The politics of restoring versus restocking in the Columbia River. *Restoration Ecology* 2(3): 149-155. http://www.nwfsc.noaa.gov/resources/salmonhatchery/risks.cfm#genetic.

Monsen, N. E., J. R. Cloern, and J. R. Burau. 2007. Effects of flow diversions on water and habitat quality: Examples from California's highly manipulated Sacramento-San Joaquin Delta. *San Francisco Estuary and Watershed Science* 5(3):1-16. http://escholarship.org/uc/item/04822861.

Moyle, P. B., P. K. Crain, and K. Whitener. 2007. Patterns in the use of a restored California floodplain by native and alien fishes. *San Francisco Estuary and Watershed Science* 5(3):1–27. http://repositories.cdlib.org/jmie/sfews/vol5/iss3/art1.

Moyle, P. B., W. A. Bennett, W. E. Fleenor, and J. R. Lund. 2010. Habitat variability and complexity in the upper San Francisco Estuary. *San Francisco Estuary and Watershed Science* 8(3):1-24. http://escholarship.org/uc/item/0kf0d32x.

Moyle, P. B., and J. F. Mount. 2007. Homogenized rivers, homogenized faunas. *Proceedings of the National Academy of Sciences* 104:5711-5712.Newman, K. B. 2008. *An Evaluation of Four Sacramento-San Joaquin River Delta Juvenile Salmon Survival Studies*. Stockton FWO, U.S. Fish and Wildlife Service.

NMFS (National Marine Fisheries Service). 2009. Biological Opinion and Conference Opinion on the Long Term Operations of the Central Valley Project and the State Water Project. http://swr.nmfs.noaa.gov/ocap/NMFS Biological and Conference Opinion on the Long Term Operations of the CVP and SWP.pdf.

Nobriga, M. L., and F. Feyrer. 2007. Shallow-water piscivore-prey dynamics in California's Sacramento-San Joaquin Delta. *San Francisco Estuary and Watershed Science* 5(2):1-15. http://escholarship.org/uc/item/387603c0.

Nobriga, M. L., F. Feyrer, R. D. Baxter, and M. Chotkowski. 2005. Fish community ecology in an altered river delta: Spatial patterns in species composition, life history strategies, and biomass. *Estuaries and Coasts* 28:776-785.

Oltmann, R. N. 1998. Measured flow and tracer-dye data showing anthropogenic effects on the hydrodynamics of south Sacramento-San Joaquin Delta, California, Spring 1996-1997. U.S. Geological Survey Open-File Report 98-285.

Palmer, M. A., E. S. Bernhardt, J. D. Allan, P. S. Lake, G. Alexander, S. Brooks, J. Carr, S. Clayton, C. N. Dahm, J. Follstad Shah, D. L. Galat, S. Gloss, P. Goodwin, D. H. Hart, B. Hassett, R. Jenkinson, G. M. Kondolf, R. Lave, J. L. Meyer, T. K. O'Donnell, L. Pagano, P. Srivastava, and E. Sudduth. 2005. Standards for ecologically successful river restoration. *Journal of Applied Ecology* 42:208–217.

Pauly, D., V. Christensen, J. Dalsgaard, R. Froese, and F. Torres Jr. 1998. Fishing down marine food webs. *Science* 279:860-863.

Perry, R. W., J. R. Skalski, P. L. Brandes, P. T. Sandstrom, A. P. Klimley, A. Ammann, and B. Macfarlane. 2009. Estimating survival and migration route probabilities of juvenile Chinook salmon in the Sacramento–San Joaquin River Delta. *North American Journal of Fisheries Management* 30:142-156.

Petts, G. E. 2009. Instream flow science for sustainable river management. *Journal of the American Water Resources Association* (JAWRA) 45(5):1071-1086.

Poff, N. L., J. D. Allan, M. B. Bain, J. R. Karr, K. L. Prestegaard, B. D. Richter, R. E. Sparks, and J. C. Stromberg. 1997. The natural flow regime. *BioScience* 47:769-784.

Postel, S., and B. Richter. 2003. *Rivers for Life: Managing Water for People and Nature*. Island Press, Washington, DC.

PRBO CalPIF (Point Reyes Bird Observatory California Partners in Flight). 2008. *Bringing the Birds Back: A Guide to Habitat Enhancement for Birds in the Sacramento Valley* (R. DiGaudio, K. Kreitinger, and T. Gardali, lead authors). California Partners in Flight Regional Conservation Plan No. 2. http://www.prbo.org/calpif.

Reclamation and USFWS (Bureau of Reclamation and U.S. Fish and Wildlife Service). 2008. Listen to the River: An Independent Review of the CVPIA Fisheries Program. Prepared by a panel of independent reviewers under contract with Circlepoint.

Reynolds, F. L., T. J. Mills, R. Benthin, and A. Low. 1993. Restoring Central Valley streams; a plan for action. Sacramento, California: California Department of Fish and Game. pp. 129. http://www.dfg.ca.gov/fish/documents/Resources/RestoringCentralVallyStreams.pdf.

Sacramento-San Joaquin Delta Conservancy. 2012. *Delta Conservancy Strategic Plan*. Public Review Draft. March 26.

San Francisco Estuary Institute. 2012. Sacramento-San Joaquin Delta Historical Ecology Investigation: Exploring Pattern and Process. Aquatic Science Center. Prepared for the California Department of Fish and Game and Ecosystem Restoration Program. August.

San Joaquin River Group Authority. 2010. *Annual Technical Report on Implementation and Monitoring of the San Joaquin River Agreement and the Vernalis Adaptive Management Plan (VAMP)*. http://www.sjrg.org/technicalreport/2010/2010_SJRGA_Annual_Technical_Report.pdf.

Simenstad, C.A., W. G. Hood, R. M. Thom, D.A. Levy, and D. L. Bottom. 2000. Landscape structure and scale constraints on restoring estuarine wetlands for Pacific Coast juvenile fishes. *Concepts and Controversies in Tidal Marsh Ecology*. M. P. Weinstein and D. A. Kreeger, eds. pp. 597–630. Kluwer Academic Publishers: Dordrecht, Netherlands.

Sommer, T., B. Harrell, M. Nobriga, R. Brown, P. Moyle, W. Kimmerer, and L. Schemel. 2001. California's Yolo Bypass: evidence that flood control can be compatible with fisheries, wetlands, wildlife, and agriculture. *Fisheries* 26:6-16.

Sommer, T., R. Baxter, and B. Herbold. 1997. The resilience of splittail in the Sacramento–San Joaquin Estuary. *Transactions of the American Fisheries Society* 126:961–976.

Sommer, T., C. Armor, R. Baxter, R. Breuer, L. Brown, M. Chotkowski, S. Culberson, F. Feyrer, M. Gingras, B. Herbold, W. Kimmerer, A. Mueller-Solger, M. Nobriga, and K. Souza. 2007. The collapse of pelagic fishes in the Upper San Francisco Estuary. *Fisheries* 32:270–277.

SWRCB (State Water Resources Control Board). 2010. *Development of Flow Criteria for the Sacramento–San Joaquin Delta Ecosystem*. California Environmental Protection Agency, Sacramento, California.

Teal, J. M., N. G. Aumen, J. E. Cloern, K. Rodriguez, and J. A. Wiens. 2009. *Ecosystem Restoration Workshop Panel Report*. CALFED Science Program.

Turner, M. G. 1989. Landscape ecology: the effect of pattern on process. *Annual Review of Ecology and Systematics* 20:265–275.

USFWS (U.S. Fish and Wildlife Service). 2008. Formal Endangered Species Act Consultation on the Proposed Coordinated Operations of the Central Valley Project (CVP) and the State Water Project (SWP). http://www.fws.gov/sfbaydelta/documents/SWP-CVP OPs BO 12-15 final signed.pdf.

USGS (United States Geological Survey). 2001. Nonindigenous species information bulletin: Asian clam, *Corbicula fluminea* (Müller, 1774) (*Mollusca: Corbiculidae*). Florida Caribbean Science Center, Gainesville, FL.

Villamanga, A. M., and B. R. Murphy. 2010. Ecological and socio-economic impacts of invasive water hyacinth (*Eichhornia crassipes*): a review. *Freshwater Biology* 55:282-298.

Whipple, A. A. 2011. Abstract: "Habitat Characteristics of Past Delta Landscapes: Knowledge for Improving Future Ecosystem Resilience." California-Nevada Chapter of the American Fisheries Society 2011 Conference Abstracts. http://www.afs-calneva.org/_files/Cal-Neva_AFS_Conf_2011_Abstracts.pdf. Historical and Current Delta Waterways figure provided via personal communication between San Francisco Estuary Institute Aquatic Science Center and Delta Science Program staff.

Whipple, A. A., R. M. Grossinger, J. C. Collins, and D. Rankin. 2010. The Historical Yolo Basin Landscape: What Parts Make the Whole? Bay-Delta Science Conference Abstract. Sacramento, California.

Wiens, J. A. 2002. Riverine landscapes: Taking landscape ecology into the water. *Freshwater Biology* 47: 501–515.

Williams, J. G. 2006. Central Valley salmon: A perspective on Chinook and steelhead in the Central Valley of California. *San Francisco Estuary and Watershed Science* 4(3):1-418. http://escholarship.org/uc/item/21v9x1t7.

Winder, M., and A. D. Jassby. 2011. Synergies between climate anomalies and hydrological modifications facilitate estuarine biotic invasions. *Ecology Letters* 14:749-757.

Wright, S. A., and D. H. Schoellhamer. 2004. Trends in the sediment yield of the Sacramento River, California, 1957-2001. *San Francisco Estuary and Watershed Science* 2(2): 1-15. http://escholarship.org/uc/item/891144f4.

Yoshiyama, R. M., E. R. Gerstung, F. W. Fisher, and P. B. Moyle. 1996. *Historical and Present Distribution of Chinook Salmon in the Central Valley Drainage of California*. Sierra Nevada Ecosystem Project: final report to Congress. In Assessments, commissioned reports, and background information. Center for Water and Wildlife Resources, University of California at Davis. Davis, California. pp. 309–362.

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CHAPTER 5

Protect and Enhance the Unique Cultural, Recreational, Natural Resource, and Agricultural Values of the California Delta as an Evolving Place

ABOUT THIS CHAPTER

This chapter describes the unique values that distinguish the Sacramento-San Joaquin Delta (Delta) and make it a special region. It also outlines the Delta Stewardship Council's (Council) five core strategies for protecting and enhancing these values:

- Designate the Delta as a special place worthy of national and state attention
- Plan to protect the Delta's lands and communities
- Maintain Delta agriculture as a primary land use, a food source, a key economic sector, and a way of life
- Encourage recreation and tourism that allow visitors to enjoy and appreciate the Delta, and that contribute to its economy
- Sustain a vital Delta economy that includes a mix of agriculture, tourism, recreation, commercial and other industries, and vital components of state and regional infrastructure

The 2 policies and 19 recommendations to carry out these strategies are found at the end of the chapter. Protecting the Delta as a place also depends on the strategies to reduce flood and other risks to the Delta that are described in Chapter 7.

RELEVANT LEGISLATION

The Sacramento-San Joaquin Delta Reform Act of 2009 declared State policy for the resources and values of the Delta (Water Code section 85054):

> *"Coequal goals" means the two goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem. The coequal goals shall be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place.*

The Legislature declares the following objectives inherent in the coequal goals for management of the Delta (Water Code section 85020):

> *(a) Manage the Delta's water and environmental resources and the water resources of the state over the long term.*
>
> *(b) Protect and enhance the unique cultural, recreational, and agricultural values of the California Delta as an evolving place.*

Water Code section 85302(h) provides direction on the implementation of measures to promote the coequal goals and inherent objectives:

> *(h) The Delta Plan shall include recommendations regarding state agency management of lands in the Delta.*

The Delta Reform Act states (Water Code section 85022 (d)):

> *(d) The fundamental goals for managing land use in the Delta are to do all of the following:*
>
>> *(1) Protect, maintain, enhance, and, where feasible, restore the overall quality of the Delta environment and its natural and artificial resources.*
>>
>> *(2) Ensure the utilization and conservation of Delta resources, taking into account the social and economic needs of the people of the state.*
>>
>> *(3) Maximize public access to Delta resources and maximize public recreational opportunities in the Delta consistent with sound resources conservation principles and constitutionally protected rights of private property owners.*
>>
>> *(4) Encourage state and local initiatives and cooperation in preparing procedures to implement coordinated planning and development for mutually beneficial uses, including educational uses, in the Delta.*
>>
>> *(5) Develop new or improved aquatic and terrestrial habitat and protect existing habitats to advance the goal of restoring and enhancing the Delta ecosystem.*
>>
>> *(6) Improve water quality to protect human health and the environment consistent with achieving water quality objectives in the Delta.*

Public Resources Code section 29703.5 describes the Delta Protection Commission's role in providing recommendations to the Delta Stewardship Council:

> *(a) The Delta Protection Commission created pursuant to Section 29735 provides an existing forum for Delta residents to engage in decisions regarding actions to recognize and enhance the unique cultural, recreational, and agricultural resources of the Delta. As such, the commission is the appropriate agency to identify and provide recommendations to the Delta Stewardship Council on methods of preserving the Delta as an evolving place as the Delta Stewardship Council develops and implements the Delta Plan.*
>
> *(b) There is a need for the five Delta counties to establish and implement a resources management plan for the Delta and for the Delta Stewardship Council to consider that plan and recommendations of the commission in the adoption of the Delta Plan.*

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CHAPTER 5

Protect and Enhance the Unique Cultural, Recreational, Natural Resource, and Agricultural Values of the California Delta as an Evolving Place

The Delta Reform Act provides that the coequal goals of providing a more reliable water supply and protecting, enhancing, and restoring the Delta ecosystem shall be achieved in a manner that protects the unique cultural, natural, recreational, resource, and agricultural values of the Delta as an evolving place. Achieving this objective begins with recognizing the values that make the Delta a distinctive and special place:

- The Delta's geography of low-lying islands and tracts, many below the water level and shaped by sloughs, shipping channels, and rivers; tidal influences; levees; and other water controls is unique among California landscapes.
- The Delta retains a rural heritage, characterized by farms and small towns linked by navigable waterways and winding country roads.
- The Delta's agricultural economy is vital to the region and contributes to California's important agricultural economy.
- The Delta is a region where maritime ports, commercial agriculture, and expanding cities coexist with a unique native ecosystem that is home to many species of wildlife and fish.
- The Delta is a place of multicultural tradition, legacy communities, and family farms.
- The Delta provides opportunities for recreation and tourism because of its unique geography, mix of activities, and rich natural resources.

The Delta's uniqueness, however, does not exempt it from change. Increasing pressures of growing populations, shifting commodity markets, climate changes, and rising sea level will require new ways of adaptation for this region. Some changes are driven by the Delta's location at the center of California's water systems and are required to meet statewide goals of restoring the Delta's ecosystem and improving water supply reliability. Other changes may be caused by floods, earthquakes, or other events that threaten the Delta's levees and islands. Some changes can be managed by policies that shape how the Delta's traditions are honored and its history preserved; guide new development; enhance recreation and tourism; and encourage agriculture, business expansion, and economic development.

Protecting the Delta as an evolving place means accepting that change will not stop, but that the fundamental characteristics and values that contribute to the Delta's special qualities and that distinguish it from other places can be preserved and enhanced while accommodating these changes (Delta Vision Blue Ribbon Task Force 2008). It does not mean that the Delta should be a fortress, a preserve, or a museum.

The Council envisions a future where the Delta's unique qualities are recognized and honored. Agriculture will continue to thrive on the Delta's rural lands; and its cities, ports, and rural villages will be desirable places to live, work, and do business. Visitors to the region will enjoy recreation on and in its waterways, marshes, resorts, parks, and historic legacy communities. The Delta's land uses and development will be resilient, protecting the rural character of the area, reducing risks to people and property, adjusting to changing conditions, and promoting the ability to recover readily from distress. The Delta's economic vitality will provide resources to respond to change and to support the families and businesses that make the Delta home. The vision of the Delta as an evolving place also acknowledges the role of Delta residents in shaping the future of the region through active and effective participation in Delta planning and management.

Creating a Common Vision of the Delta as a Place

The Delta Reform Act recognizes not only the uniqueness of the region, but also that it is managed and influenced by many State of California (State), federal, and local agencies, often with differing views about the Delta and with overlapping and sometimes conflicting jurisdictions. Through the Delta Plan, the Council intends to foster a common vision for the future of the Delta as a place and to promote more effective coordination among these agencies. (See sidebar, Looking at the Delta.)

Fashioning this common vision has begun by drawing much of the information and many of the strategies of this chapter from these agencies' reports and recommendations, including the following documents:

- The *Proposal to Protect, Enhance, and Sustain the Unique Cultural, Historical, Recreational, Agricultural, and Economic Values of the Sacramento-San Joaquin Delta as an Evolving Place* developed by the Delta Protection Commission (DPC) (DPC 2012a)
- The DPC's *Economic Sustainability Plan for the Sacramento-San Joaquin Delta* (ESP) (DPC 2012b)
- The *Recreation Proposal for the Sacramento-San Joaquin Delta and Suisun Marsh* (Recreation Proposal) developed by California State Parks (California State Parks 2011)
- The Sacramento-San Joaquin Delta Conservancy's (Delta Conservancy) *Strategic Plan*

The Public Resources Code (section 29703.5(a)) names the DPC as "the appropriate agency to identify and provide recommendations to the Council on methods of preserving the Delta as an evolving place." The DPC is an agency created in 1992 by the Delta Protection Act to plan for and guide natural resource conservation and enhancement in the legal Delta while sustaining agriculture and meeting increased recreational demand.

LOOKING AT THE DELTA

The Delta presents itself from three vantages that display alternative aspects of its character.

From the water, the Delta is a thicket of sloughs, rock-lined channels, and open waterways where the land lies unseen behind tall levees and riparian vegetation. This is a Delta of recreational boating and oceangoing freighters, piers and lift bridges, diversions and water control structures, fish and diving ducks, resorts and marinas.

Another view of the Delta is a predominantly rural, agricultural landscape dotted with historic villages and where waterways are hidden on the other side of the levee, to be glimpsed only from bridges and levee-top roads. This is a Delta of vineyards, orchards, farm fields, ditches, and waterfowl hunting clubs; of historic farmsteads and one-of-a-kind shops and restaurants; and of farm machinery and bicyclists.

A third view of the Delta looks out from its metropolitan areas: Stockton, Manteca, Lathrop, Tracy, Contra Costa County's shoreline suburbs, Suisun City, Fairfield, Sacramento, and West Sacramento. This is a Delta of downtowns, neighborhoods, and new suburbs; cooling summer breezes and clammy winter fog; waterfront parks and a catch of striped bass in the freezer; and ports, warehouses, offices, and other job sites.

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As provided in Water Code section 85301, the DPC developed the *Proposal to Protect, Enhance, and Sustain the Unique Cultural, Historical, Recreational, Agricultural, and Economic Values of the Sacramento-San Joaquin Delta as an Evolving Place* (DPC 2012a). This proposal was submitted to the Council for incorporation into the Delta Plan. The proposal includes a plan to recognize the Delta as a place of special significance by applying for a federal designation of the Delta as a National Heritage Area (NHA). The NHA designation is granted by the U.S. Congress to places where natural, cultural, historic, and recreational resources combine to form a distinctive landscape and tell a nationally important story about the country and its experience.

The DPC also recommends strategies to support increased investment in agriculture, recreation, tourism, and other resilient land uses in the Delta. These strategies are derived from the ESP (DPC 2012b). Established in 2009, the Delta Conservancy is responsible for implementing ecosystem restoration projects protecting and preserving agriculture and working landscapes; increasing recreation and tourism opportunities; promoting legacy communities and economic vitality; and protecting, conserving, and restoring the region's physical, agricultural, cultural, historical, and living resources (Public Resources Code section 32322). Careful coordination between the DPC and Delta Conservancy can maximize the impact of both agencies' economic development activities.

Protecting the Delta as an Evolving Place Is Inherent in the Coequal Goals

Protecting the Delta as an evolving place is inherent in the coequal goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem. This is partly because attaining these two goals will necessitate a growing awareness among Californians of the Delta and its values, including its agriculture, recreation, natural resources, and unique culture. It is also because Delta residents benefit from the levees that help convey fresh water through the Delta; enjoy the wildlife, fish, and recreation that the Delta ecosystem produces; and work for its water management agencies and facilities. Changes required to provide a more reliable water supply or restore the ecosystem will influence the kind of place the Delta becomes, especially if structures to improve conveyance or areas of restored habitat significantly alter the Delta's familiar farming landscape. At the same time, the needs to protect the Delta's land uses and people will shape and constrain decisions about water supplies and ecosystem restoration, including allocation of water supplies, flow and salinity objectives, levee priorities, and how impacts to communities and land uses are mitigated.

Water for agricultural, municipal, and industrial uses is a key to the Delta as a place. Delta communities are the most dependent of all Californians on Delta water supplies, which support its residents, businesses, and farms. They, like other Californians, can often do more to use water more efficiently and to develop alternative supplies through recycling, conjunctive use of groundwater, or participation in regional water supply projects. Because the communities and economy of the Delta require water of reliable quality as well as amount, updates to the Bay-Delta Water Quality Control Plan have special influence on the region. The Delta is also influenced by other Central Valley water quality plans because they protect the quality of water for Delta consumers, farmers, and recreationists and the costs Delta residents and businesses pay to meet clean water standards.

A healthy ecosystem is also important to the Delta's communities. Residents find joy and relaxation in outdoor recreation and the connection with nature that the Delta ecosystem provides. Visitors drawn to its scenery, waterways, fish, and wildlife support tourism businesses. Protecting the ecosystem maintains these benefits and restoring it can expand them, especially when it can be accomplished in ways that enhance the Delta's working landscape. Coordinating restoration with planning for flood control can help control costs for levee improvement and management, draw on multiple sources of funds for multipurpose flood control investments, and provide alternate uses for areas that cannot be protected cost effectively. Restoring marshes, riverbanks, and riparian areas will alter how some land is used, but the impacts of these changes on the Delta's unique values can be managed through cooperation, careful design to lessen or avoid adverse effects, or reasonable mitigation of unavoidable impacts.

The Delta as a Place

The California Delta is a unique place distinguished by its geography, legacy communities, a rural and agricultural setting, vibrant natural resources, and a mix of economic activities. This section describes the features that make the Delta unique. Its 839,640 acres of land, sometimes centered on a wide river but laced with a network of narrow channels and sloughs, stretch to the horizon, bounded only by the levees that were built to drain the Delta's marshes and floodprone riversides. The Legislature has found that the Delta's uniqueness is particularly characterized by its hundreds of miles of meandering waterways and the many islands adjacent to them, and has described the Delta's highly productive agriculture, recreational assets, fisheries, and wildlife as invaluable resources (Water Code section 12981(b)). These natural assets, including the ecosystem and water resources as described in Chapters 3, 4, and 6, are among the Delta's important values.

The Delta is composed of three areas recognized in California law. The Primary Zone is the largest and includes 490,050 acres at the heart of the Delta (Public Resources Code section 29728). It is primarily rural farmland, but also includes several small towns established in the nineteenth and twentieth centuries. The Secondary Zone includes 247,320 acres surrounding the Primary Zone (Public Resources Code section 29731). It also includes farmland, but is increasingly dominated by the region's cities and suburbs. Suisun Marsh lies northwest of the Primary Zone, encompassing 106,570 acres (Public Resources Code section 29101) primarily of managed wetland. The Suisun Marsh overlaps the boundary of the Delta by about 4,300 acres (see Figure 5-1).

The Legislature has declared that the Delta is a natural resource of statewide, national, and international significance, and that the cities, towns, and settlements within the Delta are of significant historical, cultural, and economic value (Public Resources Code sections 29701 and 29708). However, not all Delta users, visitors, or residents recognize or appreciate the Delta's values. In a recent survey, 78 percent of Californians said they had not heard of or did not know about the Delta (Probolsky Research 2012). A survey in 2007 found that nearly half of Stockton residents had only a vague idea—or none at all—that they lived in or near the Delta (*Stockton Record* 2012).

This lack of a clearly recognized, widely communicated identity for the Delta is described as the lack of a "brand." Delivering a coordinated message about the Delta and its resources is difficult because responsibilities for the Delta are divided among so many agencies. Many visitors and even some residents of Delta cities and suburbs are unfamiliar with the region beyond their travel route or community, or know it only in name from news media reports about conflicts over its water and natural resources. To some, the Delta's flat agricultural landscape is dull and monotonous, and its resources are "out of sight and out of mind." Access into the Delta by first-time visitors can be difficult because of its winding roads and lack of amenities that signify a special region; simplify wayfinding; educate travelers about an area's history, culture, and natural resources; or encourage public access and recreation.

Delta Primary and Secondary Zones and Suisun Marsh

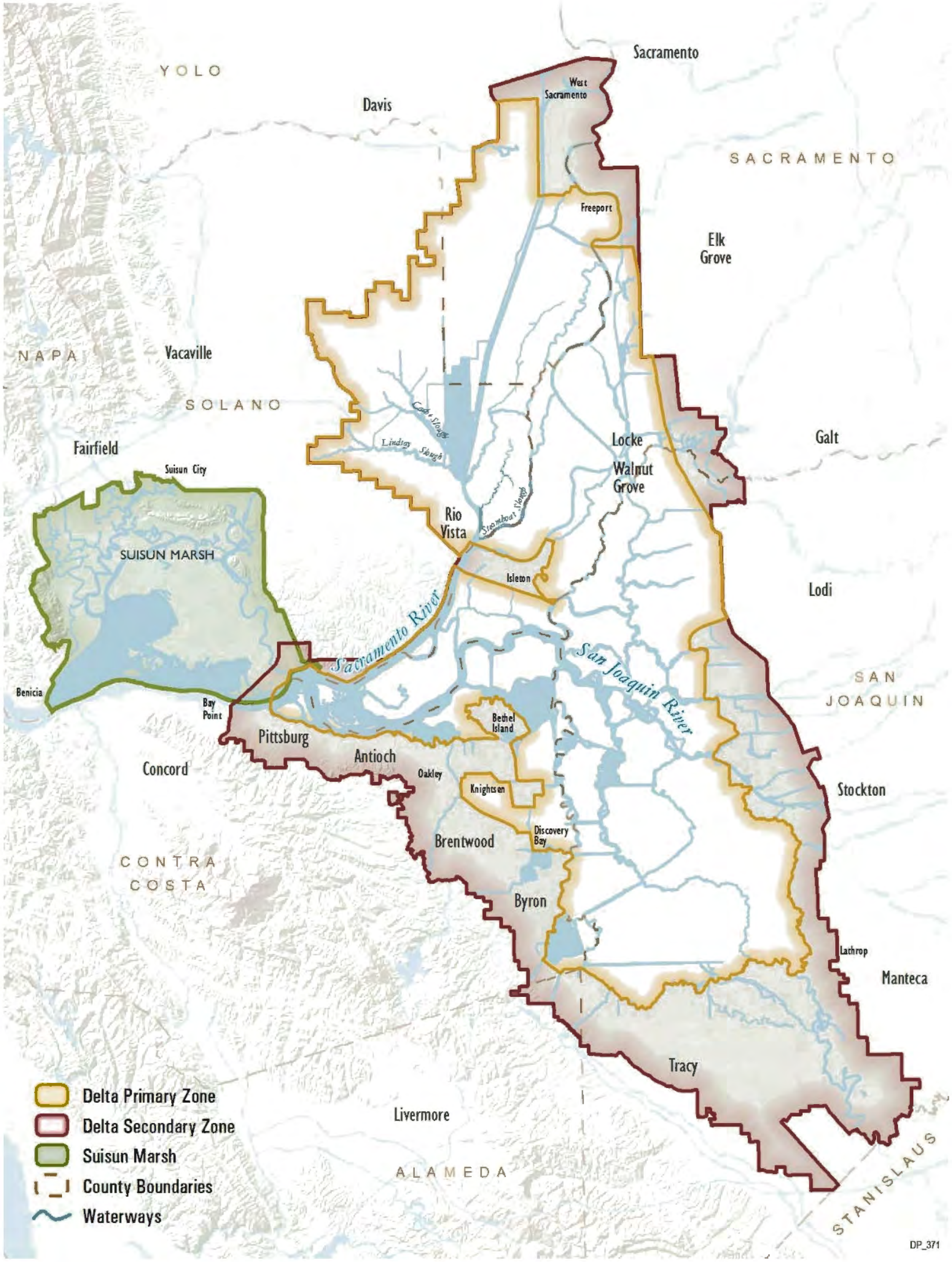

Figure 5-1

The Delta's People

About 570,000 people reside in the Delta, according to the 2010 Census. Ninety-eight percent of them live in the Delta's Secondary Zone, with the remainder in the Primary Zone. Prior to the recent recession, the population of the Delta's Secondary Zone had been growing rapidly, increasing almost 56 percent since the 1990 Census, a rate twice as fast as the state as a whole. Much of that increase occurred in new communities in previously unincorporated county areas, such as Discovery Bay; rapidly growing towns and communities such as Brentwood and Oakley on State Route 4; and cities such as Sacramento, West Sacramento, Stockton, and Lathrop. The age and household composition of the Delta's population is similar to California as a whole, but with slightly younger and larger families. About half the Delta's population is between the ages of 21 and 54, and about 29 percent are younger than 18 years old (DPC 2012b).

In contrast, the population of the Primary Zone has been essentially unchanged over those 20 years. The Primary Zone is also composed primarily of older people without children, living in smaller households.

Today, most Delta residents describe themselves as white or Hispanic, with the next largest groups being Asian, other races, and African-American or black. About one-third describe themselves as Hispanic. This diverse population reflects the many United States regions and foreign lands from which settlers emigrated to the Delta, including Mexico, China, Japan, Portugal, the Philippines, and other countries. These origins are reflected in communities and neighborhoods like Locke, an early twentieth century town built primarily by Chinese farmworkers. Cultural events honor many ethnic traditions in the Delta, including Chinese and Cambodian New Years, Portuguese festas, Greek holidays, Indian Diwali celebrations, Filipino fiestas, Cinco de Mayo events, and Juneteenth commemorations. Other festivals feature Delta agriculture, such as the Courtland Pear Fair and the Stockton Asparagus Festival (California State Parks 2011).

The Delta's Communities

The region's urban communities include the cities of Sacramento, West Sacramento, Stockton, Lathrop, Manteca, Tracy, Oakley, Brentwood, Antioch, Pittsburg, Benicia, Fairfield, Suisun City, Rio Vista, and Isleton, and the unincorporated communities of Freeport, Mountain House, Byron, Discovery Bay, Bethel Island, and Knightsen. They are located entirely or partially in the Delta's Secondary Zone or in the secondary management area of Suisun Marsh. Unincorporated communities in the Primary Zone include Clarksburg, Courtland, Hood, Locke, Walnut Grove, and Ryde. Appendix B includes maps of these unincorporated communities.

The general plans of Delta cities and counties describe where development of these communities may occur. These plans or actions by the local area formation commissions describe "spheres of influence" (SOIs) for each jurisdiction and often identify an urban limit line beyond which intense development cannot occur without amendment of the plan. About 26,000 acres of the Delta within these SOIs are expected to undergo urbanization (DPC 2012b) (see Figure 5-2). To encourage the location of new development within these SOIs rather than in rural areas, Chapter 7 policies exempt development in these areas from policies to increase flood protection standards. The Delta Plan includes no policies or recommendations to control land use or density in these communities.

Among the Delta's unincorporated communities, Bethel Island warrants a special note because of its flood risks, the development planned there, and its lack of public services. Its developed area occupies part of the 3,500-acre island, most of which is planned for rural agricultural or visitor-serving commercial uses. About 2,100 people reside on the island in about 1,300 residences concentrated on the island's south central shoreline, four mobile home parks, or 13 commercial marinas. Approximately 15 miles of levees surround the island, which is below sea level, limiting the drainage of floodwaters in the event of a levee breach.

A single road, Bethel Island Road, links the island to the mainland at the city of Oakley, complicating emergency response or evacuation in the event of flooding. Although the entire island is included in the urban limit line that Contra County's voters approved in 2006, development on the island clusters around Delta Coves, a 495-unit water-oriented residential development that was permitted in 1973, but that still remains unfinished, in part because of the bankruptcy of its developer. Other development includes mobile home parks and retail areas. Rural uses include single-family homes along the island's shoreline, marinas, resorts, a golf course, rural residential uses, and farmland. Contra Costa County's General Plan seeks to preserve and enhance the rural quality of Bethel Island and still allow for planned residential and commercial growth related to water-oriented recreation. The general plan notes that development other than a single home on existing parcels must await resolution of several issues, including improvement of the community's public services, levees, and emergency evacuation routes. Because of its flood risks and its rural character, Bethel Island is not excluded from the Delta Plan policy limiting new urban development. Restrictions on development on Bethel Island are consistent with the Contra Costa County General Plan.

As described in Chapter 2, covered actions subject to the Delta Reform Act do not include plans, programs, or projects within the Delta's Secondary Zone that a metropolitan planning agency has determined are consistent with a sustainable communities strategy adopted under California planning law. These sustainable communities strategies will, in part, accomplish the following:

- Identify the general location of uses, residential densities, and building intensities within the region.
- Identify areas within the region over their 20-plus-year planning period sufficient to house the population of the region.
- Identify areas within the region sufficient to house an 8-year projection of the regional housing need for the region.
- Identify a transportation network to serve the transportation needs of the region.
- Gather and consider information regarding resource areas and farmland in the region.
- Set forth a forecast development pattern, which, when integrated with the transportation network and other transportation measures and policies, will reduce greenhouse gas emissions from automobiles and light trucks. The sustainable community strategy development pattern will need to be based upon "current planning assumptions" that include the information in local general plans and SOI boundaries.

As provided in Water Code section 85212, the Council will cooperate with local and regional planning agencies to provide timely advice about sustainable community strategies and other local and regional plans for consistency with the Delta Plan. This will include reviewing their consistency with the ecosystem restoration needs of the Delta and whether these plans set aside sufficient lands for natural resource protection to meet the Delta's ecosystem needs. Through this coordination, decisions about locating and planning new urban development in the Secondary Zone can be coordinated to meet local communities' housing and other needs, as Water Code section 85022(d)(4) provides, while protecting and enhancing the Delta as an evolving place.

Delta Communities

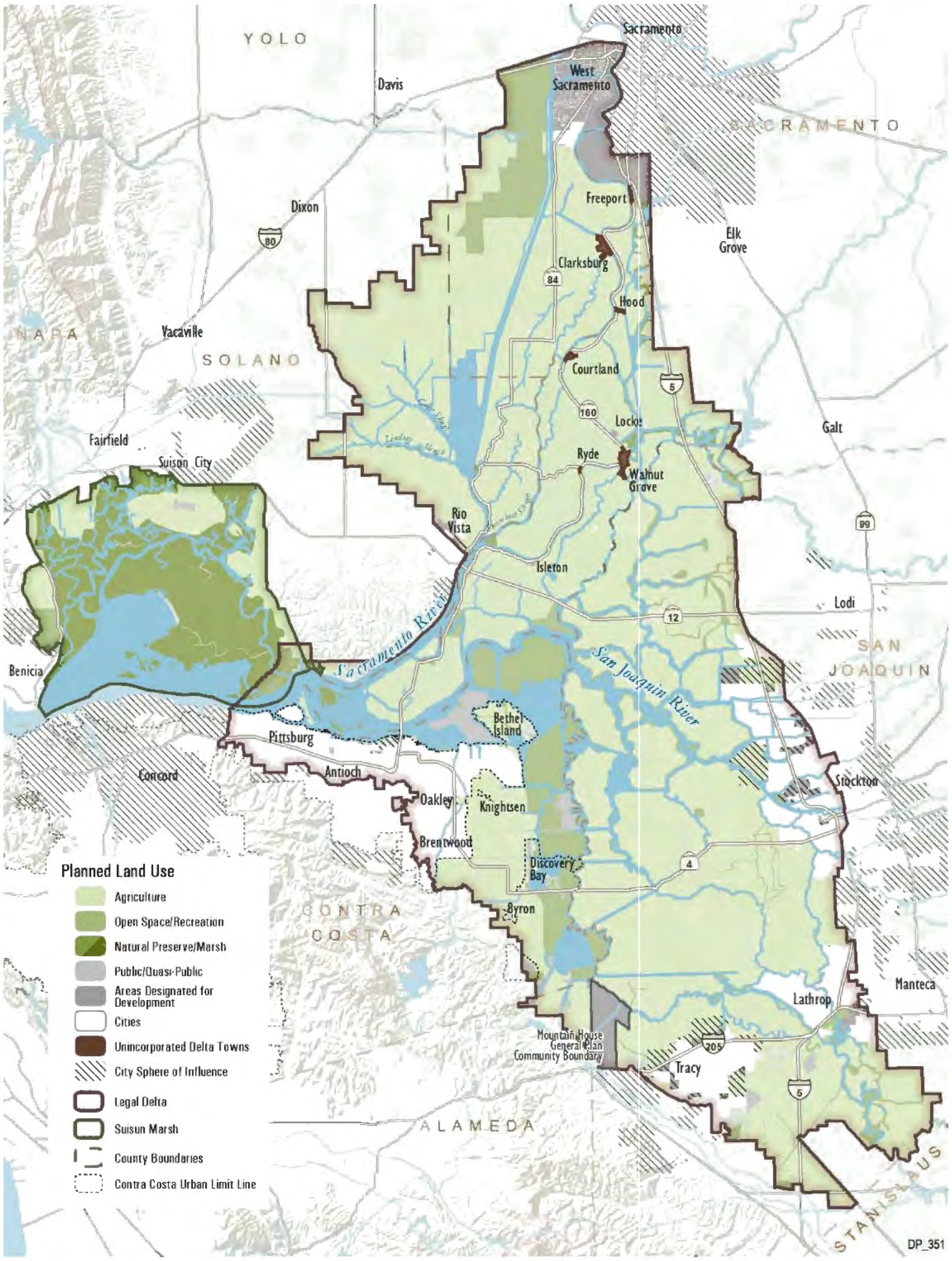

Figure 5-2

The map shows land uses designated by city and county general plans. Within cities' SOIs, the map shows land use designations proposed in city general plans, where available. In cases where cities have not proposed land uses within their SOIs, the map shows land uses designated by county general plans.

Sources: City of Benicia 2003, Contra Costa County 2008, Contra Costa County 2010, City of Fairfield 2008, City of Lathrop 2012, City of Manteca 2012, Mountain House Community Services District 2008, City of Rio Vista 2001, SACOG 2009, City of Sacramento 2008, Sacramento County 2011, Sacramento County 2012, Sacramento County 2013, San Joaquin County 2008a, San Joaquin County 2008b, Solano County 2008a, Solano County 2008b, City of Stockton 2011a, City of Stockton 2011b, City of Suisun City 2011, City of Tracy 2011a, City of Tracy 2011b, City of West Sacramento 2010, Yolo County 2010a, Yolo County 2010b.

The Delta's Legacy Communities

Bethel Island, Clarksburg, Courtland, Freeport, Hood, Isleton, Knightsen, Rio Vista, Ryde, Locke, and Walnut Grove are the Delta's legacy communities (Public Resources Code section 32301(f)). They are the residential, commercial, processing, and retail centers of the Delta, and resonate with its history and culture. Each community has its own character. Bethel Island is a recreation destination. Clarksburg and Courtland are centers for wine and pear production. Freeport and Hood were transportation centers, with river landings and rail spurs to move goods. Locke and Walnut Grove had large Asian populations who worked at packing sheds and surrounding local farms. Ryde is known for its landmark hotel, and Isleton is known for festivals and visitor-serving businesses. Rio Vista is the largest community, and Knightsen is a small community known for several nearby horse ranches. All legacy communities except Freeport, Isleton, and Bethel Island are in the Primary Zone. Rio Vista is partly in the Primary Zone and partly outside the Delta. The DPC ESP highlights the rich cultural histories of these distinctive communities and notes the importance of enhancing their legacy themes and creating better awareness of them. It highlights planning to strengthen these communities by building on the agricultural uses that surround them. It also recommends enhancing the Delta's recreation and tourism opportunities by improving these towns' lodging, entertainment, and retail options; encouraging agritourism; restoring historic buildings; and promoting context-sensitive infill development, including housing for the Delta's workforce.

Flood risks in these communities are higher than in the Delta's cities, as noted in Chapter 7, and they are too small to be capable of financing major levee improvements without significant assistance. According to the ESP, opportunities for residential or visitor-serving recreation developments in these communities may be impaired if flood risks are too high or development regulations are unpredictable or too burdensome. Although improvements to these communities' historic structures are exempt from Federal Emergency Management Agency (FEMA) floodproofing standards (FEMA 2008), flood risks, floodproofing standards for new development, and flood insurance costs can be barriers to business investment or development.

THE LEGACY OF THE DELTA'S NATIVE CALIFORNIA INDIANS

People have occupied the Delta for thousands of years. Early people gathered wild plants, including seeds, roots, greens, mushrooms, and nuts; hunted for rabbits, waterfowl, tule elk, or antelope; and speared or netted salmon, sturgeon, and other fish. Acorn processing allowed populations to grow. Permanent villages of 100 or more residents were established on sand mounds along major waterways, at the margins of tule marshes, and on the shores of Suisun Bay. Sandy uplands on Delta islands held smaller settlements. Boats of tule reeds were used to travel Delta waterways. Trade with neighbors brought obsidian and other tool stones, shell or bone ornaments, charm stones, and other goods from the coast and Sierra.

Four main groups resided in the Delta: Nisenan on the north, Miwok on the east, Yokuts in the south Delta and Contra Costa shoreline, and Patwin around Suisun Marsh and Putah Creek. Their presence is still acknowledged in place names (for example, Yolo, Suisun, and Mokelumne) and in artifacts such as stone pestles and bedrock mortars for grinding seeds and nuts; twined basketry of rushes and other plants; ancient habitations demarked by charcoal, shells, or other refuse; and cemeteries where loved ones were carefully buried, sometimes with ochre, beads, and other objects, or cremated. Today their descendants sustain a contemporary native California Indian community in the Delta.

Sources: Beals 1933, Bennyhoff and Fredrickson 1969, Fredrickson 1974, Johnson 1978, Kroeber 1925, Kroeber 1932, Levy 1978, Moratto 1984, University of California Archaeological Survey 1956, Wallace 1978,
Wilson and Towne 1978

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Climate Change

Historical, cultural, and economic resources of the Delta are subject to the impacts of climate change. An increase in sea level of up to 55 inches is projected to occur by 2100. Along with increased flood risk associated with rising sea levels and changes in runoff timing and intensity, levees, highways, and other infrastructure that support the Delta's communities and economy will be threatened. In addition, land use planning is complicated by the prospect of rising sea levels and increased flooding that may accompany climate change. Rising water levels and more severe flooding will increase hazards to land uses and developments, and confound efforts to identify safe locations for new homes and businesses.

Impacts on agriculture, such as decreasing revenues, are also likely if Delta water supplies increase in salinity (Lund et al. 2007) and water demand increases. Impacts on agriculture from warming temperatures could reduce yields and increase vulnerability to weeds and pests (California Resources Agency 2008), as well as increase soil subsidence rates through increased rates of organic matter oxidation. In addition, Delta recreation and tourism could be affected by changes in Delta fisheries.

Land Use Planning in the Delta and Suisun Marsh

The land uses in the Delta are the result of myriad decisions made by residents, businesses, investors, and others since its settlement. These decisions are shaped today by local and State agencies that are responsible for planning or regulating land use or development. Primary authority for land use planning rests with the Delta's twelve cities and five counties, which are required to adopt comprehensive long-range general plans to guide development. In addition, the Legislature has authorized three State agencies to oversee land use planning by local governments or directly regulate land use actions in the Delta and the Suisun Marsh: the Council, the DPC, and the San Francisco Bay Conservation and Development Commission (BCDC). The Council and the DPC have concurrent jurisdiction in the Delta's Primary Zone, while the Council and BCDC have concurrent jurisdiction in the Suisun Marsh. The DPC and BCDC must ensure that local land use planning is consistent with their own laws and plans, and must also certify that any covered actions that they carry out or approve, such as updating their plans, are consistent with the Delta Plan (see Table 5-1).

The Council's Role

The Legislature has declared that existing developed uses and future developments that are carefully planned and developed consistent with Delta Reform Act policies are essential to Californians' economic and social well-being, especially those who live or work in the Delta. The Delta Reform Act includes six goals for managing land use (Water Code section 85022(d)):

> (1) *Protect, maintain, enhance, and, where feasible, restore the overall quality of the Delta environment and its natural and artificial resources.*
>
> (2) *Ensure the utilization and conservation of Delta resources, taking into account the social and economic needs of the people of the state.*

State Agencies with Land Use Jurisdiction in the Delta

TABLE 5-1

State Agency	Law	Plan
Delta Stewardship Council	Sacramento-San Joaquin Delta Reform Act of 2009	Delta Plan
Delta Protection Council	Delta Protection Act of 1992	Delta Land Use and Resource Management Plan for the Primary Zone of the Delta
San Francisco Bay Conservation and Development Commission	McAteer-Petris Act of 1965, Suisun Marsh Preservation Act of 1977	San Francisco Bay Plan, Suisun Marsh Protection Plan

> *(3) Maximize public access to Delta resources and maximize public recreational opportunities in the Delta consistent with sound resources conservation principles and constitutionally protected rights of private property owners.*
>
> *(4) Encourage state and local initiatives and cooperation in preparing procedures to implement coordinated planning and development for mutually beneficial uses, including educational uses, in the Delta.*
>
> *(5) Develop new or improved aquatic and terrestrial habitat and protect existing habitats to advance the goal of restoring and enhancing the Delta ecosystem.*
>
> *(6) Improve water quality to protect human health and the environment consistent with achieving water quality objectives in the Delta.*

Goals 2, 3, and 4 are addressed in this chapter.

In addition, Water Code section 85305(a) provides, in part:

> *The Delta Plan shall attempt to reduce risks to people, property, and state interests in the Delta by promoting…appropriate land uses.*

Water Code section 85022(a) directs "state and local land use actions identified as covered actions pursuant to section 85057.5 be consistent with the Delta Plan" and that the section's "findings, policies, and goals apply to Delta land use planning and development." Thus, the Council's role in reviewing land use actions is to consider the full range of State interests in the Delta, including the economic and social well-being of Californians, environmental protection, use and conservation of resources, public access and recreation, habitat restoration and enhancement, water quality, and flood protection.

The DPC's Role

The DPC *Land Use and Resource Management Plan for the Primary Zone of the Delta* (2010) guides land uses in the Primary Zone. Local government general plans must be consistent with the DPC's land use and resource management plan. Local government land use actions may be appealed to the DPC for review of consistency with the land use and resource management plan. Chapter 2 describes the special role that the Delta Reform Act gives to the DPC to review and comment on significant projects or programs, such as ecosystem restoration or flood control projects, under consideration by the Council. The referral of projects to DPC for its review and comment and the membership of the DPC chair on the Council assure that the Delta communities will have a voice concerning actions' effects on existing and planned uses of the Delta.

The DPC's management plan states these goals for land use in the Primary Zone (DPC 2010):

> *Protect the unique character and qualities of the Primary Zone by preserving the cultural heritage, strong agricultural/economic base, unique recreational resources, and biological diversity of the Primary Zone. Direct new non-agriculturally oriented non-farmworker residential development within the existing unincorporated towns (Walnut Grove, Clarksburg, Courtland, Hood, Locke, and Ryde).*
>
> *Encourage a critical mass of farms, agriculturally-related businesses and supporting infrastructure to ensure the economic vitality of agriculture within the Delta.*

DPC's management plan also acknowledges the importance of balancing urban development with the protection of agriculture and other rural lands (DPC 2010):

> *The periphery of the Delta is undergoing rapid urbanization associated with substantial population growth. Current and future population growth increases the demand for developable land, particularly in areas near the Bay area, Stockton, and Sacramento. This demand results in the conversion of open space, primarily agricultural land, to residential and commercial uses. Increasing concern exists regarding the potential for urbanization and projects in the Secondary Zone to impact the Primary Zone.*

Thus, the DPC's role in land use review is primarily to protect agricultural land, recreational uses, and biological diversity in the Delta's Primary Zone from urban development, direct most residential development within existing towns, and ensure the economic vitality of Delta agriculture.

BCDC's Role

The BCDC was established by the McAteer-Petris Act in 1965. The agency prepared the *San Francisco Bay Plan* to guide the conservation of the Bay's natural resources and development of its shoreline. In 1977, BCDC's authority was expanded to protect wildlife use and retain biological diversity of the Suisun Marsh under the Suisun Marsh Preservation Act. With respect to land use, the Suisun Marsh Preservation Act (Public Resources Code section 29003(e) and (f)) calls for:

- Development and implementation of plans and policies to protect the marsh from degradation by excessive human use
- Definition and establishment of a buffer area consisting of upland areas that have high wildlife values themselves and also contribute to the integrity and continued wildlife use of the wetlands within the marsh

BCDC's *Suisun Marsh Protection Plan* (SMPP) guides land use and development in the Marsh (BCDC 1976). The SMPP designates an 89,000-acre primary management area of waterways, including Suisun, Honker, and Grizzly bays, tidal marshes, and managed wetlands; and a buffer zone of upland grasslands and agricultural land composing a 22,500-acre secondary management area. Both the Bay Plan and the SMPP apply to Suisun Marsh, and the SMPP controls if there is a conflict. BCDC also is the federally designated State coastal management agency for the San Francisco Bay segment of the California coastal zone. The federal Coastal Zone Management Act (CZMA) empowers BCDC to ensure that federal projects and activities are consistent with BCDC's laws and policies. A marsh development permit from BCDC is required to place fill, dredge, construct a structure, substantially change land use, subdivide property, or grade land in the wetlands and waterways of the Suisun Marsh.

BCDC retains planning and permitting authority in the primary management area of the Marsh, but shares authority in the secondary management area with local government agencies and special districts. The Suisun Marsh Preservation Act authorizes BCDC to delegate authority to issue marsh development permits to local agencies and special districts with jurisdiction in the marsh after BCDC has certified that their components of the Suisun Marsh Local Protection Program (LPP) are consistent with the Suisun Marsh Preservation Act and the SMPP. BCDC first certified all the components of the LPP in the early 1980s. LPP components can be amended only after BCDC holds a public hearing and votes for recertification. Permits granted by local governments for projects in the secondary management area under the authority of their LPP component may be appealed to BCDC.

Thus, BCDC's role in the Suisun Marsh is to protect the unique natural resources of the Suisun Marsh from the potential adverse effects of development by directly regulating land use in the primary management area of the marsh and working with local government to regulate land use in the secondary management area.

Other Agency Jurisdictions

Land use and development in the Delta are also affected by other State and federal agencies. The State Lands Commission has jurisdiction over hundreds of miles of waterways in the Delta, and issues leases for in-stream structures and uses. The Central Valley Flood Protection Board issues permits to encroach in floodways and State flood management facilities. The State and regional water quality control boards control discharges from development to public waters. The California Department of Fish and Wildlife (DFW) regulates projects that affect waterways or habitats of State-listed endangered or rare species.

Among federal agencies, FEMA has a significant effect in the region by establishing floodproofing standards for new development in communities that participate in its National Flood Insurance Program. The U.S. Army Corps of Engineers oversees the filling of public waters and wetlands. The U.S. Fish and Wildlife Service and the National Marine Fisheries Service regulate development that affects essential fish habitat or federally listed endangered or rare species. Some Delta landowners see these complex rules as a barrier to the development and use of private land. As described in Chapter 2, the Delta Plan Interagency Implementation Committee will improve coordination among regulatory agencies to ease some of these barriers.

Minimizing Land Use Conflicts

Poorly sited or designed development can also encourage additional people to place their lives and property at risk as well as restrict ecosystem restoration opportunities (see Chapter 4 and Chapter 7). Many uses are already in hazardous locations. For example, about 116,000 residential structures are located in the 100-year floodplain of the Delta, mostly near Sacramento, West Sacramento, and Stockton. Almost 8,000 residences are below mean higher high water (DWR 2008). Land use planning is complicated by the prospect of rising sea levels and increased flooding that may accompany climate changes. Some necessary water facilities, ecosystem restoration projects, or flood management facilities may need to be located on farmlands or in other locations that are inconsistent with local land use plans. State and federal agency projects are not required to secure approvals from local governments or the DPC, but nevertheless should avoid conflicts with existing and planned land uses when feasible. These projects can alter scenic views, make noise, create conflicts with adjoining land uses, generate traffic, or disrupt transportation routes if not planned carefully. Fully considering local resident views and local government positions can minimize misunderstandings, reduce avoidable conflicts, and build trust and cooperation.

The Delta's Economy

This section provides an overview of the primary sectors that make up the Delta economy. The Delta's economy is primarily urban and service oriented. The Delta is a diverse, growing, and economically integrated region that in many respects is outperforming the state as a whole. Transportation, warehousing, and utilities are important sectors. Construction, housing, and real estate are also important, but have declined with the recent recession. Retail, education, health care, and accommodations are the top employment sectors. The Primary Zone is less diverse, and depends on agriculture and, to a lesser extent, recreation and tourism. Stockton, Sacramento, and other nearby urban areas provide employment for professionals who commute from the Primary Zone, and less-skilled workers commute into the Primary Zone to jobs in agriculture and food processing.

Agriculture and the Delta's Economy

The total value of Delta crops was approximately $702 million in 2009. Truck and vineyard crops account for 54 percent of crop revenues on 18 percent of acreage. The top five Delta crops in terms of value were (1) processing tomatoes, (2) wine grapes, (3) corn, (4) alfalfa, and

(5) asparagus. The highest per-acre values in the Delta come from truck crops mainly situated in the southern Delta and deciduous crops principally located in the northern Delta. Table 5-2 summarizes top crops by gross value and acreage.

Top Five Crops in the Delta

TABLE 5-2

Position (2009)	By Gross Value	By Acres Grown
1	Tomatoes	Corn
2	Wine Grapes	Alfalfa
3	Corn	Tomatoes
4	Alfalfa	Wheat
5	Asparagus	Wine Grapes

Source: DPC 2012b

When related value-added manufacturing such as wineries, canneries, and dairy products are included, the total economic impact of Delta agriculture is 13,179 jobs, $1.059 billion in value added, and nearly $2.647 billion in economic output in the five Delta counties. Including value-added manufacturing, the statewide impact of Delta agriculture is 25,125 jobs, $2.135 billion in value added, and $5.372 billion in economic output (DPC 2012b).

See the Agriculture in the Delta section for a more detailed description of agriculture and its contribution to the Delta's way of life and economy.

The Delta's Recreation and Tourism Economy

Recreation and tourism are important contributors to the Delta's economy. DPC's ESP estimates that Delta recreation and tourism support 3,000 jobs with $100 million in wages in the Delta counties; $312 million in direct expenditures in the Delta by anglers, hunters, boaters, picnickers, campers, hikers, bicyclists, visitors driving for pleasure, and others who recreate in parks, wildlife areas, trails, or roadways; and a total of $175 million in value added to the regional economy. Statewide, Delta recreation and tourism support 5,200 jobs and contribute $348 million in value added.

Despite these significant contributions, the Delta's recreation and tourism economy has been relatively flat since the 1990s. The recreation and tourism sectors suffer from limited recognition and understanding of the Delta, and the lack of an overall marketing strategy for the region. Brannan Island State Recreation Area, the best improved State park, is scheduled to close due to budget constraints. Many other public lands lack facilities for visitors. Motor boat registrations have declined in the region. Participation in fishing and hunting has declined also. Private-sector recreation and tourism businesses are stagnant, with employment unchanged over 2 decades and little investment in new facilities. Inadequate levees leave key visitor attractions, including the legacy communities, at risk, as described in Chapter 7. Flood risks, flood insurance, and difficulties in designing attractive but floodproof visitor facilities hinder new investment in recreation and tourism businesses.

Other Contributors to the Delta Economy

The Delta's infrastructure not only supports its residents and businesses, but also includes facilities that transport people and products through the Delta from the Sierra on the east to the Bay Area on the west, or from the Sacramento Valley on the north to the San Joaquin Valley on the south. The Delta's economy benefits from the surface transportation, utilities, and other infrastructure that crisscross the Delta to serve local needs, provide access to regional urban markets, and, in turn, link the Delta's economy to national and global markets.

The Delta's most recognizable infrastructure components are its levees, which are described in Chapter 7. Key transportation corridors include Interstates 80, 5, and 205; State Routes 4, 12, and 160; and railroads operated by Union Pacific, Burlington Northern Santa Fe, Amtrak, and the Altamont Commuter Express. County roads are important for transporting crops to market and for local circulation.

The ports at Stockton and West Sacramento are served by deep water shipping channels that the U.S. Army Corps of Engineers maintains along the San Joaquin and Sacramento rivers, and the Sacramento Deep Water Ship Channel. These ports connect to San Francisco Bay and ultimately to the Pacific Ocean, providing a valuable asset to Delta communities. Rice and other crops grown in the Central Valley and other products are exported across their docks, and fertilizer and other bulk commodities are imported. The Maritime Highway Corridor is a recent initiative to expand maritime traffic between the Delta ports and the Port of Oakland, in part to reduce truck travel and its air quality impacts. Areas for water-dependent industries are located in Collinsville, Rio Vista, Pittsburg, and Antioch, where they benefit from the Delta's abundant and high-quality water.

Other infrastructure in the Delta includes water, drainage, and wastewater treatment facilities. Stockton and Sacramento draw drinking water at least partly from the Delta and discharge wastewater there. The Delta is the site of forebays, pumps, and water control structures of the Central Valley Project and State Water Project, as described in Chapter 3. Aqueducts and other facilities serving the East Bay Municipal Utility District, the Contra Costa Water District, and other areas are located in the Delta. Natural gas wells in the Delta fuel power plants and other energy uses. Wind turbines and other renewable power sources also are located in the Delta. Electric transmission lines and fuel pipelines cross the Delta to carry energy to energy users. Communications towers support broadcasting and telecommunications. These facilities need to be planned carefully to avoid conflicts with water supply, ecosystem restoration, or flood management facilities, and existing and planned land uses.

Delta Investment Fund

In 2009, the Legislature established a Delta Investment Fund in the State Treasury (Public Resources Code section 29778.5). DPC's ESP recommends forming a regional agency to manage the fund, and to implement and facilitate economic development efforts, either through expansion of the DPC's authority or creation of a joint powers authority composed of local governments.

Agriculture in the Delta

Agriculture is among the qualities that define the Delta as a place. This section provides additional detail about the role of agriculture and discusses issues such as subsidence and water quality that must be considered in policy making. The Delta's initial reclamation created farmland, and ongoing maintenance of its levees and water controls allows for continued farming in the region. Agriculture dominates the Delta landscape, as shown on Figure 5-3, and provides the setting for Delta residents' communities, homes, and job sites. Agriculture benefits from the Delta's productive soils, special climate, and abundant water. Delta farms provide a local source of nutritious food and forage for nearby dairies. Farming, food processing, and related industries contribute significantly to the economy, particularly in the Delta's Primary Zone, where they predominate economic output, employment, and value-added activities. Characteristic local crops, such as pears, asparagus, and dried beans, are celebrated at annual festivals and county fairs.

Agriculture in the Delta depends on high-quality farmland. Prime farmlands with the best soils comprise about 400,600 acres, close to 85 percent of all farmland in the Delta. Another 101,760 acres are unique farmland, farmland of statewide or local importance, or farmland of potential local importance (DOC 2009). Because of the fertile peat soils and the moderating marine influence, Delta agriculture's per-acre yields are almost 50 percent higher than the state's average (Trott 2007). As described in Chapters 3 and 4, reliable, abundant fresh water is also an essential contributor to Delta agriculture.

Agricultural Land Use in the Delta

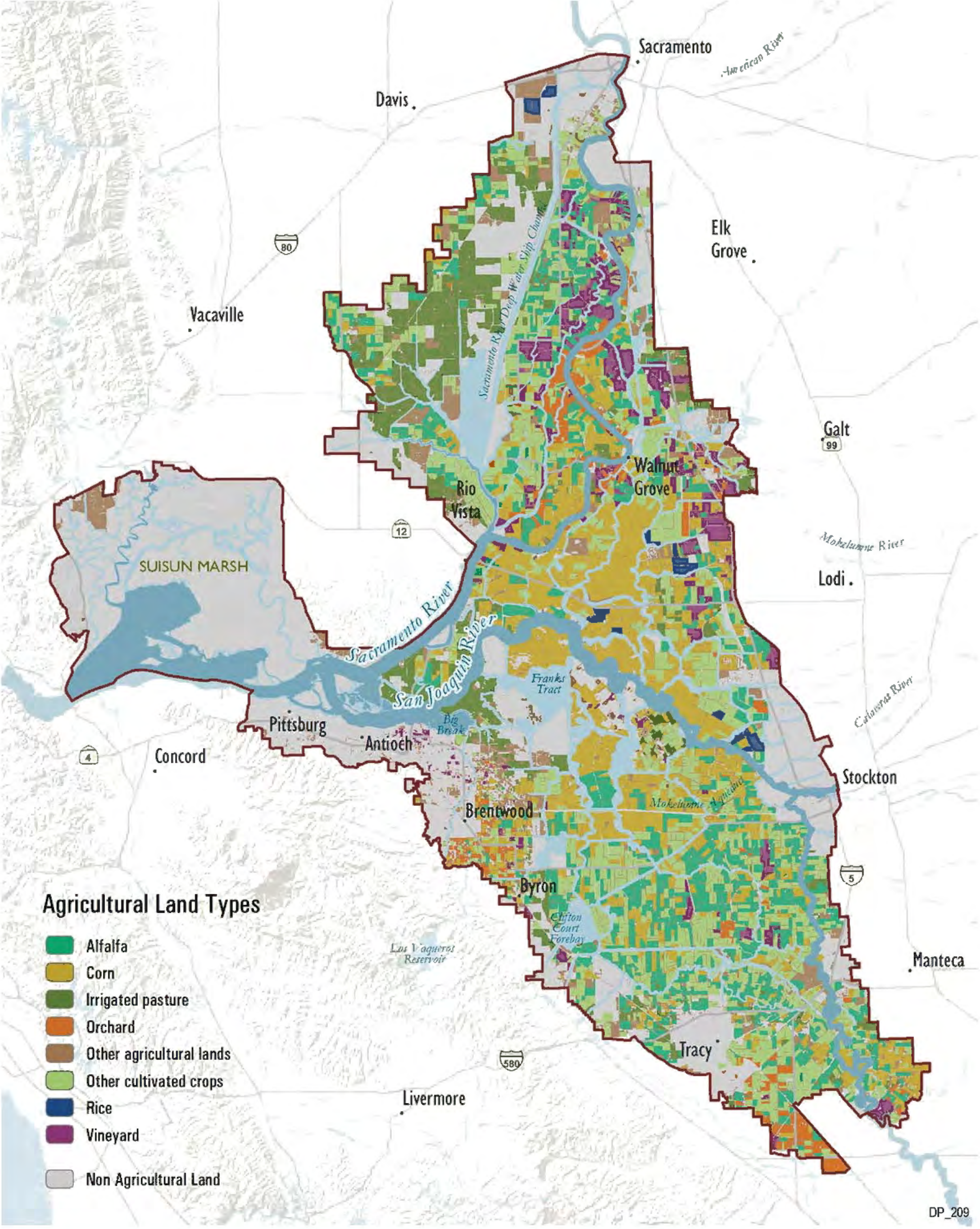

Figure 5-3 *Source: DOC 2008*

Field crops and pasture cover most of the Delta agricultural acreage. In 2010, about one-fourth of farmland in the Delta was corn, much of which is harvested as silage and used in the dairy industry. Alfalfa, the second most widely planted crop, covered about 20 percent of the Delta's farmland. Together, these croplands comprise about 10 percent of the irrigated acreage supporting California's dairy industry. Barley, wheat, and oats were planted on about 69,000 acres. About 41,000 acres of irrigated pasture are used by livestock. Truck crops, including processing tomatoes, asparagus, cucumbers, potatoes, pumpkins, and melons, covered nearly 52,500 acres. Almost 31,000 acres support vineyards. Orchards of pears, almonds, walnuts, and cherries grow on about 17,000 acres (DPC 2012b).

The DPC ESP forecasts that high-value crops, including truck, deciduous, and vineyard crops, are likely to increase in coming decades, potentially increasing farm incomes and economic output. Lower value crops, including field and grain crops, are likely to decline. Some traditional Delta crops are losing markets due to changing consumer preferences and competition from other regions. For example, the Bartlett pear market peaked around World War I, when 50 percent of all Bartletts were produced in California, mainly in the Delta. Until 1930, the Delta was also the world's asparagus capital, producing 90 percent of the globe's production (DPC 2011). Today, a mere 7,200 acres of asparagus fields remain. But growth of wine grapes and other crops, and expansion of local crop processing, particularly winemaking, could enhance agriculture's contribution to the Delta's economy (DPC 2012b). Urban development, ecosystem restoration, or flood control facilities that take farmland out of production could hasten the decline of agriculture.

Value is added to Delta crops when they are processed for ease of use or shipment. Examples include food and beverage manufacturing, such as the tomato canneries or sugar processors that were prominent twentieth century Delta businesses. Today's opportunities include winemaking or emerging sectors such as olive pressing. Special local markets that serve consumers in the Delta counties or Bay Area, such as farm-to-school programs or community-supported agriculture, also may provide new markets for some Delta crops. Facilities that improve the region's capacity to aggregate and distribute its crops to these local markets may enhance Delta agriculture (SACOG 2011). Consistent interpretation and application of regulations about food processing and distribution could help local producers and distributors establish facilities (Sumner and Rosen-Molina 2011).

Protecting Productive Farmlands

Although agriculture is the principal land use in the Delta, the total area of agricultural lands (including fallow lands) in the combined Delta and Suisun Marsh area has declined from about 549,420 acres in 1984[1] to 460,450 acres in 2008, and the percentage of agricultural land has decreased from about 65 percent of this combined area in 1984 to about 55 percent in 2008 (DOC 1984, DOC 1988, DOC 1990, DOC 2008). An additional 28,000 acres of farmland may be lost in the near future under current local government general plans. The Delta Plan acknowledges this loss since it focuses growth within existing city boundaries. However, any further loss of farms to urban development is unacceptable. The continued viability of agriculture in the Delta will require the protection of sufficient farmland and fresh water to support commercially viable operations and provide ways for agriculture to coexist with habitat restoration. Policies DP P1 and DP P2 acknowledge the importance of protecting these lands. The DPC and local governments play key roles in the protection of these lands.

The loss of some farmland to urbanization, habitat, and flooding is inevitable, the DPC ESP concludes; but continued shifts to higher-valued crops and value-added activities, as well as planning restoration in appropriate locations, may help compensate if land loss is not too great. As described in Chapter 4, elevations, locations, and other factors are key determinants of the optimal sites for ecosystem restoration. When these restoration areas include farmlands, achieving the coequal goals of restoring the Delta ecosystem and improving water supply reliability may make some loss of productive agricultural lands unavoidable. Some conveyance alternatives could take farmland out of production, too. Improving flood control facilities may also unavoidably affect some farmland.

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[1] Data for Sacramento and San Joaquin counties were not available in the 1984 DOC report; thus, data for these counties were taken from the 1988 and 1990 reports, respectively.

Subsidence

The reclamation of Delta islands and their cultivation for agriculture initiated a process of land subsidence, mostly due to oxidation of peat soils, but also from wind erosion. Drainage and cultivation dried the saturated peat, reducing its volume by approximately 50 percent. Early cultivation practices also included burning, which further reduced the volume of the soil and altered its structure. Over time, long-term oxidation reduced about 2.6 to 3.3 billion cubic yards of these peaty soils to small particles and gases. As a result, much of the central Delta today is below sea level, with some islands 12 to 15 feet below sea level. Many islands now more closely resemble bowls surrounded by water, with high sides defined by levees and deep, hollowed-out bases. Although subsidence has slowed in some areas, other regions of the Delta continue to lose soil to oxidation and wind erosion at a rate of 5 to 15 tons/acre/year. It is projected that some areas of the Delta could subside an additional 2 to 4 feet by 2050 (Deverel and Leighton 2010), resulting in the loss of up to 350 to 500 million cubic yards of soil at a rate of 5 to 15 tons/acre/year (see Figure 5-4).

Land subsidence impairs Delta agriculture, not only because of soil loss, but also by increasing the difficulty of maintaining drainage systems and levees. As described in Chapter 7, subsidence makes levees less stable and increases flood risks. The costs to recover a flooded island could be great. Some suggest that many islands would cost more to reclaim after flooding than the value of the land for agriculture. In 1998, 4,200 acres of farmland were lost when Liberty Island flooded and was not reclaimed (Reclamation District 2093 2009). Other once-farmed islands that were not reclaimed after flooding include Big Break, Franks Tract, and Mildred Island (Suddeth et al. 2010).

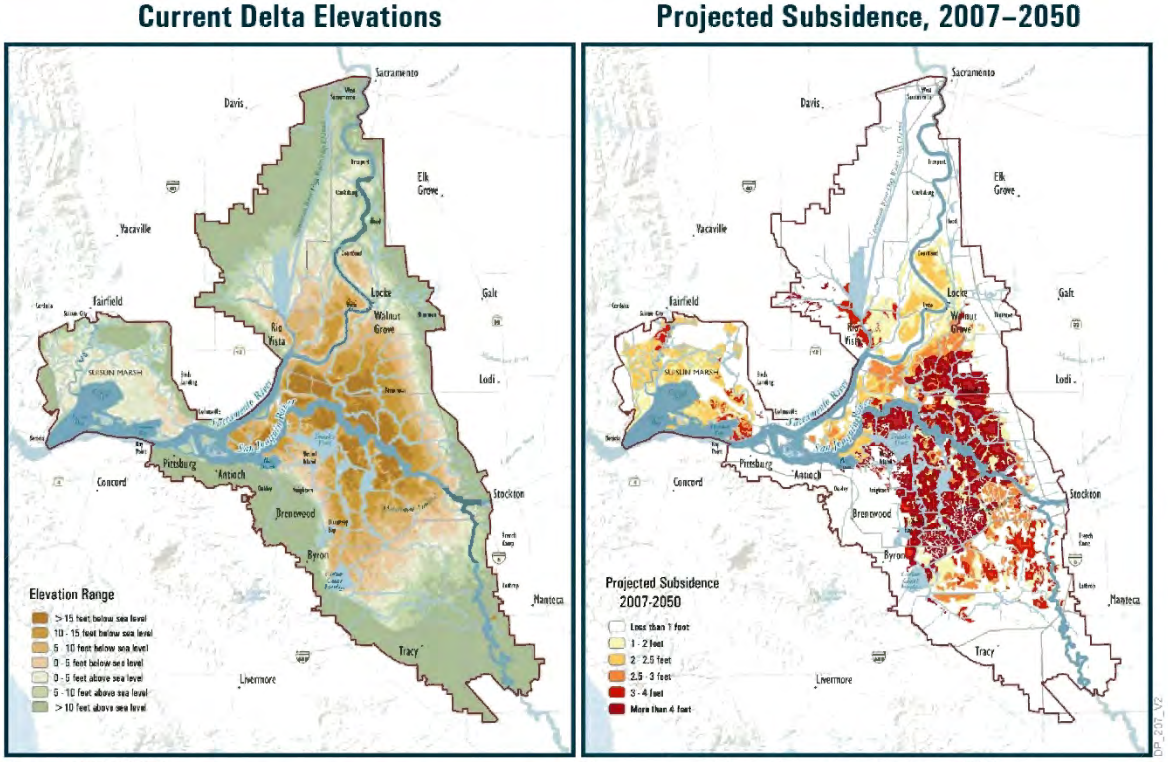
Oxidation of peat soils also liberates vast quantities of carbon dioxide (CO_2), contributing to global warming (Armentano 1980). Oxidation of the Delta's agricultural soils emits about 4.4 to 5.3 million tons of CO_2 annually (Delta Conservancy 2012). For comparison, a typical 500-megawatt coal-fired power plant emits 3 million tons of CO_2 per year.

The potential to retire croplands on deeply subsided islands and manage them to rebuild peat and sequester carbon is sometimes pondered as an alternative to continued farming (Armentano 1980). State and federal agency investigations of alternative land management practices show that soils can be rebuilt, reversing subsidence and sequestering carbon, with some appropriately managed activities, such as tule farming (Miller 2008). Recent actions by the California Air Resources Board, under the California Global Warming Solutions Act of 2006 (Health and Safety Code section 38500 et seq.), provide for the development of a carbon market program, whereby certain activities may be considered acceptable for providing offset credits. Although this program is still in its initial stages, future opportunities may exist for Delta farmers to gain offset credits for growing plants that promote subsidence reversal and sequester carbon.

Agriculture and Water Quality

The DPC's ESP provides scenarios for how potential declines in water quality that could accompany some water conveyance, ecosystem restoration, or water quality actions could affect Delta agriculture. The potential for the agricultural economy to grow in the Delta will depend, in part, on the protection of the Delta's abundant fresh water and the policy response. Chapter 6 contains a detailed discussion of water quality and the Council's strategies for water quality.

Subsidence in the Delta



Current Delta Elevations

Projected Subsidence, 2007–2050

Source: DWR 2009

Source: adapted from Deverel and Leighton 2010

Figure 5-4

Oxidation of peat soils through natural processes and human activities has caused the land elevation in the Delta to drop. Much of the central Delta is now at or below sea level. Future subsidence has been projected in these areas. As subsidence progresses, levees must be continually maintained, strengthened, and periodically raised to support increasing hydraulic stress.

Wildlife-friendly Agriculture

Agriculture has the potential to coexist with and even enhance restoration of the Delta ecosystem despite the conversion of some farmland to habitat. Techniques that integrate management of agriculture and wildlife habitat, often called "wildlife-friendly agriculture," include crop rotations that include soil-building crops or fallowing; integrated pest management to reduce pesticides; cover crops; the strategic use of permanent crops, such as pasture, to reduce soil disturbance and oxidation; and conservation tillage for field and row crops (Trott 2007). Some native species have adapted to using agricultural lands as habitat in place of tidal marshes, grasslands, and seasonal wetlands. Rice and other flood-irrigated crops support a range of wildlife, especially waterfowl, shorebirds, wading birds, and giant garter snakes. Swainson's hawk, other raptors, and coyote feed on small mammals and ground-nesting birds that inhabit alfalfa fields and other irrigated pastures. Waste grain also provides food for species such as ring-necked pheasant and greater sandhill crane (Trott 2007).

To support Delta agriculture and species recovery, farmers in the Delta are encouraged to implement management practices to maximize habitat values. Some U.S. Department of Agriculture (USDA) programs provide financial incentives for landowners to manage natural areas on their properties, including the Wildlife Habitat Incentives Program, the Environmental Quality Incentives Program, and the Conservation Reserve Program. The DFW, U.S. Fish and Wildlife Service, and Delta Conservancy also can assist landowners who want to enhance wildlife habitat.

As described in Chapter 4, safe harbor agreements can assure these landowners that the presence of an endangered species on their property will not result in restrictions on activities on their land. Facilitating and creating standard rules for these agreements with Delta landowners may encourage more landowners to participate in conservation programs. Restoring wildlife and fish through wildlife-friendly agriculture can help achieve ecosystem restoration objectives while reducing the loss of farmland to habitat restoration.

Agritourism

Agritourism is another opportunity to add further value to the Delta economy from agricultural activities. Defined as recreational, educational, and other visits to working farms, agritourism is a small but fast-growing source of income for farms in the region and a growing segment of the Delta economy. In the Delta, agritourism destinations may include wineries, on-farm duck clubs, farm stands, and other places. Agritourism was estimated by USDA to generate $4 million in income for farms in the five Delta counties in 2007 (DPC 2012b). For farmers who choose to participate, agritourism can provide additional income, an opportunity to sell farm products directly to consumers, or alternative uses for unproductive lands or buildings. The Discover the Delta Foundation's Delta Discovery Center combines several agritourism functions, including a produce stand, wine sales, and interpretive features that teach people about the Delta's importance (Sumner and Rosen-Molina 2011).

Recreation and Tourism in the Delta

This section provides an overview of recreation and tourism in the Delta. DPC estimates that about 12 million activity days of recreation occur in the Delta annually (DPC 2012b). Recreational users originate from both within and outside the Delta. Visitors value the wide expanses of open land, interlaced waterways, historic towns, and the lifestyle offered by the Delta. The region's mix of land and water offers diverse recreation experiences and facilities, including fishing, boating, birdwatching, other nature activities, hunting, enjoying restaurants, campgrounds, picnic areas, and historic towns and buildings. Recreation also benefits from the Delta's open, agricultural landscape, with its scenic vineyards, orchards, and farmsteads. These are often backed by views of Mt. Diablo or the Montezuma Hills on the horizon, which provide a setting for outdoor photography, a scenic bike ride, or a drive along the Delta's roads. Special events draw visitors to taste local produce and wine, and learn about this unique place. These recreation opportunities are described in more detail in the DPC's ESP and in the Recreation Proposal that California State Parks submitted to the Council and DPC pursuant to Water Code section 85301(c)(1). Figure 5-5 shows the locations of State parks and other protected lands in the Delta. Figure 5-6 shows the variety and distribution of some of these opportunities in the Delta.

State Parks and Other Protected Lands

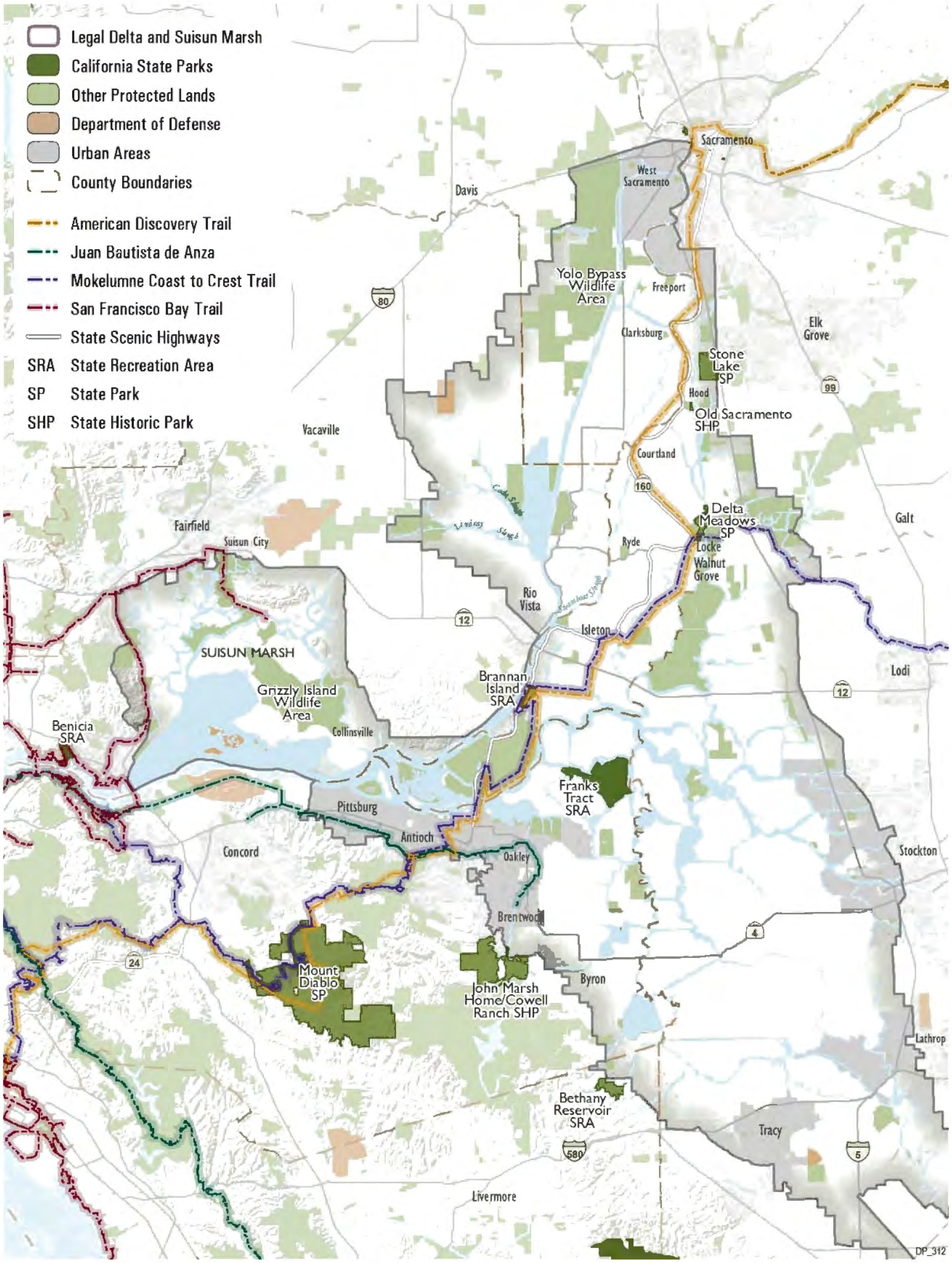


Figure 5-5 *Source: California State Parks 2011*

Major Delta Resources and Recreation

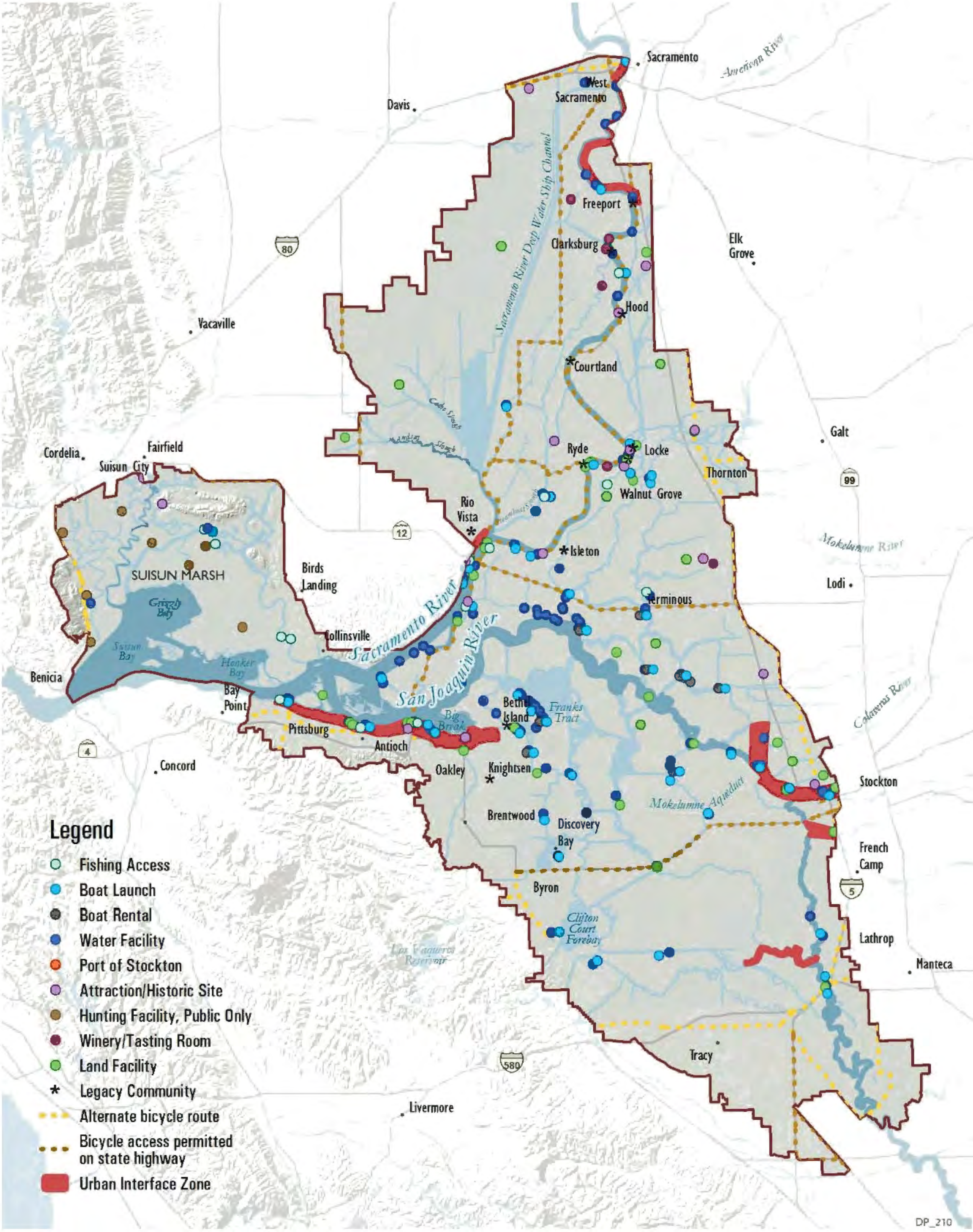


Figure 5-6

Sources: California Chambers and Visitors Bureau 2010, California Resources Agency 2007, DPC 2006, Discover the Delta Foundation 2010, California Department of Fish and Game 2009

The DPC ESP and the California State Parks Recreation Proposal both foresee opportunities to increase recreation and tourism in the Delta as the population of surrounding areas grows, especially with improved branding and marketing. Both reports emphasize improvements of "gateways" to the region on the Delta's urban edges and "base camps," focal points for visitors inside the Delta at destinations such as resorts, legacy communities, and parks. They also recommend diversifying dispersed outdoor recreation "adventures" at points of interest and activity areas for boaters, nature area visitors, and others. Ecosystem restoration, as described in Chapter 4, can enhance opportunities for nature-based recreation and boating, especially by nonmotorized boats, according to both reports.

The California State Parks Recreation Proposal recommends enhancing State parks and other State agencies' properties and programs to create a network of recreation areas in the Delta, and encourages improvement of public access along the shorelines of growing Delta communities, consistent with Water Code section 85022(d)(3). It recommends that recreation improvements be provided in new water management and habitat restoration projects unless they are inconsistent with the project purposes, in conformance with Water Code sections 11910–11915.5, or public safety. DPC's ESP also recommends that recreation facilities be included in ecosystem restoration projects when feasible. Additionally, the ESP emphasizes growing the tourism and recreation economy through private, visitor-serving businesses, and collaboration and partnerships between public- and private-sector recreation providers.

Future prospects for Delta recreation and tourism will be strongly influenced by decisions about the Delta ecosystem, water quality, levee improvements, and governance, including land use and environmental standards. The Bay Delta Conservation Plan (BDCP), Delta water quality plans, levee investments, and other decisions yet to be made can all significantly affect recreation and tourism.

Boating

Navigable waterways in the Delta and Suisun Marsh are available for public access and provide many recreational opportunities. Boating activities total more than 6.4 million visitor days annually, composed of 2.13 million annual boat trips with a projected growth to 8 million visitor days by 2020, according to the Department of Boating and Waterways. Almost 100 marinas, with more than 11,000 boat slips, and almost 60 launch ramp lanes support boating in the Delta and Suisun Marsh (DBW 2002). Popular activities include powerboating on the Sacramento and San Joaquin rivers, paddling sloughs and channels in canoes and kayaks, and sailing on the open water of Suisun and Honker bays. About 116,000 boats are registered in the five Delta counties, creating a large pool of potential recreationists (California State Parks 2011).

Public Recreation Lands

Public lands comprise about 10 percent of the Delta. State and local parks, State or national wildlife areas and refuges, ecological preserves, and other public lands provide important sites for relaxing outdoors, a family picnic, camping, and other outdoor recreation in the Delta. California State Parks owns three properties in the Delta: Brannan Island State Recreation Area and properties at Locke Boarding House-Delta Meadows and Stone Lakes. The DFW and the State Lands Commission also manage important State-owned recreation areas. The largest State ownerships are the California Department of Water Resources (DWR) lands on Sherman and Twitchell islands, which are available seasonally for hunting.

Table 5-3 summarizes the agency responsibilities, recreation-related opportunities, and examples of recreation facilities in the Delta managed by the State. City and county parks, including those of the East Bay Regional Park District, also provide important public recreation areas. These public lands are increasingly important for Delta recreation because privately owned riverbanks and levees, which comprise most of the Delta's shoreline, are increasingly posted to prevent trespass, reducing access to rivers and sloughs for bank fishing, nature observation, and outdoor relaxation.

State Agencies with Responsibility for Recreation in the Delta

TABLE 5-3

State Agency Name and Role	Recreation-related Facilities and Opportunities	Delta and Suisun Marsh Examples
California State Parks offers high-quality outdoor recreation and educational opportunities, protects natural and cultural resources, awards grants for local parks, and oversees the California Recreational Trails System.	Day-use picnic areas, campgrounds, marinas, trails, excursion railroads, interpretive services, heritage resource protection, restrooms	Brannan Island State Recreation Area, Old Sacramento State Historic Park, American Discovery Trail
California Department of Fish and Wildlife manages hunting and fishing; operates public lands for wildlife conservation, hunting, fishing, environmental education, and nature study; and encourages private conservation.	Ecological reserves, wildlife areas, boat launches, nature-based recreation and events, fish hatcheries	Woodbridge Ecological Reserve, Grizzly Island Wildlife Area, Clarksburg boat launch
California Department of Boating and Waterways provides public recreational boating facilities on public lands, marine patrol law enforcement, boating safety and clean and green education, and controls of aquatic invasive species.	Public boat launching facilities, public visitor docks, boat-in day use and overnight facilities, vessel pumpout facilities, floating restrooms, floating campsites	Antioch Marina, Brannan Island State Recreation Area, Sherman Island, Belden's Landing, Bethany Reservoir, and Rio Vista boat launch facilities
California Department of Transportation operates state highways, historic bridges, and ferries, and designates state scenic highways.	Scenic highways, ferries, historic bridges	State Highway 160, J-Mack Ferry, Steamboat Slough Bridge
California Department of Water Resources manages California's water resources, including State Water Project reservoirs, dams, land, and waterways available for recreation use.	Reservoirs, water conveyance infrastructure (canals, diversion sites, waterway flows), flood control projects, habitat management sites and facilities	Bethany Reservoir, Sacramento River flows, Fremont Weir, Suisun Marsh salinity control structure, Dutch Slough habitat restoration project
State Lands Commission has jurisdiction over hundreds of miles of waterways in the Delta and issues leases for instream recreation infrastructure.	Navigable waterways, submerged lands, dock and pier leases	Threemile Slough, Walnut Grove Public Dock

State Agencies with Responsibility for Recreation in the Delta

TABLE 5-3

State Agency Name and Role	Recreation-related Facilities and Opportunities	Delta and Suisun Marsh Examples
Sacramento-San Joaquin Delta Conservancy will implement ecosystem restoration, advance environmental protection, and support economic sustainability, including tourism and recreation.	Projects that enhance natural resources, cultural resources, or economic sustainability in a manner complementary to increased recreation, tourism, and environmental education	The Delta Plan, Bay Delta Conservation Plan, Economic Sustainability Plan, and Delta Conservancy Strategic Plan will guide projects
State Coastal Conservancy makes grants to purchase, protect, restore, and enhance coastal resources, including San Francisco Bay and Suisun Marsh, and to provide access to the shore.	Shoreline accessways, trails, habitat protection and restoration areas, farmland and open space protection	Rush Ranch protection, San Francisco Bay Area water trail, Marsh Creek stream restoration and trail
Delta Protection Commission adaptively manages the Delta's Primary Zone, including, but not limited to, agriculture, wildlife habitat, and recreation activities.	Heritage resource recognition and enhancement, agritourism program, regional trails	National Heritage Area feasibility study, Great California Delta Trail, Economic Sustainability Plan

Source: California State Parks 2011

Nature-based Recreation

Many recreation opportunities depend on the region's wildlife and fish, which support angling, nature observation, and hunting. Anglers pursue native fish, such as salmon and sturgeon, and introduced species such as striped bass, largemouth bass, and catfish. Some of the most visited public wildlife areas include the Yolo Bypass Wildlife Area, Lower Sherman Island, Calhoun and Acker Island, Stone Lakes National Wildlife Refuge, Cosumnes River Preserve, Solano County Land Trust's Jepson Prairie and Rush Ranch, and Suisun Marsh's wildlife management areas, including Grizzly Island and Joice Island. Hunting waterfowl is especially important in Suisun Marsh, most of which is managed by private duck clubs. Careful management of wildlife and fish is important to maintaining nature-based recreation, which can benefit from the restoration of fisheries and expansion of wildlife habitat.

Heritage Tourism

The Delta's legacy communities and other historic sites, from house museums to twentieth century industrial sites and weather-beaten marine facilities, attract history buffs and heritage tourists. Museums, nature centers, and interpretive programs draw visitors who want to learn about the Delta's natural and cultural resources. The region's productive farms and wineries, and its diverse ethnic heritage are attractions for food and wine tourism, and for community festivals and other special events. (Agritourism is discussed earlier in the Agriculture in the Delta section.)

Linking these areas and providing access to them are the Delta's waterways and roads. State Route 160 has a special role and provides visitors from metropolitan Sacramento and Contra Costa County with access to the Sacramento River, legacy communities, and the Delta's State parks. Its attractive rural landscape is reflected in its designation as a state scenic highway. California State Parks' Recreation Proposal recommends that the California Department of Transportation seek national scenic byway status for this route and prepare a scenic byway plan that would identify opportunities to improve signage, interpretation, and amenities for access, recreation, and nonautomobile circulation. A national scenic byway is a road recognized by the U.S. Department of Transportation for its archaeological, cultural, historic, natural, recreational, and/or scenic qualities. The program preserves and protects the nation's scenic but often less-traveled roads, and promotes tourism and economic development. Funding for byway-related projects is granted annually by the Federal Highway Administration. State Routes 4 and 12 are also important for recreational travel.

The American Discovery Trail, Mokelumne Coast-To-Crest Trail, and Great Delta Trail (Public Resources Code section 5852 et seq.) are State trails that can provide recreational access for bicyclists, hikers, and others. DPC's ESP and California State Parks' Recreation Proposal also recommend a system of water trails to guide boaters through the Delta's channels.

POLICIES AND RECOMMENDATIONS

The policies and recommendations presented in this section address the unique values that distinguish the Delta and make it a special region, and outline the Council's five core strategies for protecting and enhancing these values as follows:

- Designate the Delta as a special place worthy of national and state attention
- Plan to protect the Delta's lands and communities
- Maintain Delta agriculture as a primary land use, a food source, a key economic sector, and a way of life
- Encourage recreation and tourism that allow visitors to enjoy and appreciate the Delta and that contribute to its economy
- Sustain a vital Delta economy that includes a mix of agriculture, tourism, recreation, commercial and other industries, and vital components of state and regional infrastructure

Protecting the Delta also depends on the strategies to reduce flood and other risks, as detailed in Chapter 7.

Designate the Delta as a Special Place

Designating the Delta as a special place can build public recognition of the Delta and its unique resources. The DPC proposes to seek the Delta's designation as an NHA to recognize and promote "Delta-as-a-Place" and to cultivate appreciation and understanding of the Delta. The DPC recommends that the NHA include the legal Delta and Suisun Marsh, as well as adjoining areas in Rio Vista and the Carquinez Strait.

The proposed NHA's vision is "a regional network of partner sites, with interpretive/educational components, that will be linked where possible and serve as the primary attractions, on existing public properties or on private properties with the voluntary consent and involvement of the landowners." The NHA's goals are to "brand the Delta as a region of national significance to educate the public about 'Delta-as-a-Place,' and build more support for preserving, protecting, and enhancing the Delta." Other goals relate to economic development, public access, historic preservation, interpretation, and more.

Although State Route 160 is already recognized as a state scenic highway, national scenic byway status under the U.S. Department of Transportation and a scenic byway plan would provide opportunities to improve signage, interpretation, and amenities for access, recreation, and nonautomobile circulation. The byway program would qualify the route for special funding from the Federal Highway Administration.

Problem Statement

Because the Delta is different, it is sometimes unappreciated and misunderstood. Without a clear message about the Delta and its importance, the region and its resources can suffer from inattention or misuse. If the Delta's unique cultural, recreational, and agricultural values are not recognized, they are unlikely to be protected and enhanced.

Policies

No policies with regulatory effect are included in this section.

Recommendations

DP R1. Designate the Delta as a National Heritage Area

The Delta Protection Commission should complete its application for designation of the Delta and Suisun Marsh as a National Heritage Area, and the federal government should complete the process in a timely manner.

DP R2. Designate State Route 160 as a National Scenic Byway

The California Department of Transportation should seek designation of State Route 160 as a National Scenic Byway, and prepare and implement a scenic byway plan for it.

Plan to Protect the Delta's Lands and Communities

Protecting the Delta's lands and communities involves a multipronged policy approach. In the coming years and decades, the Delta will face increasing pressures from a growing population, changes in commodity markets, and changes in climate and sea level that will require flexibility and adaptation.

Some changes will be driven by the Delta's role in California's water systems, and they will be required to meet statewide goals of restoring the Delta's ecosystem and improving water supply reliability. These and other changes will shape how the Delta's communities and history are preserved, guide new development, affect recreation and tourism, and influence agriculture, business expansion, and economic development.

The policies and recommendations below reflect the Council's approach to fostering land uses and development that are resilient to these changes, reduce risks to people and property, adjust to changing conditions, and recover readily from distress. Protecting the Delta also depends on sustaining its economic vitality and maintaining the region as a desirable place to live, do business, and visit.

The maps that the following policies and recommendations reference are based on the best information available to the Council, but they may not precisely match either the built environment or local government land use plans. Where uncertainty exists with respect to the boundaries of areas referenced in these policies, the following rules should be considered in making determinations:

- The areas depicted should be assumed to generally follow parcel lines or other major landmarks, such as a road or highway, or river and stream.
- Local government general plans, including their land use diagrams, in effect at the time of the Delta Plan's adoption, may be consulted.

Problem Statement

Poorly sited or designed projects can detract from the values that contribute to the Delta's distinctive character, including its primarily rural, agricultural landscape; conflict with established uses, including farming and tourism; reduce opportunities for ecosystem restoration; or increase flood risks. By limiting significant new development to areas currently designated for development in cities, their SOIs, and unincorporated towns, the Council intends to foster a land use pattern that enhances the Delta's unique sense of place by protecting agriculture and the open, rural landscape while reducing risks to people and property. Outside the urban areas and towns mentioned above, in areas designated as agriculture, open space, recreation, natural preserve or marsh, or public/quasi-public, minor projects that are consistent with local land use designations, such as farmworker housing in areas designated as agriculture, are also appropriate. Similar limitations are already in place in the Primary Zone of the Delta, where the Delta Protection Act requires that new development must be consistent with the DPC's Land Use and Resource Management Plan. Additional protections for the Secondary Zone are needed. Diligent local *implementation of State law regarding flood protection in urban, urbanizing, and rural lands, and the National Flood Insurance Program will provide complementary flood protection benefits. New residential subdivisions, if any, in rural areas will also need to include adequate flood protection, as described in RR P2.*

Therefore, outside the urban areas and towns mentioned above, in areas that are designated as agriculture, open space, recreation, natural preserve or marsh, or public/quasi-public, the Council intends to enable counties to move forward with approval of minor projects that are consistent with these designations, such as farmworker housing in areas designated as agriculture. However, any proposals to site new residential development in rural areas will need to include adequate flood protection, as described in RR P2.

Careful planning for development in legacy communities is needed to protect their unique character and overcome barriers to investment. The Delta's urban areas will also continue to need sites for housing, employment, and businesses, supported by adequate roads and other infrastructure. Water management facilities, ecosystem restoration actions, and flood control projects will need to be accommodated in the Delta, too. Avoiding condemnation of property for water management, ecosystem restoration, and flood management facilities, when feasible, can promote better relations with Delta residents and local governments.

Policies

The appendices referred to in the policy language below are included in Appendix B of the Delta Plan.

DP P1. Locate New Urban Development Wisely

(a) New residential, commercial, and industrial development must be limited to the following areas, as shown in Appendix 6 and Appendix 7:

(1) Areas that city or county general plans as of May 16, 2013, designate for residential, commercial, and industrial development in cities or their spheres of influence;

(2) Areas within Contra Costa County's 2006 voter-approved urban limit line, except no new residential, commercial, and industrial development may occur on Bethel Island unless it is consistent with the Contra Costa County general plan effective as of May 16, 2013;

(3) Areas within the Mountain House General Plan Community Boundary in San Joaquin County; or

(4) The unincorporated Delta towns of Clarksburg, Courtland, Hood, Locke, Ryde, and Walnut Grove.

(b) Notwithstanding subsection (a), new residential, commercial, and industrial development is permitted outside the areas described in subsection (a) if it is consistent with the land uses designated in county general plans as of May 16, 2013, and is otherwise consistent with this Chapter.

(c) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers proposed actions that involve new residential, commercial, and industrial development that is not located within the areas described in subsection (a). In addition, this policy covers any such action on Bethel Island that is inconsistent with the Contra Costa County general plan effective as of May 16, 2013. This policy does not cover commercial recreational visitor-serving uses or facilities for processing of local crops or that provide essential services to local farms, which are otherwise consistent with this Chapter.

(d) This policy is not intended in any way to alter the concurrent authority of the Delta Protection Commission to separately regulate development in the Delta's Primary Zone.

23 CCR Section 5010
NOTE: Authority cited: Section 85210(i), Water Code.
Reference: Sections 85020, 85022, 85300, 85302, and 85305, Water Code.

DP P2. Respect Local Land Use When Siting Water or Flood Facilities or Restoring Habitats

(a) Water management facilities, ecosystem restoration, and flood management infrastructure must be sited to avoid or reduce conflicts with existing uses or those uses described or depicted in city and county general plans for their jurisdictions or spheres of influence when feasible, considering comments from local agencies and the Delta Protection Commission. Plans for ecosystem restoration must consider sites on existing public lands, when feasible and consistent with a project's purpose, before privately owned sites are purchased. Measures to mitigate conflicts with adjacent uses may include, but are not limited to, buffers to prevent adverse effects on adjacent farmland.

(b) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers proposed actions that involve the siting of water management facilities, ecosystem restoration, and flood management infrastructure.

23 CCR Section 5011
NOTE: Authority cited: Section 85210(i), Water Code.
Reference: Sections 85020, 85022, 85054, 85300, and 85305, Water Code.

Recommendations

DP R3. Plan for the Vitality and Preservation of Legacy Communities

Local governments, in cooperation with the Delta Protection Commission and Delta Conservancy, should prepare plans for each community that emphasize its distinctive character, encourage historic preservation, identify opportunities to encourage tourism, serve surrounding lands, or develop other appropriate uses, and reduce flood risks.

DP R4. Buy Rights of Way from Willing Sellers When Feasible

Agencies acquiring land for water management facilities, ecosystem restoration, and flood management infrastructure should purchase from willing sellers, when feasible, including consideration of whether lands suitable for proposed projects are available at fair prices.

DP R5. Provide Adequate Infrastructure

The California Department of Transportation, local agencies, and utilities should plan infrastructure, such as roads and highways, to meet needs of development consistent with sustainable community strategies, local plans, the Delta Protection Commission's Land Use and Resource Management Plan for the Primary Zone of the Delta*, and the Delta Plan.*

DP R6. Plan for State Highways

The Delta Stewardship Council, as part of the prioritization of State levee investments called for in Water Code section 85306, should consult with the California Department of Transportation as provided in Water Code section 85307(c) to consider the effects of flood hazards and sea level rise on State highways in the Delta.

DP R7. Subsidence Reduction and Reversal

The following actions should be considered by the appropriate State agencies to address subsidence reversal:

- *State agencies should not renew or enter into agricultural leases on Delta or Suisun Marsh islands if the actions of the lessee promote or contribute to subsidence on the leased land, unless the lessee participates in subsidence reversal or reduction programs.*
- *State agencies currently conducting subsidence reversal projects in the Delta on State-owned lands should investigate options for scaling up these projects if they have been deemed successful. The California Department of Water Resources should develop a plan, including funding needs, for increasing the extent of their subsidence reversal and carbon sequestration projects to 5,000 acres by January 1, 2017.*
- *The Delta Stewardship Council, in conjunction with the California Air Resources Board (CARB) and the Delta Conservancy, should investigate the opportunity for the development of a carbon market whereby Delta farmers could receive credit for carbon sequestration by reducing subsidence and growing native marsh and wetland plants. This investigation should include the potential for developing offset protocols applicable to these types of plants for subsequent adoption by the CARB.*

Maintain Delta Agriculture

Agriculture is the principal land use in the Delta; however, in recent decades, the total area of agricultural lands has declined, as has the overall percentage of lands in agricultural use. The continued viability of agriculture in the Delta will require the protection of sufficient farmland and fresh water to support commercially viable operations and provide ways for agriculture to coexist with habitat restoration. Policies DP P1 and DP P2 acknowledge the importance of protecting these lands. Farming in the Delta will have to respond to changing conditions and new challenges in the coming years. Among these challenges are shifting commodity markets and consumer demand, changes in climate and water supplies, and subsidence of reclaimed agricultural lands. To support both Delta agriculture and species recovery, farmers in the Delta are encouraged to implement "wildlife-friendly" management practices to maximize habitat values. Restoring wildlife and fish through wildlife-friendly agriculture can help achieve ecosystem restoration objectives while reducing the loss of farmland to habitat restoration. Agritourism is a small but fast-growing source of income for farms in the region. It is another opportunity to add further value to the Delta economy from agricultural activities.

Problem Statement

Agriculture in some parts of the Delta is threatened by urbanization, subsidence, and changing markets due to increased competition from other countries and regions, and shifting consumer preferences. The impacts from water conveyance facilities, ecosystem restoration, changing water quality, and flood management plans are yet to be determined, but rapid and significant changes could disrupt agriculture. Farmers are concerned that regulations and other barriers to conducting business and using their land also threaten the continued viability of agriculture.

Policies

No policies with regulatory effect are included in this section.

Recommendations

DP R8. Promote Value-added Crop Processing

Local governments and economic development organizations, in cooperation with the Delta Protection Commission and the Delta Conservancy, should encourage value-added processing of Delta crops in appropriate locations.

DP R9. Encourage Agritourism

Local governments and economic development organizations, in cooperation with the Delta Protection Commission and the Delta Conservancy, should support growth in agritourism, particularly in and around legacy communities. Local plans should support agritourism where appropriate.

DP R10. Encourage Wildlife-friendly Farming

The California Department of Fish and Wildlife, the Delta Conservancy, and other ecosystem restoration agencies should encourage habitat enhancement and wildlife-friendly farming systems on agricultural lands to benefit both the environment and agriculture.

Encourage Recreation and Tourism

The Delta region offers diverse recreation experiences and facilities such as fishing, boating, birdwatching, other nature activities, hunting, campgrounds, parks and picnic areas, and historic towns and buildings. DPC and California State Parks foresee opportunities to improve and increase recreation and tourism in the Delta. Both agencies recommend improvements of "gateways" to the region on the Delta's urban edges and "base camps" inside the Delta at destinations such as resorts, legacy communities, or parks that are focal points for visitors. Building on the reports of the DPC and California State Parks, the Council recommends protecting and improving existing recreation opportunities while seeking ways of providing new, and better coordinated, opportunities. Ecosystem restoration, as described in Chapter 4, can also enhance opportunities for nature-based recreation and boating. Future prospects for recreation and tourism will be influenced by decisions about the Delta ecosystem, water quality, levee improvements, and governance, including land use and environmental standards. The BDCP, Delta water quality plans, levee investments, and other decisions yet to be made can all significantly affect recreation and tourism.

Problem Statement

Recreation opportunities abound, but many have not been fully developed due to inadequate visitor information, aging and inadequate facilities, and restricted access to public lands. Limited cooperation in marketing, planning, and public-private partnerships between public recreation providers, other government land managers, businesses, and others hinders recreation and tourism, and impedes expansion of visitor-serving businesses.

Policies

No policies with regulatory effect are included in this section.

Recommendations

DP R11. Provide New and Protect Existing Recreation Opportunities

Water management and ecosystem restoration agencies should provide recreation opportunities, including visitor-serving business opportunities, at new facilities and habitat areas whenever feasible; and existing recreation facilities should be protected, using California State Parks' Recreation Proposal for the Sacramento-San Joaquin Delta and Suisun Marsh *and Delta Protection Commission's* Economic Sustainability Plan for the Sacramento-San Joaquin Delta *as guides.*

DP R12. Encourage Partnerships to Support Recreation and Tourism

The Delta Protection Commission and Delta Conservancy should encourage partnerships between other State and local agencies, and local landowners and business people to expand recreation, including boating, promote tourism, and minimize adverse impacts to nonrecreational landowners.

DP R13. Expand State Recreation Areas

California State Parks should add or improve recreation facilities in the Delta in cooperation with other agencies. As funds become available, it should fully reopen Brannan Island State Recreation Area, complete the park at Delta Meadows-Locke Boarding House, and consider adding new State parks at Barker Slough, Elkhorn Basin, the Wright-Elmwood Tract, and south Delta.

DP R14. Enhance Nature-based Recreation

The California Department of Fish and Wildlife, in cooperation with other public agencies, should collaborate with nonprofits, private landowners, and business partners to expand wildlife viewing, angling, and hunting opportunities.

DP R15. Promote Boating Safety

The California Department of Boating and Waterways should coordinate with the U.S. Coast Guard and State and local agencies on an updated marine patrol strategy for the region.

DP R16. Encourage Recreation on Public Lands

Public agencies owning land should increase opportunities, where feasible, for bank fishing, hunting, levee-top trails, and environmental education.

DP R17. Enhance Opportunities for Visitor-serving Businesses

Cities, counties, and other local and State agencies should work together to protect and enhance visitor-serving businesses by planning for recreation uses and facilities in the Delta, providing infrastructure to support recreation and tourism, and identifying settings for private visitor-serving development and services.

Sustain a Vital Delta Economy

Many of the policies and recommendations in this chapter deal with aspects of the Delta's economy such as maintaining agriculture and encouraging recreation and tourism. The Delta's economy also benefits from the surface transportation, utilities, and other infrastructure that crisscross the Delta to serve local needs and link the Delta to regional, national, and global markets. Facilities such as natural gas wells, wind turbines, other renewable power sources, electric transmission lines, and fuel pipelines need to be planned carefully to avoid conflicts with water supply, ecosystem restoration, or flood management facilities and existing and planned land uses. The ports at Stockton and West Sacramento are valuable assets to Delta communities and the state. Areas for water-dependent industries are located in Collinsville, Rio Vista, Pittsburg, and Antioch.

Problem Statement

Other economic opportunities in the Delta, including port and energy uses, could suffer if unplanned development, flooding, or other land uses interfere with them.

Policies

No policies with regulatory effect are included in this section.

Recommendations

DP R18. Support the Ports of Stockton and West Sacramento

The ports of Stockton and West Sacramento should encourage maintenance and carefully designed and sited development of port facilities.

DP R19. Plan for Delta Energy Facilities

The California Energy Commission and California Public Utilities Commission should cooperate with the Delta Stewardship Council as described in Water Code section 85307(d) to identify actions that should be incorporated in the Delta Plan by 2017 to address the needs of Delta energy development, storage, and distribution.

Timeline for Implementing Policies and Recommendations

Figure 5-7 lays out a timeline for implementing the policies and recommendations described in the previous sections. The timeline emphasizes near-term and intermediate-term actions.

Timeline for Implementing Policies and Recommendations

TIMELINE

CHAPTER 5: Delta as an Evolving Place

	ACTION (REFERENCE #)	LEAD AGENCY(IES)	NEAR TERM 2012–2017	INTERMEDIATE TERM 2017–2025
POLICIES	Locate new urban development wisely (DP P1)	Local governments	●	●
	Respect local land use when siting water or flood facilities or restoring habitats (DP P2)	Local governments and State agencies	●	●
RECOMMENDATIONS	Designate the Delta as a National Heritage Area (DP R1)	DPC	●	
	Designate State Route 160 as a National Scenic Byway (DP R2)	Caltrans	●	
	Plan for the vitality and preservation of legacy communities (DP R3)	Local governments, DPC, Delta Conservancy	●	
	Buy rights of way from willing sellers when feasible (DP R4)	Local, State, and federal agencies	●	●
	Provide adequate infrastructure (DP R5)	Caltrans, local agencies, and utility providers	●	●
	Plan for State highways (DP R6)	Council, Caltrans	●	
	Subsidence reduction and reversal (DP R7)	State agencies	●	
	Promote value-added crop processing (DP R8)	Local governments and economic development organizations	●	●
	Encourage agritourism (DP R9)	Local governments and economic development organizations	●	●
	Encourage wildlife-friendly farming (DP R10)	DFW, Delta Conservancy	●	●
	Provide new and protect existing recreation opportunities (DP R11)	Water management and ecosystem restoration agencies	●	●
	Encourage partnerships to support recreation and tourism (DP R12)	DPC, Delta Conservancy	●	●
	Expand State Recreation Areas (DP R13)	Parks	●	●
	Enhance nature-based recreation (DP R14)	DFW	●	●
	Promote boating safety (DP R15)	Boating and Waterways	●	
	Encourage recreation on public lands (DP R16)	DWR, DFW, Delta Conservancy, Parks	●	
	Enhance opportunities for visitor-serving businesses (DP R17)	Local governments and State agencies	●	●
	Support the Ports of Stockton and West Sacramento (DP R18)	Ports of Stockton and West Sacramento	●	●
	Plan for Delta energy facilities (DP R19)	California Energy Commission and PUC	●	

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Agency Key:

Boating and Waterways: California Department of Boating and Waterways
Delta Conservancy: Sacramento-San Joaquin Delta Conservancy
Caltrans: California Department of Transportation
Council: Delta Stewardship Council
DFW: California Department of Fish and Wildlife
DPC: Delta Protection Commission
DWR: California Department of Water Resources
Parks: California State Parks
PUC: California Public Utilities Commission

Figure 5-7

Science and Information Needs

Better information about recreation and tourism in the Delta and additional research into best practices for managing farmlands in the Delta can contribute to efforts to protect the Delta's unique values. These needs include the following:

- Surveys of Delta recreation at regular intervals, such as every 5 years, to inform marketing and planning for recreation and tourism
- Assessments of opportunities to control or reverse subsidence of farmland
- Analysis of land and water use by agriculture, including land ownership (resident vs. absentee; age of owner; size of holding, etc.), cropping patterns, soil types, and other factors to identify the Delta's agricultural regions, their competitive advantages, threats and opportunities
- Analysis of farm labor housing needs.

Issues for Future Evaluation and Coordination

Many Delta agencies and residents are concerned that the region's economy may suffer if agriculture or other uses decline significantly due to habitat restoration or water conveyance projects, especially the BDCP described in Chapter 3, or changes in State priorities for levee investment resulting from the studies recommended in Chapter 7. DPC's ESP forecasts adverse economic impacts from farmland loss based on a scenario of how these decisions may affect the region. Its Proposal to Protect the Delta as a Place recommends that the Delta Investment Fund support protection of the Delta economy, and be administered by the DPC and guided by an investment committee appointed by the DPC's commissioners (DPC 2012a). The Delta Conservancy will also play a role in some economic development efforts, as provided in Public Resources Code section 32322(b).

Because BDCP and new levee investment priorities are not yet complete, the magnitude of any impacts to farmland, other uses, or the Delta's economy cannot reasonably be forecast. If significant adverse impacts to the Delta economy do result from farmland losses or other impacts due to habitat restoration, water conveyance, or revised levee investment priorities, then measures to compensate for these losses may warrant consideration. This consideration should include creation of a regional agency to implement and facilitate economic development efforts, guided by the DPC's ESP. The agency's responsibilities could include the following:

- Branding and marketing the Delta
- Coordinating with counties and cities to encourage planning and infrastructure development that is aligned with economic sustainability strategies
- Providing regulatory assistance to reduce impediments to priority activities, including visitor-serving developments, dredging, levee construction, and ecosystem restoration, to reduce impediments and lower costs of these activities
- Encouraging value-added processing of Delta crops, agritourism, visitor-serving commercial businesses, and preservation of the historic buildings in legacy communities
- Recommending and overseeing expenditures from the Delta Investment Fund

Performance Measures

Development of informative and meaningful performance measures is a challenging task that will continue after the adoption of the Delta Plan. Performance measures need to be designed to capture important trends and to address whether specific actions are producing expected results. Efforts to develop and track performance measures in complex and large-scale systems like the Delta are commonly multiyear endeavors. The recommended output and outcome performance measures listed below are provided as examples and subject to refinement as time and resources allow. Final administrative performance measures are listed in Appendix E and will be tracked as soon as the Delta Plan is completed.

Recommended performance measures for protection and enhancement of the unique cultural, recreational, natural resources, and agricultural values of the Delta as an evolving place are described below.

Output Performance Measures

- Congress designates the Delta and Suisun Marsh as an NHA by January 1, 2014. (DP R1)
- Water management, ecosystem restoration, and flood management projects minimize conflicts with adjoining uses by including adequate mitigation measures to avoid adverse effects. (DP P2)
- Recreation facilities are included in new ecosystem restoration projects. (DP R9)
- The DWR and others increase the extent of their subsidence reversal and carbon sequestration projects to 5,000 acres by January 1, 2017. (DP R7)

Outcome Performance Measures

- No further rural farmland in the Delta is lost to urban development. (DP P1)
- Progress toward protecting the Delta legacy communities, as indicated by renovation of historic structures, floodproofing, and other reductions in flood hazards, and maintenance or growth of small businesses and population. (DP R3)
- Increasing tonnage of cargo and the number of jobs at the ports of Stockton and West Sacramento. (DP R18)

References

Armentano, T. V. 1980. Drainage of organic soils as a factor in the world carbon cycle. *BioScience* 30:825-30.

BCDC (San Francisco Bay Conservation and Development Commission). 1976. *Suisun Marsh Protection Plan*.

Beals, R. L. 1933. The ethnology of the Nisenan. *University of California Publications in American Archaeology and Ethnography* 31(6):335-410.

Bennyhoff, J. A., and D. A. Fredrickson. 1969. A proposed integrative taxonomic system for central California archaeology. *Toward a New Taxonomic Framework for Central California Archaeology*. Edited by R. E. Hughes, 15–24. Berkeley, CA: University of California, Archaeological Research Facility.

California Chambers and Visitors Bureau. 2010. Website used to identify recreational facilities in the Delta. http://www.californiadelta.org/index.htm. Accessed by The Dangermond Group. March.

California Resources Agency. 2007. Public, Conservation, and Trust Lands in California. Site accessed June 1, 2010. http://www.atlas.ca.gov/download.html#/casil/planning/landOwnership.

California Resources Agency. 2008. *Managing an Uncertain Future: Climate Change Adaptation Strategies for California's Water*. Sacramento, CA.

California State Parks. 2011. *Recreation Proposal for the Sacramento-San Joaquin Delta and Suisun Marsh*. Sacramento, CA.

City of Benicia. 2003. General Plan land use designations within Suisun Marsh. Digitized into GIS format by AECOM from City of Benicia Land Use map in 2012.

City of Fairfield. 2008. General Plan land use designations within Suisun Marsh. Received from the City of Fairfield in 2012.

City of Lathrop. 2012. General Plan Land Use map for the City of Lathrop. October. Site accessed March 14, 2013. http://www.ci.lathrop.ca.us/cdd/documents/.

City of Manteca. 2012. General Plan land use designations in GIS format. Received by Eryn Pimentel, AECOM, from Jeffrey Davis, City of Manteca, on September 4.

City of Rio Vista. 2001. General Plan land use designations in electronic non-GIS format. Site accessed 2009. http://www.riovistacity.com/images/Documents/chapter_04.pdf.

City of Sacramento. 2008. General Plan land use designations in electronic GIS format. Site accessed 2009. http://www.cityofsacramento.org/gis/data.html.

City of Stockton. 2011a. GIS layers for city spheres of influence and General Plan land use designations. Site accessed April 14, 2011. http://www.stocktongov.com/services/gis/mapdatDat.html.

City of Stockton. 2011b. General Plan land use designations in GIS format and General Plan land use designations within Suisun Marsh (digitized into GIS format by AECOM from Land Use map in 2012). Site accessed April 14, 2011. http://www.stocktongov.com/services/gis/mapdatDat.html.

City of Suisun City. 2011. General Plan land use designations within Suisun Marsh. Digitized into GIS format by AECOM from Land Use map in 2012.

City of Tracy. 2011a. General Plan land use designations provided in GIS format. Delivered via file transfer protocol from Victoria Lombardo, Senior Planner, City of Tracy, to Jessica Law, Urban and Environmental Planner, AECOM, on March 10, 2011.

City of Tracy. 2011b. City of Tracy Sphere of Influence provided in GIS format. Delivered via file transfer protocol from Victoria Lombardo, Senior Planner, City of Tracy, to Jessica Law, Urban and Environmental Planner, AECOM, on March 10, 2011.

City of West Sacramento. 2010. General Plan land use designations in GIS format. Site accessed December 28, 2010. http://www.cityofwestsacramento.org/services/gis/downloads.cfm.

Contra Costa County. 2008. GIS layer for Urban Limit Line for Contra Costa County. October. Site accessed June 27, 2011. http://ccmap.us/Details/asp?Product=134490.

Contra Costa County. 2010. GIS layer for City Spheres of Influence in Contra Costa County. January. Site accessed January 28, 2011. https://www.ccmap.us/catalog.asp?UserChoice=2&Layercntrl=0000000000000000000000.

DBW (California Department of Boating and Waterways). 2002. *Sacramento–San Joaquin Delta Boating Needs Assessment (2000-2020)*. Prepared by The Dangermond Group.

Delta Conservancy (Sacramento-San Joaquin Delta Conservancy). 2012. *Strategic Plan*. West Sacramento, CA.

Delta Vision (Delta Vision Blue Ribbon Task Force). 2008. *Delta Vision Strategic Plan*. October 17. http://deltavision.ca.gov/strategicplanningprocess/staffdraft/delta_vision_strategic_plan_standard_resolution.pdf.

Deverel, S. and D. Leighton. 2010. Historic, recent, and future subsidence, Sacramento-San Joaquin Delta, Calif., USA. *San Francisco Estuary and Watershed Science*. 8(2):23 p.

DFG (California Department of Fish and Game). 2009. GIS data. Planning for the Habitat Management, Preservation, and Restoration Plan for the Delta 2009.

Discover the Delta Foundation. 2010. Website used to identify recreational facilities in the Delta. http://www.discoverthedelta.org. Accessed by The Dangermond Group.

DOC (California Department of Conservation). 1984. Farmland Mapping and Monitoring Program 1984. Important Farmland designations for Alameda, Contra Costa, Solano, and Yolo counties. Site accessed July 22, 2010. ftp://ftp.consrv.ca.gov/pub/dlrp/fmmp/.

DOC (California Department of Conservation). 1988. Farmland Mapping and Monitoring Program 1988. Important Farmland designations for Sacramento County. Site accessed July 23, 2010. ftp://ftp.consrv.ca.gov/pub/dlrp/fmmp/.

DOC (California Department of Conservation). 1990. Farmland Mapping and Monitoring Program 1990. Important Farmland designations for San Joaquin County. Site accessed July 15, 2010. ftp://ftp.consrv.ca.gov/pub/dlrp/fmmp/.

DOC (California Department of Conservation). 2008. Farmland Mapping and Monitoring Program 2008. Important Farmland designations for Alameda, Contra Costa, Sacramento, San Joaquin, Solano, and Yolo counties. Site accessed October 8, 2009. ftp://ftp.consrv.ca.gov/pub/dlrp/fmmp/.

DOC (California Department of Conservation). 2009. Williamson Act designations for California. Site accessed August 20, 2010. ftp://ftp.consrv.ca.gov/pub/Dlrp/WA/Map%20and%20PDF/CALIFORNIA%20WILLIAMSON%20ACT/Total%20WA%20GIS%20to%202009/.

DPC (Delta Protection Commission). 2006. GIS layer prepared by The Dangermond Group identifying recreation facilities in the Delta for the Delta Recreation Strategy Plan. Delivered from Doug Gardner, The Dangermond Group, to Eryn Pimentel, AECOM on March 7, 2011.

DPC (Delta Protection Commission). 2010. *Land Use and Resource Management Plan for the Primary Zone of the Delta*. Adopted February 25, 2010.

DPC (Delta Protection Commission). 2011. *Feasibility Study for a Sacramento-San Joaquin Delta National Heritage Area*. Public Review Draft. October.

DPC (Delta Protection Commission). 2012a. *Proposal to Protect, Enhance, and Sustain the Unique Cultural, Historical, Recreational, Agricultural, and Economic Values of the Sacramento-San Joaquin Delta as an Evolving Place*. January 26.

DPC (Delta Protection Commission). 2012b. *Economic Sustainability Plan for the Sacramento-San Joaquin Delta*. Public Draft. October 10.

DWR (California Department of Water Resources). 2008. Topical Area: Economic Consequences. Technical Memorandum: Delta Risk Management Strategy Phase 1. Final. May.

DWR (California Department of Water Resources). 2009. *California Water Plan Update 2009.* Sacramento, CA.

Federal Emergency Management Agency (FEMA). 2008. *Flood Plain Management Bulletin – Historic Structures*. FEMA P-467-2.

Fredrickson, D. A. 1974. Cultural diversity in early central California: a view from the north Coast Ranges. *Journal of California Anthropology* 1(1):41-53.

Johnson, P. J. 1978. Patwin. *Handbook of North American Indians*. Volume 8: California. Edited by R. F. Heizer, 350-360. Washington, D.C.: Smithsonian Institution.

Kroeber, A. L. 1925. Handbook of the Indians of California. *Bureau of American Ethnology Bulletin 78*.

Kroeber, A. L. 1932. The Patwin and their neighbors. *University of California Publications in American Archaeology and Ethnology* 29(4):253-423.

Levy, R. 1978. Eastern Miwok. *Handbook of North American Indians*. Volume 8: California. Edited by R. F. Heizer, 398-413. Washington, D.C.: Smithsonian Institution.

Lund, J., E. Hanak, W. Fleenor, R. Howitt, J. Mount, and P. Moyle. 2007. *Envisioning Futures for the Sacramento-San Joaquin Delta*. Public Policy Institute of California. San Francisco, CA.

Miller, Robin. 2008. *Subsidence Reversal in a Re-established Wetland in the Sacramento-San Joaquin Delta, California, USA*. U.S. Geological Survey.

Moratto, M. J. 1984. *California Archaeology*. San Francisco: Academic Press.

Mountain House Community Services District. 2008. Mountain House Zoning map. September 18, 2008. Site accessed July 27, 2011. http://www.ci.mountainhouse.ca.us/master-plan.asp.

Probolsky Research. 2012. *California Statewide Voter Survey: Report on Results*. January 27, 2012.

Reclamation District 2093. 2009. *Liberty Island Conservation Bank Initial Study/Mitigated Negative Declaration*. April.

SACOG (Sacramento Area Council of Governments). 2009. GIS layer for Spheres of Influence in SACOG region. December. Site accessed January 28, 2011. http://sacog.org/mapping/clearinghouse/Mapping Center.

SACOG (Sacramento Area Council of Governments). 2011. *Sacramento Region Rural-Urban Connections Strategy*. May.

Sacramento County. 2011. General Plan land use designations in GIS format. Site accessed 2012. http://www.sacgis.org/GISDataPub/Data/.

Sacramento County. 2012. Letter from Sacramento County to the Delta Stewardship Council, Re: Revised Maps of the Unincorporated Delta Communities. November 20.

Sacramento County. 2013. Sacramento County Online Map, Sacramento County, California. Site accessed March 10, 2013. http://generalmap.gis.saccounty.net/JSViewer/county_portal.aspx

San Joaquin County. 2008a. City of Lathrop SOI map. March 4. Site accessed February 3, 2011. http://www.sjgov.org/lafco/SOI%20Maps/Lathrop_Sphere_new%202008.pdf.

San Joaquin County. 2008b. City of Manteca SOI map. October 29. Site accessed February 3, 2011. http://www.co.san-joaquin.ca.us/lafco/Manteca%20MSR/Manteca_Sphere.pdf.

Solano County. 2008a. GIS layer for City Spheres of Influence in Solano County. May. Site accessed August 10, 2011. http://regis.solanocounty.com/data.html.

Solano County. 2008b. General Plan land use designations provided in GIS format. Obtained 2009.

Stockton Record. 2012. Poll finds few know about Sacramento-San Joaquin Delta. February 5. http://www.modbee.com/2012/02/05/2057167/poll-finds-few-know-anything-about.html.

Suddeth, R., J. Mount, and J. Lund. 2010. Levee decisions and sustainability for the Sacramento-San Joaquin Delta. *San Francisco Estuary and Watershed Science* 9(2).

Sumner, D., and J. Rosen-Molina. 2011. *Evaluations of Policy Alternatives to Benefit Agriculture in the Sacramento-San Joaquin Delta of California*. Developed by the University of California Agricultural Issues Center for the California Department of Food and Agriculture. February.

Trott, Ken. 2007. Context Memorandum: Agriculture in the Delta Iteration 2. August 10, 2007. Site accessed November 11, 2010. http://deltavision.ca.gov/context_memos/Agriculture/Agriculture_Iteration2.pdf.

University of California Archaeological Survey. 1956. No 35, *Papers of California Archaeology* 44-46.

Wallace, W. J. 1978. Northern Valley Yokuts. *Handbook of North American Indians*. Volume 8: California. Edited by R. F. Heizer, 462-476. Washington, D.C.: Smithsonian Institution.

Wilson, N. L., and A. H. Towne. 1978. Nisenan. *Handbook of North American Indians*. Volume 8: California. Edited by R. F. Heizer, 387-397. Washington, D.C.: Smithsonian Institution.

Yolo County. 2010a. General Plan land use designations in GIS format. Site accessed 2010. http://www.yolocounty.org/Index.aspx?page=823.

Yolo County. 2010b. Yolo County General Plan 2030 layer provided in GIS format. Delivered via file transfer protocol from Marcus Neuvert, GIS Specialist, Yolo County DITT, to Dillon Cowan, Staff Engineer, CH2M HILL, Inc., on July 1.

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CHAPTER 6

Improve Water Quality to Protect Human Health and the Environment

ABOUT THIS CHAPTER

This chapter discusses the trade-offs and conflicts inherent in managing water quality for multiple objectives. It recommends strategies to make balanced improvements primarily through the prioritization of projects and programs. It also provides support to related information in Chapters 3, 4, and 5.

Other State of California (State) agencies have broad authority to protect and regulate water quality. This chapter sets forth priority Sacramento-San Joaquin Delta (Delta)-specific recommendations for those agencies and focuses on four core strategies where best available science shows the need for improved water quality to achieve the coequal goals:

- Require Delta-specific water quality protection
- Protect beneficial uses by managing salinity
- Improve drinking water quality
- Improve environmental water quality

These core strategies form the basis of the 12 recommendations found at the end of this chapter. These major aspects are critical to protecting human health and improving the environment. Salinity is discussed in a separate section because of its importance as a defining characteristic of the estuary and its implications to ecosystem health, its linkage to water project operations, and its historical importance in the Delta.

RELEVANT LEGISLATION

The protection and improvement of water quality is inherent to meeting the coequal goals of the State. Water quality plays a critical role in the achievement of a more reliable water supply and protection, restoration, and enhancement of the Delta ecosystem. Water quality also contributes to the values of the Delta as an evolving place. The Sacramento-San Joaquin Delta Reform Act of 2009 calls for improving water quality as follows:

> *85020 The policy of the State of California is to achieve the following objectives that the Legislature declares are inherent in the coequal goals for management of the Delta:…(e) Improve water quality to protect human health and the environment consistent with achieving water quality objectives in the Delta.*
>
> *85022(d) The fundamental goals for managing land use in the Delta are to do all of the following: … (6) Improve water quality to protect human health and the environment consistent with achieving water quality objectives in the Delta.*
>
> *85302(d) The Delta Plan shall include measures to promote a more reliable water supply that address all of the following: … (3) Improving water quality to protect human health and the environment.*
>
> *85302(e) The following subgoals and strategies for restoring a healthy ecosystem shall be included in the Delta Plan… (5) Improve water quality to meet drinking water, agriculture, and ecosystem long-term goals.*

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CHAPTER 6

Improve Water Quality to Protect Human Health and the Environment

The Delta Reform Act acknowledges water quality as an important element of a reliable water supply and directs the Delta Stewardship Council (Council) to improve water quality to protect human health and the environment. In general, water quality is an abstract concept unless it is discussed relative to protection of the beneficial uses of that water. The Delta Reform Act highlights drinking water, agriculture, and ecosystem goals as important beneficial uses for the purpose of the Delta Plan. The Council's role with respect to water quality is to ensure that the policies and recommendations in the Delta Plan balance the protection of myriad—and sometimes competing—beneficial uses of water.

In California, the entities primarily responsible for managing water quality in the state are the nine regional water quality control boards (RWQCBs) and the State Water Resources Control Board (SWRCB). The RWQCBs are responsible for water quality planning, permitting and enforcement, and financial assistance, when funds are available. The SWRCB is responsible for statewide plans, permits, and policies, and serves as a review body for RWQCB decisions. The SWRCB also has the important and challenging task of administering the State's complex water rights system of permits and licenses. As part of these duties, the SWRCB sets water quality objectives for major waterways, including the tributaries of the Delta, as described in Chapter 4. The Central Valley RWQCB is the regional board with primary jurisdiction in the Delta and Delta watershed.

Water quality in the Delta is influenced by many factors. Seasonal rainfall, snow runoff, and reservoir releases flow in from several rivers and streams, primarily the Sacramento and the San Joaquin rivers. During very high flows, some of this water flows across floodplains before it enters the Delta. Tides can bring saline waters into the Delta from the San Francisco Bay. There are also discharges from cities, industries, and agricultural lands. As all of these flows enter the Delta, they bring with them a variety of contaminants. Additionally, water is diverted from the Delta, either for use within the Delta or for use in Central and Southern California and other service areas. The timing and physical qualities of these flows into and out of the Delta affect the water quality needed to support the beneficial uses of Delta waters.

In achieving the coequal goals, the Council envisions a Delta where improved water quality supports a healthy ecosystem and the multiple beneficial uses of water, including municipal supply and recreational uses such as fishing and swimming. To support a more resilient and healthy Delta ecosystem, salinity patterns should be consistent with more natural flow patterns with inflows of high-quality water. Nutrient concentrations should support diverse and productive aquatic food webs, and should not cause excessive growth of nuisance aquatic plants or blooms of harmful algae. Physical attributes of the aquatic environment, such as dissolved oxygen (DO) concentrations, temperature ranges, and turbidity levels, should support the needs of native species. At all times, the Delta should be free of harmful concentrations of toxic substances. Discharges of treated wastewater, urban runoff, or agricultural return flows should be regulated so that they do not have a negative effect on the Delta. High water quality is imperative to the coequal goals and crucial for protecting the beneficial uses of Delta water, successful restoration of aquatic habitats, and sustenance of native plants and animals.

Beneficial uses of Delta waters involve trade-offs that are important to recognize and address when establishing water quality goals. These trade-offs emerge in cases where acceptable or even ideal water quality for one use may have unintended or adverse effects on another use. For example, variable salinity levels are beneficial for many native species in the Delta, but can be problematic for agricultural or municipal uses. Bromide salts, one component of salinity, can result in cancer-causing disinfection byproducts with some water treatment methodologies. Similarly, organic carbon in drinking water sources can contribute to harmful disinfection byproduct formation (Leenheer and Croue 2003). However, for ecosystem purposes, organic carbon is beneficial and is increased by wetland creation. Also, wetland creation can result in increased methylation of mercury, resulting in bioaccumulation of mercury in fish species, a threat to human health when these fish are consumed. Water quality is strongly connected to water supply, as reservoir releases to control salinity can reduce the availability of fresh water at times of the year when it is needed most. These and other issues affecting water quality policy are discussed in this chapter.

Beneficial Uses of Water in and from the Delta

A goal of the Delta Plan is to maintain water quality at a level that supports and enhances designated beneficial uses. Table 6-1 lists the beneficial uses for water in the Delta as specified in the SWRCB's 2006 *Water Quality Control Plan for the San Francisco Bay/Sacramento–San Joaquin Delta Estuary* (Bay-Delta Plan).

The most important part of any water quality discussion is identifying the existing and potential uses of the water in question. These uses drive the level of water quality that must be attained, and what requirements and limitations must be placed on dischargers and diverters of that water to protect those uses. Specific discharge limitations are based on adopted science-based objectives necessary to protect associated beneficial uses. These limitations are then included in discharge permits.

Factors Influencing Water Quality in the Delta

This section provides an overview of factors that influence water quality in the Delta and existing water quality regulations. Water quality in the Delta is influenced by factors such as:

- Freshwater inflows and outflows
- In-Delta land use
- Dredging
- The Delta levee system
- Tides
- Point source inputs of pollutants
- Nonpoint source inputs of pollutants
- In-Delta water use
- Export diversions and operations

Delta Water Beneficial Uses

TABLE 6-1

Beneficial Use	Description
Municipal and Domestic Supply	Uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.
Industrial Service Supply	Uses of water for industrial activities that do not depend primarily on water quality including, but not limited to, mining cooling water supply, hydraulic conveyance, gravel washing, fire protection, and oil well repressurization.
Industrial Process Supply	Uses of water for industrial activities that depend primarily on water quality.
Agricultural Supply	Uses of water for farming, horticulture, or ranching including, but not limited to, irrigation, stock watering, or support of vegetation for range grazing.
Groundwater Recharge	Uses of water for natural or artificial recharge of groundwater for purposes of future extraction, maintenance of water quality, or halting of saltwater intrusion into freshwater aquifers.
Navigation	Uses of water for shipping, travel, or other transportation by private, military, or commercial vessels.
Water Contact Recreation	Uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These include, but are not limited to, swimming, wading, water skiing, skin and scuba diving, surfing, white-water activities, fishing, or use of natural hot springs.
Non-contact Water Recreation	Uses of water for recreational activities involving proximity to water, but not normally involving body contact with water, where ingestion is reasonably possible. These include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tide pool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.
Shellfish Harvesting	Uses of water that support habitats suitable for the collection of filter-feeding shellfish (e.g., clams, oysters, and mussels) for human consumption, commercial, or sports purposes.
Commercial and Sport Fishing	Uses of water for commercial or recreational collection of fish, shellfish, or other organisms including, but not limited to, uses involving organisms intended for human consumption or bait purposes.
Warm Freshwater Habitat	Uses of water that support warmwater ecosystems including, but not limited to, preservation of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.
Cold Freshwater Habitat	Uses of water that support coldwater ecosystems including, but not limited to, preservation or enhancements of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.
Migration of Aquatic Organisms	Uses of water that support habitats necessary for migration or other temporary activities by aquatic organisms, such as anadromous fish.
Spawning, Reproduction, and/or Early Development	Uses of water that support high-quality aquatic habitats suitable for reproduction and early development of fish.
Estuarine Habitat	Uses of water that support estuarine ecosystems including, but not limited to, preservation or enhancement of estuarine habitats, vegetation, fish, shellfish, or wildlife (e.g., estuarine mammals, waterfowl, shorebirds).
Wildlife Habitat	Uses of water that support estuarine ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.
Rare, Threatened, or Endangered Species	Uses of water that support habitats necessary, at least in part, for the survival and successful maintenance of plant or animal species established under State or federal law as being rare, threatened, or endangered.

Source: SWRCB 2006

Generally, water quality is better in the northern Delta than in the central and southern Delta because higher-quality Sacramento River inflows are greater than inflows from the San Joaquin River, and the proportion of agricultural water use and drainage in the San Joaquin Valley is greater than in the Sacramento Valley. The SWRCB has listed Delta waterways (various streams, rivers, and sloughs in the Delta), the Carquinez Strait, and San Francisco Bay as having impaired water quality pursuant to the federal Clean Water Act (CWA) section 303(d) list[1] (SWRCB 2010). Pollutants of concern include insecticides, herbicides, mercury, selenium, nutrients, and legacy organic pollutants such as (DDT) and polychlorinated biphenyls (PCBs). Additional water quality issues in the Delta include temperature, salinity, turbidity, low DO, bromide, dissolved organic carbon, pathogens, and harmful algal blooms (HABs). Amounts of these constituents that are too high (or in some cases too low) can impair the ability of these waters to support beneficial uses, such as municipal water supply, recreational use, agricultural water supply, and habitat that supports healthy fish and wildlife populations. See Chapter 4 for additional discussion on how these water quality stressors can affect the Delta and its ecosystem.

Protecting Water Quality Is a Balancing Act

Water quality is central to the State's goals for the Delta – restoring the Delta ecosystem and providing for a more reliable water supply, while protecting and enhancing the Delta as a unique and evolving place. Conditions that affect water quality must be managed and balanced in a way that allows these goals to be met simultaneously. When one use is protected, steps must be taken to minimize impacts on other uses. The following examples of this interconnectedness illustrate the difficulty of the challenge at hand.

Water supply for agricultural, municipal, and industrial use requires control of chemical constituents such as salinity, and certain pollutants that could pose a threat to human health. Efforts to protect, enhance, and restore the Delta ecosystem, however, require the management of volume and timing of flows to provide beneficially variable salinity for certain species and sufficient fresh water for others. This management regime must also consider management of nutrients and suspended solids to ensure a viable food chain within the Delta.

Protecting the communities within the Delta and their water use involves many of these same salinity and pollutant controls that are important for any water supply, but water quality in the Delta must also support recreational uses such as swimming, fishing, and boating. Cumulative discharges of pollutants from Delta communities and from recreational craft can affect in-Delta uses. Sea level rise caused by climate change will affect in-Delta water use and the manner in which flows are managed to meet water quality demands. Levee construction and placement is important to guard against flooding that could threaten in-Delta and exported water supplies. In addition, levee construction can either disrupt ecosystem processes or help provide important habitat benefits, depending on the project's location and individual attributes.

Climate Change

Impacts on water quality from climate change are difficult to predict. However, a recent analysis by the U.S. Geological Survey (USGS) suggests that climate change poses a significant threat to water quality (Cloern et al. 2011). Increases in sea level would increase salinity intrusion into the Delta, threatening water quality for agricultural and municipal uses. Increased air and water temperatures would result in increased runoff amounts in winter, with less in spring and summer. Warmer water can directly affect the life cycle of many fish species and stimulate growth of nuisance aquatic plants or blooms of harmful algae, which can lead to decreases in DO and increases in organic carbon. Increased runoff in the winter could result in more erosion and greater pulses of pollutants.

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[1] The "303(d) list" is the list of impaired and threatened waters (stream/river segments, lakes) that states have identified as not meeting water quality standards and other requirements. Under section 303(d), the law requires that states establish priority rankings for waters on the list and develop total maximum daily loads (TMDLs) for these waters.

Existing Water Quality Regulations

Many different agencies have a role in the regulation of water quality in the Delta. The SWRCB and the RWQCBs have primary responsibility over discharges affecting beneficial uses of water in California with the oversight of the U.S. Environmental Protection Agency (USEPA). Drinking water supply is regulated by the California Department of Public Health, also with oversight by USEPA. Additionally, the California Department of Pesticide Regulation regulates the sale and use of pesticides, which affect water quality. (See sidebar, A Water Quality Success Story.)

A WATER QUALITY SUCCESS STORY

Widespread use of the organophosphorus pesticide diazinon in the Central Valley and episodes of aquatic toxicity caused the Central Valley RWQCB to add the Sacramento and Feather rivers to its list of impaired water bodies in 1994. A total maximum daily load for diazinon was adopted in 2003. Stakeholders also took action to implement a diazinon control strategy, and the USEPA and California Department of Pesticide Regulation took steps to restrict approved uses of diazinon. Grants from the USEPA, the former CALFED Bay-Delta Program, and other agencies provided funding support for control program implementation and research throughout the Central Valley region, including the San Joaquin River.

These water quality control efforts have helped to reduce levels of diazinon to the point that violations of water quality standards in the Sacramento and San Joaquin rivers are rare. Although pesticide pollution is still a problem in parts of some Central Valley streams and rivers, the experience with diazinon shows that programs to address these and other water quality problems can be effective (USEPA 2010).

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The RWQCBs develop water quality control plans (known as Basin Plans) that establish water quality standards and implementation plans for achieving standards for all surface water and groundwater in their respective regions. Water quality standards include identification of beneficial uses, numeric and narrative water quality objectives to protect those uses, and water quality control policies. The RWQCBs issue discharge permits and requirements that specify the amounts of pollutants that may be discharged based on these objectives. Although these permits are intended to ensure protection of these beneficial uses, some water bodies continue to exceed standards, and beneficial uses are not being protected. These impaired water bodies are identified and listed pursuant to federal CWA section 303(d).

Placement of a water body on the CWA 303(d) list initiates a process to develop a pollution limit, or total maximum daily load (TMDL), to address each pollutant causing the impairment. A TMDL defines how much of a pollutant a water body can tolerate and still meet water quality standards. The TMDL must account for all sources of a pollutant, including point sources and nonpoint sources (discharges from wastewater treatment facilities; runoff from urban areas, agricultural inputs, and streets or highways; “toxic hot spots”; and aerial deposition). In addition to accounting for past and current activities, TMDLs may also consider projected future population growth that could increase pollutant levels. The TMDL identifies allocations for point sources and for nonpoint sources, and includes a margin of safety to account for uncertainty. An implementation plan is developed that specifies a set of actions that must be carried out to ensure that the TMDL results in achievement of water quality standards. TMDLs are usually implemented through amendments to the appropriate Basin Plan, which, in turn, will result in changes to discharge permits as they are reissued. Once a TMDL is approved, it may be some time before the necessary studies are completed to set and apportion specific discharge limitations among all dischargers and potential dischargers.

The 2008-2010 Integrated Report (SWRCB 2010), which includes the 303(d) list, prioritizes TMDLs to be developed for each water body-pollutant combination on the CWA section 303(d) list, and establishes schedules for completion of the TMDLs. Approved TMDLs and TMDLs under development are listed in Table 6-2.

On February 10, 2011, the USEPA issued an Advanced Notice of Proposed Rulemaking (USEPA 2011) as part of an effort to assess the effectiveness of current water quality programs designed to protect aquatic species in the San Francisco Bay and the Delta (referred to here as the Bay-Delta). The document identified key water quality issues affecting Bay-Delta aquatic resources and summarized current research for each of these issues, including total ammonia, selenium, pesticides, emerging contaminants, and other parameters affecting estuarine habitat and the migratory corridors of anadromous fish. The notice was intended to solicit public comment on possible USEPA actions to address water quality conditions affecting the Bay-Delta. USEPA may make changes to programs in the Bay-Delta through a formal rulemaking process as a result of further evaluation and consideration of public comment. These changes could affect federal water quality programs administered by the State.

Water quality in the Delta is also regulated by the San Francisco Bay Conservation and Development Commission (BCDC), which has jurisdiction on all tidal areas of the Bay, including Suisun Bay and Suisun Marsh. BCDC policies regarding water quality are intended to prevent the release of pollution into Bay waters to the greatest extent feasible. The BCDC makes decisions regarding water quality impacts based on evaluation by and the advice of the San Francisco Bay RWQCB. The BCDC reviews State and federal actions, permits, projects, licenses, and grants affecting the Bay, including Suisun Marsh, pursuant to the federal Coastal Zone Management Act.

In the Delta and the Suisun Marsh, the Bay-Delta Plan establishes water quality objectives for which implementation is achieved through assigning responsibilities to water right holders and water users (SWRCB 2006). (See sidebar, Water Board Regulation and the Bay-Delta Plan.) This is because the parameters to be controlled are significantly affected by flows and diversions; these responsibilities were established in Water Rights Decision 1641 in 1999. The Bay-Delta Plan also provides protection for beneficial uses that require control of salinity and operations of the various water projects in the Delta, including the State Water Project (SWP) and Central Valley Project (CVP) (SWRCB 2006).

TMDLs Approved and under Development in the Central Valley, Delta, and Suisun Bay

TABLE 6-2

Water Bodies	Pollutants	Status
American River	Mercury	Under Development
Cache Creek, Bear Creek, Harley Gulch	Mercury	Approved
Central Valley	Organochlorine Pesticides	Under Development
Central Valley	Pesticides	Under Development
Clear Lake	Mercury	Approved
Clear Lake	Nutrients	Approved
Grasslands	Selenium	Approved
North San Francisco Bay (includes Suisun Bay)	Selenium	Under Development
Sacramento and Feather Rivers	Diazinon	Approved
Sacramento County Urban Creeks	Diazinon and Chlorpyrifos	Approved
Sacramento-San Joaquin River Delta	Diazinon and Chlorpyrifos	Approved
Sacramento-San Joaquin River Delta	Mercury	Approved
Salt Slough	Selenium	Approved
San Francisco Bay (includes Suisun Bay)	Mercury	Approved
San Francisco Bay (includes Suisun Bay)	PCBs	Approved
San Francisco Bay Area Urban Creeks	Diazinon/Pesticide Toxicity	Approved
San Joaquin River	Salt and Boron	Approved
San Joaquin River	Diazinon and Chlorpyrifos	Approved
San Joaquin River	Selenium	Approved
Stockton Deep Water Ship Channel (Phase 1)	Dissolved Oxygen	Approved
Stockton Deep Water Ship Channel (Phase 2)	Dissolved Oxygen	Under Development
Stockton Urban Sloughs	Dissolved Oxygen	Under Development
Stockton Urban Water Bodies	Pathogens	Approved
Suisun Marsh	Dissolved Oxygen	Under Development
Suisun Marsh	Mercury	Under Development
Upper Sacramento River	Cadmium, Copper, and Zinc	Approved

Sources: Central Valley RWQCB 2011; San Francisco Bay RWQCB 2011a

The SWRCB and RWQCBs are the regulatory agencies with statutory authority to adopt water quality control plans, including regulating waters for which water quality standards are required by the federal CWA (Water Code sections 13170 and 13240). The Council recognizes the SWRCB's role and authority in regulating water quality, and supports and encourages the timely development and enforcement of programs (for example, water quality objectives and waste discharge requirements (WDRs), TMDLs, and National Pollutant Discharge Elimination System [NPDES] permits) to reduce pollutant loads that are causing water quality impairments in the Delta. The Council also supports and encourages the completion of the elements of the SWRCB's 2010 *Update to Strategic Plan 2008-2012* (June 2010) and the *Strategic Workplan for Activities in the San Francisco Bay/ Sacramento–San Joaquin River Delta Estuary* (July 2008) prepared by the SWRCB, Central Valley RWQCB, and San Francisco Bay RWQCB.

WATER BOARD REGULATION AND THE BAY-DELTA PLAN

Water Quality Criteria, Objectives, and Standards. The SWRCB and RWQCBs have primary responsibility for the regulation of discharges and control of pollutants that affect California's surface and groundwater resources.

The water boards do this by using scientific studies and information to first determine the water quality *criteria* that are needed for specific beneficial uses of that water. Examples of beneficial uses include drinking water use, agricultural use, recreation, and others listed in the Bay-Delta Plan. The water quality criteria are then used to develop water quality objectives.

Water quality *objectives* account for additional information such as economic impacts, effects on other uses, available technology, and similar factors. Water quality objectives are considered equivalent to water quality *standards* required by the USEPA. The RWQCBs adopt water quality control plans that contain these objectives; they identify specific beneficial uses of each water body covered by that plan and specific water quality objectives to protect those uses. These plans are then used to issue general or site-specific discharge permits with specific pollutant discharge limitations.

Section 303(d) of the federal CWA requires that California create a listing of impaired water bodies that are not meeting water quality standards. Water bodies on this 303(d) list require development of a TMDL, which establishes a limitation on the amount of pollution that water body can be exposed to without adversely affecting its beneficial uses. This TMDL allocates proportions of the total limitation among dischargers to the impaired surface water. TMDLs typically result in changes to water quality control plans, so that existing and future permits contain pollutant limits or other provisions necessary to ensure that the water quality standards are met.

Flow Objectives. The SWRCB is responsible for administering and overseeing the right to take and use water in California. Where storage, transport, diversion, and use of water threaten to adversely affect water quality and beneficial uses, the SWRCB may adopt plans that set objectives for water quality and flow where necessary to protect beneficial uses. As a special kind of water quality objective, *flow objectives* are developed on the basis of scientifically developed information and account for other factors, such as economic impacts, physical constraints, and effects on other uses such as water supply and agricultural use.

The Bay-Delta Plan. In the case of the Delta, the SWRCB has adopted the Bay-Delta Plan. This plan contains water quality objectives, including flow objectives. The Delta Reform Act required that certain flow criteria be developed, which the SWRCB completed in 2010.

In early 2012, the SWRCB officially launched the comprehensive review of the Bay-Delta Plan. The water quality control planning phase of this review will include review of potential modifications to current objectives included in the Bay-Delta Plan, the potential establishment of new objectives, and modifications to the program of implementation for those objectives. It will also include potential changes to the monitoring and special studies program included in the Bay-Delta Plan. The water quality control planning process will not include amendments to water rights and other measures to implement a revised Bay-Delta Plan. A separate environmental impact report will be prepared for these actions. In addition, a separate substitute environmental document is being prepared to address updates to the water quality objectives for the protection of southern Delta agricultural beneficial uses, San Joaquin River flow objectives for the protection of fish and wildlife beneficial uses, and the program of implementation for those objectives.

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Salinity in the Delta

The Delta is an estuary, and like any estuary, fresh water from rivers and tributaries flows downstream where it mixes with salt water. The location, extent, and dynamics of the freshwater-saltwater interface are important drivers of many estuarine (ecological) processes and important considerations in water management for human uses. The geographic extent of water of the correct salinity is important to many estuarine species as it is an important characteristic of their habitat. Crops vary in their tolerance of salt content in water used for irrigation, and salinity can reduce yields of sensitive crops at relatively low levels. Salt in municipal water supplies increases corrosion of pipes and appliances, can affect taste, and can contribute to the formation of disinfection byproducts that are harmful to human health. The management-intensive regulation of salinity in the Delta for multiple benefits is another example of the highly altered system the Delta has become. This section provides a summary of the history of Delta salinity problems and the effects of salinity on agricultural, municipal, and industrial water use.

History and Causes of Delta Salinity Problems

The location of the freshwater-saltwater interface in the estuary shifts with the seasons and the tides and from year to year depending on the amount of precipitation, water diversions, and Delta outflow (Kimmerer 2004; Malamud-Roam et al. 2007; Stahle et al. 2011). The location, extent, and dynamics of this freshwater-saltwater gradient have changed over the past 150 years because of landscape modification, water management and flood management infrastructure such as dams and conveyance facilities, channel dredging, and climate change.

Figure 6-1 is a representation of salinity over a range of concentrations relevant to suitability for water supply. It shows the salinity gradient in the western Delta under high and low outflow conditions. Changes in seasonal inflow to the Delta caused by upstream diversions, storage of water behind the State and federal water project dams, and operation of the State and federal Delta pumps have generally shifted the salinity gradient upstream and have changed seasonal and interannual salinity patterns. Even with these measurable shifts in salinity caused by diversion, storage, and conveyance of water, a primary driver of seasonal and annual salinity variability in the western Delta and Suisun Marsh continues to be the amount of precipitation in the watershed (Enright and Culberson 2010).

The examination of tree rings throughout the mountains of California provides a good indicator of precipitation over the last 650 years, but tree rings alone cannot accurately reproduce the details of Delta salinity over this period (Stahle et al. 2011). However, strong evidence indicates that the western Delta was a freshwater ecosystem for 2,500 years before human modification in the nineteenth and twentieth centuries (Malamud-Roam and Ingram 2004). Channel dredging, significant reductions in tidal marsh area, and levee construction have changed Delta salinity by increasing the strength of tides in the Delta, increasing connections between channels, and reducing the moderating effects of wetlands and floodplains on outflow. Consequently, simply allowing more variability in Delta outflow will not produce the same salinity patterns that existed before development.

Although sea water is the primary source of salinity in the western Delta and Suisun Marsh, it is not the only source. Agricultural drainage is another significant source of salinity, particularly in the San Joaquin Valley. Municipal and industrial discharges also can locally increase salinity, although such salinity increases are generally small compared to increases from brackish water inputs. All surface waters and groundwaters contain some amount of salt, and this salt is concentrated with use through evaporation and transpiration of water by plants (Central Valley Drinking Water Policy Workgroup 2007). The remaining water in drainage, agricultural return flows, or percolated groundwater has a higher salt concentration than the supply water. This normal increase in salinity with water use is exacerbated in some parts

Salinity in the Delta Varies by Inflow Volumes

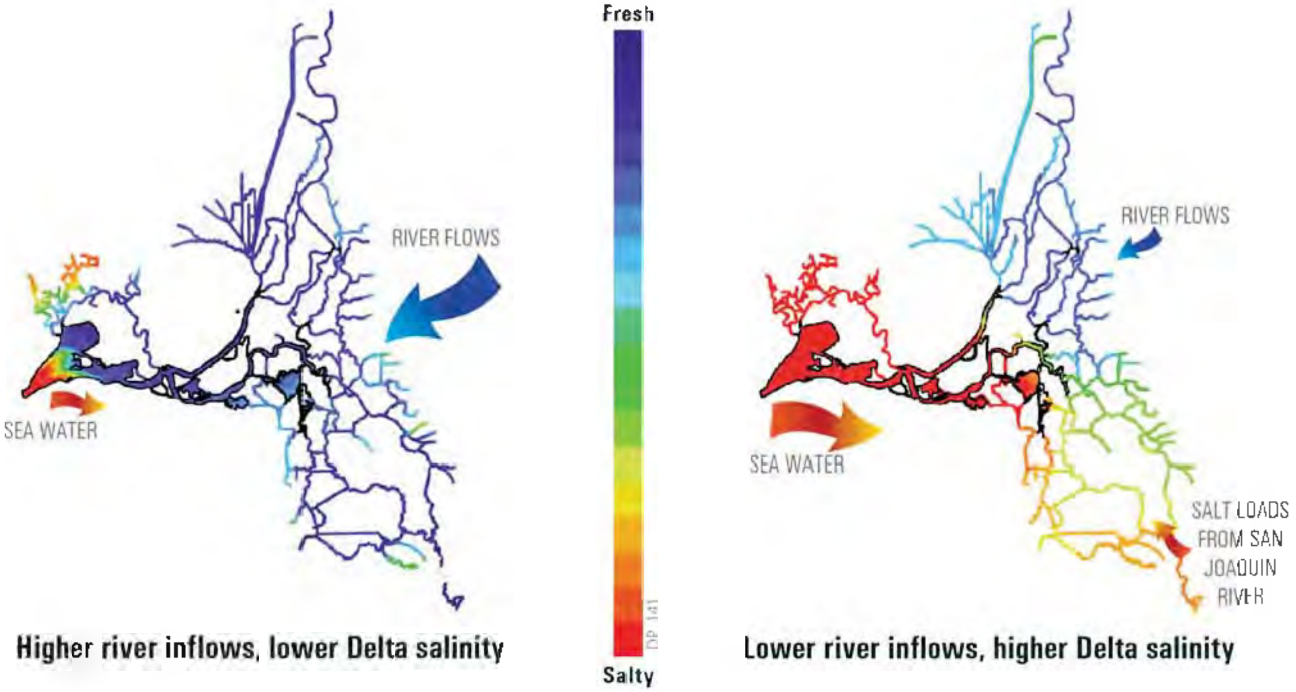
Fresh
Salty
RIVER FLOWS
SEA WATER
Higher river inflows, lower Delta salinity
RIVER FLOWS
SEA WATER
SALT LOADS FROM SAN JOAQUIN RIVER
Lower river inflows, higher Delta salinity

Figure 6-1

Delta salinity varies with inflow and outflow. Very high flows (left) push fresh water well into Suisun Bay and produce low-salinity conditions throughout the Delta. During very low flow periods (right), sea water can be seen pushing into the interior Delta from Suisun Bay with high salinity also entering from the San Joaquin River in the southeastern Delta.

Source: Central Valley Drinking Water Policy Workgroup 2007; images created by Resource Management Associates

of the San Joaquin Valley by naturally occurring salts in soils and a Delta water supply that already includes salt. Some of the salt load in the San Joaquin Valley accumulates in groundwater, affecting a variety of uses. Another manifestation of the salt problem is elevated salinity in the San Joaquin River at the point where it enters the Delta; this level is much higher than in the Sacramento River and marginally meets applicable water quality standards for much of the year. At times, salinity from sea water mixing into the western Delta and salinity from the San Joaquin River creates a Delta with a "freshwater corridor" leading from the Sacramento River to the State and federal water export pumps in the south Delta.

Salinity in the Delta Ecosystem

The role of water quality characteristics in ecosystem function, including salinity, temperature, turbidity, and DO, is discussed in detail in Chapter 4. Salinity is a defining characteristic of habitat for estuarine organisms and perhaps the most important water quality characteristic affecting municipal, industrial, and agricultural water use. However, salinity patterns that benefit native species are sometimes in conflict with human uses of water.

The salinity tolerances and preferences of fish vary by species. Delta smelt spawn in fresh water, but juveniles and adults generally show a preference for salinity in the range of 0.5 to 5 parts per thousand (ppt). Adult longfin smelt tolerate a much wider range of salinity and thrive in salinities greater than 5 ppt. Splittail do well in a wide range of salinities from fresh water up to 18 ppt (Moyle 2002). Largemouth bass and bluegill, introduced species, prefer fresh water and are rarely found at salinities greater than 1 to 2 ppt. The location, extent, and dynamics of the freshwater-saltwater interface in the Bay-Delta is an important factor in the distribution and abundance of many fish, invertebrate, and plant species, and is largely determined by the amount of fresh water flowing from the Delta west into Suisun Bay.

The interface between fresh water and salt water is a critical region of the estuary for many native fish and other organisms. Although there is no broadly accepted definition, the low salinity zone (LSZ) of the estuary is generally considered to be the region with salinity ranging from fresh water up to about 5 ppt, about one-seventh the salinity of sea water. The part of the salinity gradient centered on 2 ppt is considered to be of particular importance because it is hypothesized to be an area where suspended particulate matter and organisms accumulate. The location in the Bay-Delta where the tidally averaged salinity at 1 meter from the bottom is 2 ppt is known as X2 (measured as distance in kilometers from the Golden Gate Bridge) and serves as a water quality objective to regulate Delta outflow. The endangered Delta smelt show a preference for the LSZ. Their distribution during most of the year is centered near X2 (Nobriga et al. 2008). The position of X2 is also correlated with the abundance of several estuarine fish and invertebrates such as the bay shrimp and longfin smelt. That is, higher outflows (X2 located closer to the Golden Gate Bridge) are correlated with greater abundance of longfin smelt and bay shrimp (Kimmerer 2004). However, the processes linking greater Delta outflow with the abundance of estuarine species in the Bay-Delta system are not clearly understood, and continue to be studied and debated.

One proposed mechanism for the benefits of X2 as a regulatory marker for Delta smelt and other pelagic species is its relationship to the extent of low-salinity habitat. Lower values of X2 place it in the vicinity of Grizzly and Suisun bays, which results in a much larger area of low-salinity habitat than when X2 is located upstream of the confluence of the Sacramento and San Joaquin rivers. One of the potential negative effects of climate change will be a reduction in the availability of suitable low-salinity habitat for Delta smelt. The combined effects of sea level rise and changes in other aspects of estuarine habitat caused by climate change and increased water diversions are likely to pose a significant threat to the future survival of Delta smelt (Feyrer et al. 2011). Additional information on the relationship between flows in the Delta, the low-salinity zone, and implications for ecosystem health is included in Chapter 4.

Effects of Salinity on Agricultural Water Use

As noted in Chapter 5, agricultural use of water in the Delta is a significant factor in the health of the Delta's regional economy. The effect of salinity on agricultural water use varies by crop, soil type, and other factors (Hoffman 2010). The existing water quality objective, designed to protect the most sensitive crops, is set by the SWRCB at 700 microsiemens per centimeter (μS/cm) during the irrigation season and 1,000 μS/cm for the remainder of the year in southern Delta channels. At 700 μS/cm, water is relatively fresh, approximately equivalent to a salinity of 0.37 ppt (about 1 percent). The SWRCB is reviewing this objective based on the most recent information about the impacts of salinity on typical Delta crops. Salts from upstream and in-Delta agricultural drainage and from seawater intrusion from the Bay can affect agricultural water use in the Delta. Poor flow circulation in some parts of the Delta resulting from water diversions and historical channelization can exacerbate salinity problems.

Water quality to protect agricultural water use in the southern Delta is controlled through a combination of San Joaquin River inflow, export pumping, and Delta outflow changes. When salinity threatens to exceed water quality objectives for the San Joaquin River near Vernalis, additional high-quality water is released from New Melones Reservoir.

The effect of these releases is tempered by the installation and operation of flow barriers in the southern Delta to benefit agriculture. Salinity from seawater intrusion is reduced through a combination of reservoir releases, gate closures, and export pumping changes that, when necessary, control Delta outflow. Any significant changes to the way that water moves into or through the Delta, such as sea level rise, changed conveyance, changed inflow, or changed outflow, will change salinity patterns in the Delta.

Water quality at the SWP and CVP export pumps in the southern Delta, while usually meeting all applicable standards for municipal and agricultural use, is significantly higher in salinity than Sacramento River inflow to the Delta. Allowing salinity to vary in a way that might benefit native species could affect agricultural and municipal uses of Delta water.

Effects of Salinity on Municipal and Industrial Water Uses

Salinity contamination of municipal water supplies, as described in the following section on drinking water quality, can make water unpalatable, contributes to the formation of harmful disinfection byproducts, and increases corrosion of pipes and equipment. The existing objectives for protection of municipal and industrial beneficial uses in the southern Delta, expressed as limits on concentration of chloride, were developed to protect former industrial uses, but have been retained because they also protect drinking water quality. Secondary standards (standards that apply to aesthetic properties) for drinking water supplies also apply to water exported from the Delta by the CVP and SWP.

Under the current salinity regulations and operations practices for Delta water, municipal and industrial water supplies generally meet all salinity objectives. However, sea level rise, Delta levee failures, and increasing salt from upstream all threaten Delta municipal and industrial water supplies. Removing salts from water supplies is technically possible, although difficult and expensive; and disposing of the concentrated salt waste stream remains a key challenge.

Increased salinity further affects the reliability of municipal and industrial water supplies by reducing opportunities for water reuse and recycling (Healey et al. 2008), in turn potentially increasing reliance on imported surface water. Moving Delta intakes upstream, away from the influence of seawater intrusion and San Joaquin River inflow, could substantially reduce these water supply threats and is the subject of analysis under the current Bay Delta Conservation Plan process.

The salinity regime in the Delta is driven by natural flows, water management, and human land and water uses in the Delta and its watershed. Achieving the coequal goals will require updated comprehensive flow objectives and water quality control programs for salinity that balance ecosystem and water supply needs. The SWRCB must pay significant attention to the examination and resolution of these water quality issues in its development of new Delta flow requirements and as new plans for Delta conveyance are developed.

Drinking Water Quality

Water moving through the Delta contributes some part of the drinking water supplies for more than 25 million Californians. It is also used extensively for body-contact recreation such as swimming and water skiing. At the current locations where Delta water is diverted for municipal use, the water sometimes contains relatively high concentrations of bromide, organic carbon, nutrients, and dissolved solids (salinity). These drinking water constituents of concern are not directly harmful in drinking water, but they lead to formation of harmful chemicals during drinking water treatment, or contribute to taste, odor, or other municipal water supply problems. Sources of these drinking water constituents of concern include natural processes, such as tidal mixing of sea water into the Delta, and the flux of water and organic matter from wetlands, as well as urban runoff, agricultural runoff, and municipal wastewater discharge. Pathogenic (infectious) protozoa, bacteria, and viruses are also present in Delta waters and are a disease risk for both drinking water and body-contact recreation.

The future of water quality is a major concern for municipalities using Delta water. Current water quality regulations and policies for surface waters do not directly apply to many of the drinking water quality constituents of concern. Sea level rise, levee failure, salinity variability, agricultural water use, and increased urban runoff due to population growth in the watershed all pose a threat to drinking water quality. Clear policies regarding the protection of water quality relevant to the drinking water quality constituents of concern are needed to prevent such degradation. The Central Valley RWQCB is developing a drinking water policy that is, in part, intended to prevent the degradation of high-quality drinking water sources (Central Valley RWQCB 2010).

Disinfection Byproducts

Treatment of public water supplies is necessary to prevent disease caused by pathogenic organisms. However, bromide and organic carbon in municipal water supplies contribute to the formation of harmful disinfection byproducts when water is treated for domestic use (Healey et al. 2008, AWWA 2011). (See sidebar, Disinfection Byproducts.) The disinfection byproducts of primary concern in tap water, such as trihalomethanes (THMs), haloacetic acids, and bromates, are carcinogens subject to stringent public health standards. Treatment of water from the Delta is particularly challenging because it can contain elevated levels of both bromide and organic carbon (DWR 2007). Changes to drinking water treatment processes to reduce the amounts of disinfection byproducts in tap water are technologically challenging and can significantly increase the cost of drinking water treatment (Chen et al. 2010).

Organic carbon (total or dissolved) is an aggregate measure of the amount of a wide variety of organic compounds in water. In fresh water, these compounds typically come largely from decaying plant material. Along with bromide, elevated concentrations of organic carbon contribute to formation of disinfection byproducts. The amount of disinfection byproduct varies with the type and source of organic carbon, but total organic carbon concentration is nearly always correlated with disinfection byproduct formation. Large-scale restoration of wetlands could increase the amount of disinfection byproducts formed in Delta

DISINFECTION BYPRODUCTS

Disinfection byproducts are formed when disinfectants used in water treatment plants react with bromide and/or natural organic matter (decaying vegetation) present in the source water. Different disinfectants produce different types or amounts of disinfection byproducts. Disinfection byproducts identified in drinking water include THMs, haloacetic acids, and bromates. The USEPA has established regulations for these contaminants and set the maximum contaminant levels (MCLs) to prevent health effects (40 *Code of Federal Regulations* Part 141).

Trihalomethanes (THM) are a group of four chemicals formed along with other disinfection byproducts when chlorine or other disinfectants used to control microbial contaminants in drinking water react with naturally occurring organic and inorganic matter in water. The THMs are chloroform, bromodichloromethane, dibromochloromethane, and bromoform. THM violations are the primary difficulty for drinking water systems that use water from the Delta, especially the smaller systems. Some people who drink water containing total THMs in excess of the MCL over many years could experience liver, kidney, or central nervous system problems and increased risk of cancer.

Haloacetic acids are a group of chemicals formed along with other disinfection byproducts when chlorine or other disinfectants used to control microbial contaminants in drinking water react with naturally occurring organic and inorganic matter in water. Haloacetic acids include monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, monobromoacetic acid, and dibromoacetic acid. Some people who drink water containing haloacetic acids in excess of the MCL over many years may have an increased risk of cancer.

Bromate is a chemical formed when ozone used to disinfect drinking water reacts with bromide in source water. Bromate formation is a problem for drinking water systems that use ozone as the primary disinfectant. Bromate violations are uncommon, but are a concern during low-flow years when seawater intrusion causes bromide concentrations in Delta water to increase. Some people who drink water containing bromate in excess of the MCL over many years may have an increased risk of cancer.

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water used for municipal supplies due to an increased amount of total organic carbon and the greater disinfection byproduct formation potential of wetland-derived organic carbon (Kraus et al. 2008).

Salinity

Salinity, frequently measured as electrical conductivity or total dissolved solids, has several significant effects on the use of water for domestic uses. Salts make water unpalatable at relatively low concentrations, with 500 parts per million total dissolved solids set as the recommended maximum level in the California secondary drinking water standards (California Code of Regulations, Title 22, section 64449). Salinity also increases the cost of treatment and costs to the consumer due to corrosion and other factors (Howitt et al. 2009). One common component of sea water, bromide, is a disinfection byproduct precursor that forms THMs and haloacetic acids with chlorine or chloramine disinfection, and forms bromate with ozone disinfection.

Pathogens

Pathogenic organisms and pathogen indicators are found in most surface waters. Two common protozoan pathogens that cause gastroenteritis, *Giardia lamblia* and *Cryptosporidium parvum*, have been found in Delta waters (at generally low levels) with respect to drinking water sources or body-contact recreation (Tetra Tech 2007). Source waters that exceed drinking water regulatory thresholds for *Cryptosporidium* trigger additional pathogen removal requirements (USEPA 2004). Although available data do not demonstrate that such conditions currently exist at Delta municipal water supply intakes, future plans that move or create new water intakes could result in increased treatment costs. Pathogen indicators such as fecal coliforms or *E. coli* are frequently at levels of concern in urban stormwater runoff. Several urban creeks and Delta water bodies that receive urban runoff are listed as impaired due to the presence of these indicator bacteria.

Nutrients

In the Delta, drinking water supplies with excessive levels of nutrients are primarily of concern because they, along with other factors such as residence time and temperature, can stimulate algae growth in the Delta and in reservoirs (Tetra Tech 2006a, Izaguirre and Taylor 2007). Algal blooms in storage reservoirs can disrupt treatment processes, and cause taste and odor problems. Taste and odor complaints associated with Delta water supplies have been attributed to algae growth in reservoirs or in the Delta itself (DWR 2007).

Drinking Water Intakes

The quality of Delta water with respect to drinking water use varies considerably both geographically and over time. Average organic carbon and bromide concentrations are very low in the Sacramento River where it enters the Delta. San Joaquin River water is moderately high in bromide, salinity, and nutrients, and moderately high in organic carbon. Intakes in the west Delta can be strongly influenced by the estuarine salinity gradient. An intake for the City of Antioch is frequently out of use because of salinity intrusions. The North Bay Aqueduct intake on Barker Slough in the northwest Delta is strongly affected by the local watershed and has the highest average organic carbon concentrations of any Delta municipal water supply intake (Tetra Tech 2006b). In addition to the drinking water quality problems at the current North Bay Aqueduct intake location, the intake may also have a negative effect on the ecosystem because it is located in an area that is otherwise high-quality habitat for listed native fish species.

Groundwater Quality Concerns

The drinking water supply from groundwater for many communities in the Delta and areas served by water exported from the Delta is contaminated by nitrates and other pollutants, particularly in the San Joaquin Valley. Survey findings show that a high financial burden is borne by low-income households when it comes to nitrate-contaminated water

(Pacific Institute 2011). The high cost of accessing water from alternative sources, coupled with the low earnings of these households, often makes safe drinking water in these communities unaffordable (Pacific Institute 2011). Small community and private water systems throughout the Central Valley and in the Delta rely on groundwater as their primary source of drinking water. They are affected by groundwater contamination to a greater degree than larger public water systems because many are in areas that are vulnerable to contamination (SWRCB 2011). Their wells are often shallower than larger community systems, and they have limited resources to treat or respond to contaminated groundwater problems. The California Legislature explicitly recognized these issues when, in 2012, it enacted Assembly Bill 685, declaring the established State policy that "every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes" (Water Code section 106.3(a)). More information on groundwater and how it relates to the Delta can be found in Chapter 3.

Environmental Water Quality

The Delta ecosystem is affected by a variety of pollutants discharged into Delta and tributary waters. Pollutants of concern affecting Delta biological species and ecosystem processes include nutrients, pesticides, mercury, selenium, and other persistent bioaccumulative toxic substances. Newly identified pollutants of potential concern (often referred to as emerging contaminants) also need to be investigated.

Nutrients

Nutrients, and their potential benefits and problems, have become an increasingly important component in the discussion of water quality issues in the Delta. The role of nutrients and nutrient loading for the Delta and Suisun Marsh is a subject of debate. Plant nutrients of concern in water are primarily nitrogen and phosphorus compounds including ammonia, ammonium, nitrite, nitrate, and phosphate. Excessive amounts (over fertilization) or altered proportions of these nutrients in streams, rivers, lakes, estuaries, or the coastal ocean can have detrimental effects on ecosystems. Die-offs of algae that deplete oxygen and cause fish kills are a well-known example, but even less obvious effects of nutrients can have important impacts on aquatic ecosystems. Changes in the types of algae that form the base of the aquatic food web, including growth of toxic algae, have been linked to excessive amounts or altered ratios of plant nutrients. Recent and current research is reconsidering the role of nutrients for aquatic ecosystems of the Delta, as follows:

- **Ammonium.** Ammonium in Delta waters has been shown to affect ecosystem water quality. Dugdale et al. (2007) has determined that ammonium concentrations may be having a significant impact on phytoplankton composition and open-water food webs because of suppression of diatom blooms in the Bay-Delta. Ammonium concentrations in Suisun Bay and the Delta have been increasing, primarily due to point source discharge loading from wastewater treatment facilities. It is not known, however, how much this inhibition extends to freshwater algae in the Delta.
- **Nutrient ratios.** Ratios of nutrients in Delta waters are thought to be a primary driver in the composition of aquatic food webs in the Bay-Delta (Glibert et al. 2011). The effect of ammonium on food webs in the Delta remains an open question, and much active research and healthy scientific debate continue.

- **Harmful algal blooms.** HABs create a toxic environment for aquatic organisms and the organisms that eat them. The emergence of HABs over the past decade threatens environmental water quality. The shift toward greater abundance of cyanobacteria in the Delta includes known HABs such as *Microcystis aeruginosa*. *Microcystis aeruginosa* has become a common bloom-forming component of the phytoplankton of the Delta during the warm summer and early fall months (Lehman et al. 2005, 2008). Interactions between nutrients and HABs in the Delta warrant additional study and are currently being investigated.
- **Nonnative aquatic plants.** Nutrients affect the productivity of aquatic macrophytes (plants visible to the naked eye) and the structure of the aquatic plant community (Wetzel 2001). Two nonnative aquatic plants, Brazilian waterweed and water hyacinth, have become particularly problematic in the Delta. Scientific studies have documented the distribution and spread of these invasive aquatic plants in the Delta (Underwood et al. 2006, Hestir et al. 2008, Khanna et al. 2011, Santos et al. 2011). The role of nutrient enrichment in the spread and productivity of these nonnative aquatic plants is unknown. Further research is required on the potential links between invasive aquatic plants in the Delta and nutrient inputs.

The effects of increased nutrient inputs also need to be considered in light of anticipated changes in the Delta with regard to lowered turbidity and warming temperatures. Figure 6-2 shows increasing nutrients in the Delta over time. As discussed in the following section, nutrients have been implicated in DO depletion in Delta channels due to the stimulation of plant growth with subsequent death and decay, and the microbial conversion of total ammonia to nitrate through the process of nitrification.

Dissolved Oxygen

DO in water is essential to the survival of most fish and many other aquatic organisms. Depletion of DO in a water body because of decaying organic matter is a classic water quality problem that can result in clear signs of pollution, including fish kills and foul odors. Low DO concentrations also can have less obvious effects. DO events occur regularly in the channels of Suisun Marsh and the Stockton Deep Water Ship Channel (SDWSC) and sporadically elsewhere in the Delta, with several waterways listed as impaired by the RWQCB.

One of the most significant water quality issues affecting the Delta in recent decades has been low DO episodes (DO concentrations less than regulatory objectives) in the SDWSC reach of the San Joaquin River in the Delta, which were thought to act as a barrier to salmon migration (Central Valley RWQCB 2005). Until the last few years, low DO events were a regular occurrence in this part of the Delta primarily during the summer and fall months.

The SDWSC DO problem has existed since at least the 1960s. The Central Valley RWQCB added this segment of the Delta to its list of impaired water bodies in 1998, and adopted a TMDL in 2005 that follows a phased approach requiring studies and initial actions followed by reconsideration of TMDL requirements in 2012. Extensive studies have identified several contributing factors, including inputs of algae from upstream (probably related to nutrient loads), discharges of total ammonia from the Stockton Regional Wastewater Control Facility (RWCF), increased channel depth due to dredging, and reduced net flows (Central Valley RWQCB 2005). See sidebar, Applying Adaptive Management in Water Quality Decisions, for more information about an adaptive management approach to DO in the SDWSC.

The improved wastewater treatment processes at the RWCF were fully operational starting in 2006. This, along with other discharge reductions upstream, appears to have greatly reduced the frequency and severity of low DO episodes in the SDWSC. The California Department of Water Resources (DWR) aeration facility also has been shown to be an effective remedy for the occasional DO depletion problem that might occur under current conditions. The actions taken to

Nutrients Create Delta Water Problems

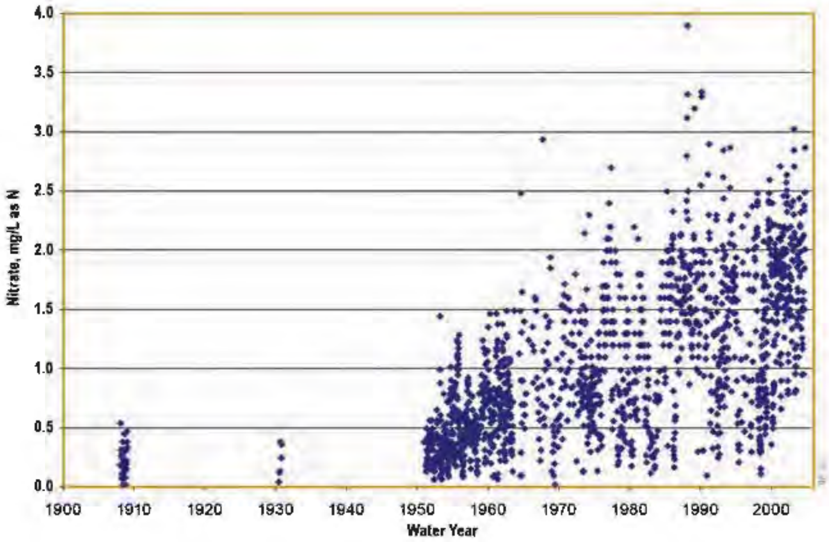

Figure 6-2 Nitrate concentrations at the point where the San Joaquin River enters the Delta dating back to 1908 show how much this important plant nutrient has increased. High nutrient concentrations are linked to a variety of problems including DO depletion, growth of nuisance aquatic plants, and taste and odor problems in drinking water.

Source: Adapted by the Delta Stewardship Council with data provided by USGS

comply with the current TMDL, along with improved flows and load reductions in the San Joaquin River watershed, appear to have provided a solution to this longstanding water quality problem. If continued, the actions taken to comply with the SDWSC TMDL should be sufficient to prevent future DO depletion problems.

The DO depletion problems in Suisun Marsh are caused by seasonal operations of ponds and wetlands managed for waterfowl hunting. For most of the year, duck club ponds are drained and occasionally flooded to promote the growth of plants that are the favored food of water fowl. When these ponds are flooded for hunting in the late summer and fall, the decay of accumulated plant matter followed by tidal exchanges of water with adjoining channels can cause severe DO depletion. Some of these low DO events have caused documented fish kills. The San Francisco Bay RWQCB has started the TMDL process to address DO depletion in Suisun Marsh.

The best pathways to address other Delta low DO problems will vary with local conditions and causes, but likely will be a combination of reduced loadings of oxygen-demanding substances and changes to flow conditions, under the framework of adaptive management. As TMDLs are developed to address low DO concentrations in the Delta, actions needed to improve DO conditions will be implemented through SWRCB and RWQCB programs, including NPDES permits, stormwater NPDES permits, WDRs, waivers of WDRs, and water rights. Low DO conditions in the Delta need to be addressed to prevent these conditions from increasing in extent and severity.

Applying Adaptive Management in Water Quality Decisions

An adaptive management approach to water quality control decisions should be taken to plan for and assess their outcomes. The following is an example of how the Council's three-stage, nine-step adaptive management framework (see Appendix C) was used for water quality decision making in the TMDL process to improve DO concentrations in the SDWSC.

		Adaptive Management Step	Improving DO Concentrations in the SDWSC
Plan	1	Define/redefine the problem	Low concentrations of DO in the SDWSC periodically exceeded the Central Valley Basin Plan water quality objectives for DO for many years. Low DO acted as a barrier to migrating salmon.
	2	Establish goals, objectives, and performance measures	**Goal:** Meet the water quality objectives for DO in the SDWSC. **Objectives:** Maintain minimum DO concentrations of 5 milligrams per liter (mg/L) at all times and 6 mg/L September through November.
	3	Model linkages between objectives and proposed action(s)	Hydrodynamic and water quality models informed the development of a Physical and Chemical Processes Conceptual Model and a Biological and Ecological Effects Conceptual Model. The models identified at least four primary factors or processes influencing oxygen concentrations: (1) San Joaquin River flow through the SDWSC, (2) SDWSC volume, (3) algae and oxygen-demanding substances from the San Joaquin River upstream of the SDWSC, and (4) oxygen-demanding substances, including ammonia discharged from the RWCF. http://www.sjrdotmdl.org/concept_model/index.htm
	4	Select action(s) (research, pilot, or full-scale) and develop performance measures	**Selected Actions:** (1) Conduct studies to identify causes for the low DO levels and assign responsibility to correct the problem; (2) reduce RWCF ammonia discharges to the San Joaquin River; and (3) construct a Demonstration Dissolved Oxygen Aeration Facility (Aeration Facility). **Performance Measures:** ▪ Administrative – Implement Phase 1 TMDL actions. ▪ Output – Implement studies; select wastewater treatment improvements to reduce ammonia discharges including engineered wetlands and nitrifying bio-towers; develop pilot-scale aeration project. ▪ Outcome – DO concentrations are maintained at or above the water quality objectives for DO. Aquatic life, including resident and migratory fish, is not affected by low DO conditions.
Do	5	Design and implement action(s)	**Selected Actions:** (1) Conduct ongoing studies to improve the conceptual models; (2) add engineered wetlands and two nitrifying bio-towers to the RWCF; and (3) design, build, and operate the Aeration Facility at Rough and Ready Island to determine its applicability for increasing DO concentrations in the SDWSC.
	6	Design and implement monitoring plan	Collect baseline DO data prior to aerator operations. Conduct ongoing studies to test the understanding of linkages in the conceptual models. Conduct compliance monitoring at the RWCF as required by the permit. Conduct performance monitoring of the Aeration Facility to measure achievement of the target (increased DO concentrations in the SDWSC).
Evaluate and Respond	7	Analyze, synthesize, and evaluate	Technical Working Group will assess the study results and aeration pilot-study results.
	8	Communicate current understanding	Technical reports, study results, and web-based conceptual models were developed and maintained on a website. Pilot Report Aeration System and staff presentation to the Central Valley RWQCB (February 3, 2011).
	9	Adapt	Development of a revised control program (Phase 2 TMDL) including identification of additional or modified actions. Development of an aeration agreement with long-term funding for operation and maintenance of the Aeration Facility, including possible future modifications. Development of a system-level (long-term) monitoring plan for the Aeration Facility. Periodic review of control program actions and aerator operations.

Pesticides

Pesticides include insecticides, herbicides, fungicides, and various other substances used to control pests. In the Bay-Delta region, the primary pesticides of concern include the organophosphorus pesticides (for example, diazinon and chlorpyrifos), pyrethroid insecticides, and the legacy organochlorine pesticides (for example, DDT, chlordane, and dieldrin). These substances are known to have adverse impacts on aquatic organisms or, in some cases (as with the organochlorine pesticides), birds and mammals.

The Sacramento, San Joaquin, and Feather rivers; the Delta; and numerous agriculturally dominated streams in the Central Valley are either listed as impaired or are covered under an existing TMDL for pesticides (Central Valley RWQCB 1998, 2006). Delta waterways were placed on the CWA section 303(d) list for diazinon and chlorpyrifos due to aquatic toxicity (SWRCB 2010).

Smaller agriculturally dominated waterways and urban creeks are particularly vulnerable to toxicity from pesticides. Although agriculture is considered the primary source of pesticide impairment in the Central Valley and Delta, urban sources are also locally important (Kuivila and Hladik 2008). Some of the highest pesticide concentrations have been observed in residential area creeks and waters receiving urban runoff (Weston et al. 2005). Pyrethroid insecticides, which are common replacements for the organophosphorus pesticides, have been implicated as the principal pesticides causing toxicity in surface water samples collected from throughout California (Hunt et al. 2010).

Aquatic invertebrates in the water column are the organisms most affected by chlorpyrifos and diazinon exposure (Giddings et al. 2000); however, pyrethroids—because of their high potential to stick to organic matter—also can affect sediment-dwelling organisms (Werner and Oram 2008, Weston et al. 2004). Pyrethroid pesticides from multiple runoff sources have been found at levels toxic to aquatic invertebrates (Weston et al. 2005, Weston 2010).

Contaminants cannot be eliminated as a possible contributor to the declines in open-water fish populations in the Delta (known as pelagic organism decline [POD]). Johnson et al. (2010) reported that insufficient data are available to determine whether contaminants played an important role in the POD. Research on the role of contaminants in the POD continues with efforts under way to better define the presence of contaminants in the environment, the effects of contaminant mixtures, sublethal effects of contaminants on the POD species, and the effects of contaminants on prey organisms (Baxter et al. 2010). Synergistic effects of pesticide mixtures have been demonstrated for other species including juvenile salmon (Laetz et al. 2009).

Mercury

The Delta and many Delta tributaries are included in the SWRCB's section 303(d) list of impaired water bodies due to mercury contamination (Central Valley RWQCB 2009). Historical mercury mining in California's Coast Ranges and mercury use associated with gold mining in the Sierra Nevada over a century ago have left an environmental legacy of pervasive mercury contamination in many Northern California watersheds (Alpers and Hunerlach 2000). The current regulatory approach for mercury includes the mercury TMDL adopted by the San Francisco Bay RWQCB in 2006 and the Delta methylmercury TMDL adopted by the Central Valley RWQCB in 2010. Unfortunately, however, mercury is likely to persist in California's environment for many years to come.

Mercury is transformed into methylmercury by bacteria in the environment. Methylmercury, initially present at very low concentrations, enters the aquatic food web and can accumulate to levels of concern in long-lived fish at the top of the aquatic food chain, such as striped bass and largemouth bass. Methylmercury has been found in some types of Delta fish at concentrations that may be harmful to human health. The State has issued health advisories for fish consumption due to mercury contamination for a number of water bodies in the Delta and its watersheds. Mercury contamination of fish is of particular concern for people who are frequent consumers of Delta fish (Shilling 2009).

There is general concern that increased concentrations of methylmercury in water, sediment, and plants and animals might result from restoration of wetland and floodplain habitats in the Delta and, thus, must be carefully planned and monitored to minimize the production of methylmercury. For instance, the restoration of wetlands, particularly in areas where the abundance of mercury in soils or sediments is elevated, could accelerate the production of methylmercury and increase the contamination of aquatic plants and animals (Naimo et al. 2000, Wiener and Shields 2000). Additionally, flooding of wetlands or uplands, or fluctuating water levels during tidal cycles could stimulate methylmercury production and transport, thereby increasing concentrations of methylmercury in water and in plants and animals (Hecky et al. 1991, Hall et al. 1998, Paterson et al. 1998, Bodaly and Fudge 1999). Increased methylmercury production is a significant concern for planned wetland and floodplain ecosystem restoration projects, and should be monitored.

Further study is needed to determine the dominant processes affecting methylmercury concentrations in food webs in the Delta. The CALFED Ecosystem Restoration Program developed a framework (Mercury Strategy) for monitoring, research, risk communication, and adaptive management to address mercury problems in the Bay-Delta system (Wiener et al. 2003). The approach taken by the Central Valley RWQCB in its Delta Mercury Control Program, adopted April 22, 2010, is consistent with the Mercury Strategy (Central Valley RWQCB 2010).

Selenium

Selenium, a naturally occurring element, is an essential nutrient at low concentrations for humans and other organisms. However, higher concentrations can be toxic to fish and wildlife. Once selenium enters the aquatic environment, it has a high potential to bioaccumulate in zooplankton and benthic (bottom-dwelling) invertebrates and, subsequently, to biomagnify in the food web as it reaches top-level predators such as fish, birds, and mammals (Skorupa and Ohlendorf 1991, Fan et al. 2002, Hamilton 2004, Stewart et al. 2004, Paveglio and Kilbride 2007).

The major source of selenium loading to San Francisco Bay is the San Joaquin River, which receives selenium-laden agricultural drainage waters from the western San Joaquin Valley (Luoma and Presser 2000). Other sources of selenium loading include oil refineries, municipal and industrial wastewater, urban and nonurban runoff, atmospheric deposition, and erosion and sediment transport from within the north San Francisco Bay. Improved wastewater treatment at petroleum refineries discharging into San Francisco Bay has reduced the amount of selenium discharged, but these facilities are still the most significant point source of this pollutant (San Francisco Bay RWQCB 2011b).

Recent monitoring results indicate that selenium water column concentrations in the north San Francisco Bay are much lower than the current 5-parts per billion objective for chronic exposure (San Francisco Bay RWQCB 2011b). However, levels of selenium in aquatic organisms and fish show that the current regulatory criteria may not be sufficient. Despite progress to reduce selenium in the Bay-Delta system, levels in the food chain are still of concern. Selenium has been identified as a possible contributing factor to the observed decline of white sturgeon, Sacramento splittail, starry flounder, and diving ducks such as surf scoters. The focus of regulatory efforts at the State and national level is shifting from water-column concentrations to the concentration of selenium in the tissues of affected organisms (San Francisco Bay RWQCB 2011b).

Historically, portions of the San Joaquin River downstream of Grasslands, Salt Slough, and Mud Slough contained elevated levels of selenium from agricultural drainage (Saiki et al. 1993). The discharge of selenium from this area also has been significantly reduced from historical levels under a control program administered by Central Valley RWQCB, with plans for further reductions through 2019 (Reclamation 2009).

Contaminants of Emerging Concern

The term "contaminants of emerging concern" refers to a broad class of largely unregulated compounds for which there is concern that adverse effects might occur at environmentally significant concentrations. Examples of manufactured chemicals frequently found in water bodies and organisms include flame retardants, pesticides, human and veterinary pharmaceuticals, and ingredients in personal care products (Kolpin et al. 2002, Daughton 2004, Hoenicke et al. 2007).

Contaminants of emerging concern include many manufactured chemicals. These manufactured chemicals have the potential to alter water quality because of their widespread use, pathways to the environment, and potency. The primary sources for most contaminants of emerging concern include effluent from wastewater treatment plants, agricultural fields, and stormwater runoff. Many chemicals identified as contaminants of emerging concern have not been tested for their potential toxic effects on aquatic life. Most emerging pollutant maximum concentrations in the environment are well below established lethal concentration values for even the most sensitive aquatic species. Sublethal and chronic low-level exposures are of primary concern (Oros 2003, Brander et al. 2009, Ostrach 2009).

Regulatory and chemical monitoring programs should adapt to the quickly changing mix of contaminants of emerging concern identified through current studies and the peer-reviewed scientific literature (best available science). Effective management of contaminants of emerging concern in the Delta will require responsible agencies to perform appropriate scanning-level activities to prioritize a specific list of pollutants of highest concern and to develop or require work plans for special studies, and to conduct or require monitoring in accordance with the work plans. To this end, in 2011, the SWRCB established a Science Advisory Panel to address contaminants of emerging concern in aquatic ecosystems. The panel completed a report in April 2012 that included several recommendations for how the SWRCB should monitor and assess potential impacts of contaminants of emerging concern (Anderson et al. 2012).

POLICIES AND RECOMMENDATIONS

Policies and recommendations to address the water quality issues discussed in the preceding sections are based on the following strategies:

- Require Delta-specific water quality protection
- Protect beneficial uses by managing salinity
- Improve drinking water quality
- Improve environmental water quality

These major aspects of water quality are critical to achieving the coequal goals. The approach described here includes augmenting or accelerating existing programs where it is feasible to address an existing or anticipated water quality problem. The SWRCB and RWQCBs have broad authority to protect and regulate water quality; therefore, this chapter sets forth priority Delta-specific recommendations and does not contain regulatory policies at this time.

Require Delta-specific Water Quality Protection

Water flow, water quality, water supply, and habitat conditions in the Delta are distinctly different from other parts of the watershed and from San Francisco Bay downstream. The Delta is the most valuable estuary and wetland ecosystem on the West Coast of North and South America (Water Code section 85002), and is the primary habitat for a number of special-status species. Many communities in and around the Delta draw their drinking water directly from Delta waterways. Delta waterways also receive urban stormwater, treated wastewater, agricultural drainage, and drainage from managed wetlands. Studies have shown that such discharges can have significant impacts on water quality. These impacts are often more severe near the point of discharge. Stormwater, wastewater, and agricultural drainage discharges into the Delta should be managed so that they do not pose a significant risk to the beneficial uses of water in the Delta.

Problem Statement

Water quality management approaches developed for general application statewide or in other regions may not be sufficient for the unique and dynamic conditions of the Delta, its biological resources, and critical water supply services. Water supplies and habitats for special-status species require proactive and anticipatory measures for water quality protection consistent with their importance in achieving the coequal goals.

Policies

No policies with regulatory effect are included in this section.

Recommendations

WQ R1. Protect Beneficial Uses

Water quality in the Delta should be maintained at a level that supports, enhances, and protects beneficial uses identified in the applicable State Water Resources Control Board or regional water quality control board water quality control plans.

WQ R2. Identify Covered Action Impacts

Covered actions should identify any significant impacts to water quality.

WQ R3. Special Water Quality Protections for the Delta

The State Water Resources Control Board or regional water quality control board should evaluate and, if appropriate, propose special water quality protections for priority habitat restoration areas identified in recommendation ER R2 or other areas of the Delta where new or increased discharges of pollutants could adversely impact beneficial uses.

Protect Beneficial Uses by Managing Salinity

Beneficial uses within the Delta include drinking water, agriculture, and ecosystem protection. Salinity potentially affects these uses, but to varying degrees. The primary sources of salinity in the Delta are from tidal seawater intrusion from the Pacific Ocean through the San Francisco Bay, and to a lesser extent from agricultural and other discharges in the Central Valley. Historically, natural flows through the Delta regulated salinity in a way that favored the Delta ecosystem. Today, salinity in the Delta is dominated by the effects of upstream water diversions and use of the Delta to convey flows to Central and Southern California. The SWRCB is responsible for ensuring protection of beneficial uses through regulation of pollutant discharges, and regulation of water diversions and flows under their water rights authority.

Problem Statement

Salinity affects Delta agricultural, municipal, and environmental beneficial uses, but in different ways. Salinity and flow conditions in the Delta are affecting ecosystem, agricultural, and municipal uses. The timing and distribution of salinity is primarily affected by flow, which is largely determined by water management in the Delta and its watersheds as determined by applicable flow objectives. Delta conditions have changed since the current Delta flow objectives were adopted, and new scientific information about salinity, flow, and their effects on beneficial uses is available.

Policies

ER P1 in Chapter 4 on the SWRCB's Delta Flow Objectives addresses this issue.

Recommendations

ER R1 in Chapter 4 on the SWRCB's Update of Delta Flow Objectives addresses this issue.

Improve Drinking Water Quality

Millions of Californians entirely or partially rely on the Delta as a drinking water supply, and the future quality of that water supply is uncertain. Contamination of groundwater supplies places greater demand on surface waters that are tributary to the Delta for urban and agricultural users. Current water quality regulations and policies for surface waters do not apply directly to many of the drinking water quality constituents of concern. Sea level rise, levee failure, salinity variability, agricultural water use, and increased urban runoff from population growth in the watershed all pose a threat to drinking water quality. To prevent such degradation, we need clear policies regarding the protection of water quality relevant to the drinking water quality constituents of concern. The Central Valley RWQCB's anticipated drinking water policy is intended, in part, to prevent the degradation of high-quality drinking water sources (Central Valley RWQCB 2010).

In 2006, the SWRCB, the Central Valley RWQCB, and stakeholders began a joint effort to address salinity and nitrate problems in California's Central Valley and adopt long-term solutions that will lead to enhanced water quality and economic sustainability. Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) is a collaborative basin planning effort aimed at developing and implementing a comprehensive salinity and nitrate management program.

Problem Statement

Delta drinking water supplies are degraded by inputs from sea water, regional soils, and sediments; from agricultural, urban, and industrial sources from the watershed; and from in-Delta sources.

Policies

No policies with regulatory effect are included in this section.

Recommendations

WQ R4. Complete Central Valley Drinking Water Policy

The Central Valley Regional Water Quality Control Board should complete the Central Valley Drinking Water Policy by July 2013.

WQ R5. Complete North Bay Aqueduct Alternative Intake Project

The California Department of Water Resources should complete the North Bay Aqueduct Alternate Intake Project Environmental Impact Report by December 31, 2012, and begin construction as soon as possible thereafter.

WQ R6. Protect Groundwater Beneficial Uses

The State Water Resources Control Board should complete development of a Strategic Workplan for protection of groundwater beneficial uses, including groundwater use for drinking water, by December 31, 2012.

WQ R7. Participation in CV-SALTS

The State Water Resources Control Board and Central Valley Regional Water Quality Control Board should consider requiring participation by all relevant water users that are supplied water from the Delta or the Delta watershed or discharge wastewater to the Delta or the Delta watershed to participate in the Central Valley Salinity Alternatives for Long-Term Sustainability Program.

Improve Environmental Water Quality

A variety of pollutants are discharged into Delta and tributary waters. These pollutants affect Delta biological species and ecosystem processes. Pollutants of concern include nutrients, pesticides, mercury, selenium, and other persistent bioaccumulative toxic substances. Newly identified pollutants of potential concern (emerging contaminants) also need to be investigated.

Problem Statement

Pollutants contained in municipal, industrial, agricultural, other nonpoint source discharges, and legacy sources flowing into the Delta and its tributary waterways, including pollutants that bioaccumulate and biomagnify in the food web, impair the Delta ecosystem. Evidence from water quality and ecosystem monitoring continues to show that significant water pollution problems persist in the Bay-Delta system and the Central Valley. Insufficient funding and support could lead to slowing or even erminating the SWRCB and the San Francisco Bay and Central Valley RWQCBs' engagements in regulatory processes, research, and monitoring that are essential to improving water quality in the Delta.

Policies

No policies with regulatory effect are included in this section.

Recommendations

WQ R8. Completion of Regulatory Processes, Research, and Monitoring for Water Quality Improvement

The State Water Resources Control Board and the San Francisco Bay and Central Valley Regional Water Quality Control Boards are currently engaged in regulatory processes, research, and monitoring essential to improving water quality in the Delta. In order to achieve the coequal goals, it is essential that these ongoing efforts be completed and, if possible, accelerated, and that the Legislature and Governor devote sufficient funding to make this possible. The Delta Stewardship Council specifically recommends that:

- *The State Water Resources Control Board should complete development of the proposed policy for nutrients for inland surface waters of the State of California by January 1, 2014.*
- *The State Water Resources Control Board and the San Francisco Bay and Central Valley Regional Water Quality Control Boards should prepare and begin implementation of a study plan for the development of objectives for nutrients in the Delta and Suisun Marsh by January 1, 2014. Studies needed for development of Delta and Suisun Marsh nutrient objectives should be completed by January 1, 2016. The water boards should adopt and begin implementation of nutrient objectives, either narrative or numeric, where appropriate, for the Delta and Suisun Marsh by January 1, 2018.*
- *The State Water Resources Control Board and the Central Valley Regional Water Quality Control Board should complete the Central Valley Pesticide Total Maximum Daily Load and Basin Plan Amendment for diazinon and chlorpyrifos by January 1, 2013.*
- *The State Water Resources Control Board and the Central Valley Regional Water Quality Control Board should prioritize and accelerate the completion of the Central Valley Pesticide Total Maximum Daily Load and Basin Plan Amendment for pyrethroids by January 1, 2016.*
- *The State Water Resources Control Board and the San Francisco Bay and Central Valley Regional Water Quality Control Boards have completed Total Maximum Daily Load and Basin Plan Amendments for methylmercury, and efforts to support their implementation should be coordinated. Parties identified as responsible for current methylmercury loads or proponents of projects that may increase*

methylmercury loading in the Delta or Suisun Marsh should participate in control studies or implement site-specific study plans that evaluate practices to minimize methylmercury discharges. The Central Valley Regional Water Quality Control Board should review these control studies by December 31, 2018 and determine control measures for implementation starting in 2020.

WQ R9. Implement Delta Regional Monitoring Program

The State Water Resources Control Board and Regional Water Quality Control Boards should work collaboratively with the California Department of Water Resources, California Department of Fish and Wildlife, and other agencies and entities that monitor water quality in the Delta to develop and implement a Delta Regional Monitoring Program that will be responsible for coordinating monitoring efforts so Delta conditions can be efficiently assessed and reported on a regular basis.

WQ R10. Evaluate Wastewater Recycling, Reuse, or Treatment

The Central Valley Regional Water Quality Control Board, consistent with existing water quality control plan policies and water rights law, should require responsible entities that discharge wastewater treatment plant effluent or urban runoff to Delta waters to evaluate whether all or a portion of the discharge can be recycled, otherwise used, or treated in order to reduce contaminant loads to the Delta by January 1, 2014.

WQ R11. Manage Dissolved Oxygen in Stockton Ship Channel

The State Water Resources Control Board and the Central Valley Regional Water Quality Control Board should complete Phase 2 of the Total Maximum Daily Load and Basin Plan Amendment for dissolved oxygen in the Stockton Deep Water Ship Channel by January 1, 2015.

WQ R12. Manage Dissolved Oxygen in Suisun Marsh

The State Water Resources Control Board and the San Francisco Bay Regional Water Quality Control Board should complete the Total Maximum Daily Load and Basin Plan Amendment for dissolved oxygen in Suisun Marsh wetlands by January 1, 2014.

Timeline for Implementing Policies and Recommendations

Figure 6-3 lays out a timeline for implementing the policies and recommendations described in the previous section. The timeline emphasizes near-term and intermediate-term actions.

Timeline for Implementing Policies and Recommendations

TIMELINE **CHAPTER 6: Improve Water Quality**

	ACTION (REFERENCE #)	LEAD AGENCY(IES)	NEAR TERM 2012–2017	INTERMEDIATE TERM 2017–2025
RECOMMENDATIONS	Protect beneficial uses (WQ R1)	Varies	●	●
	Identify covered action impacts (WQ R2)	Varies	●	●
	Special water quality protections for the Delta (WQ R3)	SWRCB, RWQCB	●	
	Complete Central Valley drinking water policy (WQ R4)	Central Valley RWQCB	●	
	Complete North Bay Aqueduct Alternative Intake Project (WQ R5)	DWR	●	
	Protect groundwater beneficial uses (WQ R6)	SWRCB	●	
	Participation in CV-SALTS* (WQ R7)	SWRCB and Central Valley RWQCB	●	
	Completion of regulatory processes, research, and monitoring for water quality improvements (WQ R8)	SWRCB, San Francisco Bay and Central Valley RWQCBs	●	
	Implement Delta regional monitoring program (WQ R9)	SWRCB and RWQCBs	●	
	Evaluate wastewater recycling, reuse, or treatment (WQ R10)	Central Valley RWQCB	●	
	Manage dissolved oxygen in Stockton Ship Channel (WQ R11)	SWRCB and Central Valley RWQCB	●	
	Manage dissolved oxygen in Suisun Marsh (WQ R12)	SWRCB and San Francisco Bay RWQCB	●	

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*CV-SALTS: Central Valley Salinity Alternatives for Long-Term Sustainability Program

Agency Key: DWR: California Department of Water Resources RWQCB: Regional Water Quality Control Board(s) SWRCB: State Water Resources Control Board

Figure 6-3

Science and Information Needs

Successful management of water quality depends on a well-designed, comprehensive, and consistent system of water quality monitoring. Current Delta water quality monitoring is fragmented among several different agencies and programs. The Central Valley RWQCB has initiated an effort to develop a Delta Regional Monitoring Program that will consolidate and coordinate most of the current monitoring. Developing a coordinated and thorough regional monitoring program is essential to performance measurement and adaptive management in the Delta.

As identified above, a number of outstanding science questions need to be resolved with respect to water quality. Additional study is needed on the following:

- The effects of salinity on introduced and native plant and animal species
- Trends in concentrations of drinking water constituents of concern
- The effects of nutrients on the Delta ecosystem and municipal water supplies
    - The importance of phytoplankton bloom suppression from ammonium
    - The role of nutrient loading on HABs in the Delta
    - Possible linkages between nonnative aquatic plants and nutrient inputs
- Controlling DO depletion
- The effects of the simultaneous presence of multiple pesticides, even at low levels, on species of concern
- The processes contributing to mercury and selenium compounds in food webs and their effects on the ecosystem
- The impacts of pharmaceutical compounds, personal care products, and other emerging contaminants on the ecosystem
- The combined effects of multiple contaminants and water quality conditions on the ecosystem
- Sources and impacts of pathogens on drinking water sources and recreation in the Delta
- An analysis and evaluation of existing water quality models in the Delta
- Fate and transport of water quality contaminants in the Delta

Issues for Future Evaluation and Coordination

Additional areas of interest and concern related to water quality and the Delta may deserve consideration in the development of future Delta Plan updates, including the following:

- **Small and disadvantaged communities:** Ensuring a safe drinking water supply can have a disproportionate cost for small and disadvantaged communities. Delta communities that are small and disadvantaged include Bethel Island, Courtland, Freeport, Hood, Isleton, Locke, and Walnut Grove. There are also small and disadvantaged communities in areas served by water exported from the Delta that are disproportionately impacted by nitrate and other groundwater pollutants. Available options to correct unsafe drinking water conditions include shared services and facilities; consolidation of several small systems into a single, larger system; centralized treatment; interim point-of-use treatment or use of bottled water; replacement of a contaminated source with an uncontaminated source; and, in the case of chemical contamination, blending of contaminated sources with uncontaminated sources. Consideration also must be given to the new State policy that “every human being has the right to safe, clean, affordable and accessible water adequate for human consumption, cooking, and sanitary purposes” (Water Code section 106.3(a)). Availability and prioritization of funding, restructuring of regulatory requirements, and provision of technical assistance may all be part of the solution, but involve the authority of various agencies including the California Department of Public Health, SWRCB, DWR, U.S. Department of Agriculture, and local cities and counties. An integrated effort including the input and involvement of the regulatory and affected agencies will be needed to properly address these issues and to refine effective recommendations.

- **Coordinated and prioritized water quality monitoring and modeling:** Various water quality monitoring and modeling efforts are ongoing, but are not coordinated among affected agencies. Agencies involved in these efforts include the SWRCB, RWQCBs, DWR, the Interagency Ecological Program, California Department of Fish and Wildlife, and now, the Council. Collective discussion and evaluation by these and other entities will be needed in order to make recommendations regarding the need for and prioritization of water quality modeling in the Delta.
- **Contaminants of emerging concern:** The SWRCB and RWQCBs should continue ongoing efforts to address contaminants of emerging concern. This work should include development of a work plan for conducting or requiring special studies of pollutants, including emerging contaminants and causes of toxicity in Delta waters and sediments.
- **Water quality objectives for selenium:** The identified sources of selenium as a contaminant and its potential to bioaccumulate and biomagnify in the environment are ongoing concerns. The SWRCB and San Francisco Bay and Central Valley RWQCBs should continue efforts to revise water quality objectives for selenium.

Performance Measures

Development of informative and meaningful performance measures is a challenging task that will continue after the adoption of the Delta Plan. Performance measures need to be designed to capture important trends and to address whether specific actions are producing expected results. Efforts to develop and track performance measures in complex and large-scale systems like the Delta are commonly multiyear endeavors. The recommended output and outcome performance measures listed below are provided as examples, and subject to refinement as time and resources allow. Final administrative performance measures are listed in Appendix E and will be tracked as soon as the Delta Plan is completed.

Output Performance Measures

- DWR begins constructing the North Bay Aqueduct Alternate Intake Project as soon as possible after the environmental impact report is completed. (WQ R5)
- Progress toward reducing concentrations of inorganic nutrients (ammonium, nitrate, and phosphate) in Delta waters over the next decade. (WQ R8)
- TMDLs for critical pesticides (for example, diazinon, chlorpyrifos, and pyrethroids) in the waters and sediments of the Delta are met by 2020. (WQ R8)
- A Delta regional water quality monitoring program is implemented within the first 5 years of the Delta Plan. (WQ R9)

Outcome Performance Measures

- Water quality in the Delta meets objectives established in the applicable water quality control plan. (WQ R1)
- Trends in measureable toxicity from pesticides and other pollutants in Delta waters will be downward over the next decade. (WQ R8)
- Progress toward consistently meeting applicable DO standards in the Delta by 2020. (WQ R8, WQ R11, and WQ R12)
- HABs will lessen in severity and spatial coverage in the Delta over the next decade. (WQ R3 and WQ R8)
- The spatial distribution and productivity of nuisance nonnative aquatic plants will decline over the next decade. (WQ R3 and WQ R8)

References

Alpers, C. N. and M. P. Hunerlach. 2000. Mercury Contamination from Historic Gold Mining in California. U.S. Geological Survey Fact Sheet FS-061-00, Sacramento, California. 6 pp.

AWWA (American Water Works Association). 2011. *Water Quality and Treatment*. 1,696 pp.

Anderson, P. D., N. D. Denslow, J. E. Drewes, A. W. Olivieri, D. Schlenk, G. I. Scott, and S. A. Snyder. 2012. Technical Report 692. *Monitoring Strategies for Chemicals of Emerging Concern (CECs) in California's Aquatic Ecosystems: Recommendations of a Science Advisory Panel*. SCCWRP.

Baxter, R., R. Breuer, L. Brown, L. Conrad, F. Feyrer, S. Fong, K. Gehrts, L. Grimaldo, B. Herbold, P. Hrodey, A. Mueller-Solger, T. Sommer, and K. Souza. 2010. *Interagency Ecological Program 2010 Pelagic Organism Decline Work Plan and Synthesis of Results*. Interagency Ecological Program for the San Francisco Estuary.

Bodaly, R A., and R. J. P. Fudge. 1999. Uptake of mercury by fish in an experimental boreal reservoir. *Archives of Environmental Contamination and Toxicology* 37:103-109.

Brander, S. M., I. Werner, J. W. White, and L. A. Deanovic. 2009. Toxicity of a dissolved pyrethroid mixture to *Hyalella azteca* at environmentally relevant concentrations. *Environmental Toxicology and Chemistry* 28:1493–1499.

Central Valley Drinking Water Policy Workgroup. 2007. Conceptual Model for Salinity in the Central Valley and Sacramento-San Joaquin Delta. Prepared by the CALFED Bay-Delta Program. July.

Central Valley RWQCB (Regional Water Quality Control Board). 1998. *The Water Quality Control Plan for the California Regional Water Quality Control Board, Central Valley Region—The Sacramento River Basin and The San Joaquin River Basin*. Fourth Edition. Revised September 2009 (with approved amendments.)

Central Valley RWQCB (Regional Water Quality Control Board). 2005. *Amendments to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins for the Control Program for Factors Contributing to the Dissolved Oxygen Impairment in the Stockton Deep Water Ship Channel*. February 2005 Final Staff Report.

Central Valley RWQCB (Regional Water Quality Control Board). 2006. *Amendments to the Water Quality Control Plan For the Sacramento River and San Joaquin River Basins for the Control of Diazinon and Chlorpyrifos Runoff into the Sacramento–San Joaquin Delta*. June 2006 Final Staff Report.

Central Valley RWQCB (Regional Water Quality Control Board). 2009. *Clean Water Act Section 305(b) and 303(d) Integrated Report for the Central Valley Region*.

Central Valley RWQCB (Regional Water Quality Control Board). 2010. Resolution No. R5-2010-0079 *Establishment of a Central Valley Drinking Water Policy for the Sacramento-San Joaquin Delta and Upstream Tributaries*.

Central Valley RWQCB (Regional Water Quality Control Board). 2011. Information compiled from website: TMDL and 303(d) List - TMDL Projects in the Central Valley Region. Accessed May. http://www.swrcb.ca.gov/centralvalley/water_issues/tmdl/central_valley_projects/index.shtml.

Chen, W., K. Haunschild, J. Lund, and W. Fleenor. 2010. Current and long-term effects of Delta water quality on drinking water treatment costs from disinfection byproduct formation. *San Francisco Estuary and Watershed Science* 8(3). http://escholarship.org/uc/item/0qf4072h.

Cloern, J., N. Knowles, L. Brown, D. Cayan, and M. Dettinger. 2011. Projected evolution of California's San Francisco Bay-Delta-River system in a century of climate change. *PLoS ONE* 6(9): e24465. doi:10.1371/journal.pone.0024465.

Daughton, C. 2004. Non-regulated water contaminants: emerging research. *Environmental Impact Assessment Reviews* 24:711–732.

DWR (California Department of Water Resources). 2007. *California State Water Project Watershed Sanitary Survey – 2006 Update*. http://www.water.ca.gov/waterquality/drinkingwater/docs/program_reports/calif_state_water_project_watershed_sanitary_survey_2006_update.pdf.

Dugdale, R. C., F. P. Wilkerson, V. E. Hogue, and A. Marchi. 2007. The role of ammonium and nitrate in spring bloom development in San Francisco Bay. *Estuarine, Coastal, and Shelf Science* 73:17-29.

Enright, C. and S. D. Culberson. 2010. Salinity trends, variability, and control in the northern reach of the San Francisco Estuary. *San Francisco Estuary and Watershed Science* 7(2). http://escholarship.org/uc/item/0d52737t.

Fan, T. W-M., S. J. Teh, D. E. Hinton, and R. M. Higashi. 2002. Selenium biotransformations into proteinaceous forms by foodweb organisms of selenium laden drainage waters in California. *Aquatic Toxicology* 57:65-84.

Feyrer, F., K. Newman, M. Nobriga, and T. Sommer. 2011. Modeling the effects of future outflow on the abiotic habitat of an imperiled estuarine fish. *Estuaries and Coasts* 34:120-128.

Giddings, J. M., L. W. Hall, Jr., and K. R. Solomon. 2000. Ecological risks of diazinon from agricultural use in the Sacramento–San Joaquin River Basins, California. *Risk Analysis* 20:545–572. doi: 10.1111/0272-4332.205052.

Glibert, P. M., D. Fullerton, J. M. Burkholder, J. C. Cornwell, and T. M. Kana. 2011. Ecological stoichiometry, biogeochemical cycling, invasive species, and aquatic food webs: San Francisco Estuary and Comparative Systems. *Reviews in Fisheries Science* 19:358-417.

Hall, B. D., D. M. Rosenberg, and A. P. Wiens. 1998. Methyl mercury in aquatic insects from an experimental reservoir. *Canadian Journal of Fisheries and Aquatic Sciences* 55:2036-2047.

Hamilton, S. J. 2004. Review of selenium toxicity in the aquatic food chain. *Science of the Total Environment* 326:1-31.

Hecky, R. E., D. J. Ramsey, R. A. Bodaly, and N. E. Strange. 1991. Increased methylmercury contamination in fish in newly formed freshwater reservoirs, in T. Suzuki et al. (Eds.), *Advances in Mercury Toxicology*. Plenum Press, New York. pp. 33–52.

Healey, M. C., M. D. Dettinger, and R. B. Norgaard, eds. 2008. *The State of Bay-Delta Science, 2008*. CALFED Science Program: Sacramento, CA, 174 pp.

Hestir, E. L., S. Khanna, M. E. Andrew, M. J. Santos, J. H. Viers, J. A. Greenberg, S. S. Rajapakse, and S. L. Ustin. 2008. Identification of invasive vegetation using hyperspectral remote sensing in the California Delta ecosystem. *Remote Sensing of Environment* 112:4034-4047.

Hoffman, G. J. 2010. *Salt Tolerance of Crops in the Southern Sacramento-San Joaquin Delta*. Report to the SWRCB.

Hoenicke, R., D. R. Oros, J. J. Oram, and K. M. Taberski. 2007. Adapting an ambient monitoring program to the challenge of managing emerging pollutants in the San Francisco Estuary. *Environmental Research* 105:132-144.

Howitt, R. E., J. Kaplan, D. Larson, D. MacEwan, J. Medellín-Azuara, G. Horner, and N. Lee. 2009. *The Economic Impacts of Central Valley Salinity*. Report to the California SWRCB. http://swap.ucdavis.edu/SWAPFiles/ReportsPapers/MainDocument_031909.pdf.

Hunt, J. W., D. Markiewica, and M. Pranger. 2010. *Summary of Toxicity in California Waters 2001-2009*. Report prepared for the Surface Water Ambient Water Program. November 2009.

Izaguirre, G., and W. D. Taylor. 2007. Geosmin and MIB events in a new reservoir in southern California. *Water Science and Technology* 55:9-14.

Johnson, M. L., I. Werner, S. Teh, and F. Loge. 2010. *Evaluation of Chemical Toxicological, and Histolopathologic Data to Determine Their Role in the Pelagic Organism Decline*. Report to the SWRCB. http://www.waterboards.ca.gov/centralvalley/water_issues/delta_water_quality/comprehensive_monitoring_program/contaminant_synthesis_report.pdf.

Khanna, S., M. J. Santos, and S. L. Ustin. 2011. An integrated approach to a biophysiologically based classification of floating aquatic macrophytes. *International Journal of Remote Sensing* 32:1067-1094.

Kimmerer, W. J. 2004. Open water processes of the San Francisco estuary: from physical forcing to biological responses. *San Francisco Estuary and Watershed Science* 2(1).

Kolpin, D. W., E. T. Furlong, M. T. Meyer, E. M. Thurman, S. D. Zaugg, L. B. Barber, and H. T. Buxton. 2002. Pharmaceuticals, hormones, and other organic wastewater contaminants in U.S. streams, 1999–2000: A national reconnaissance. *Environmental Science and Technology* 36:1202-1211.

Kraus, T. E. C., B. A. Bergamaschi, P. J. Hernes, R. G. M. Spencer, R. Stepanauskas, C. Kendall, R. F. Losee, and R. Fujii. 2008. Assessing the contribution of wetlands and subsided islands to dissolved organic matter and disinfection byproduct precursors in the Sacramento-San Joaquin River Delta: A geochemical approach. *Organic Geochemistry* 39: 1302-1318.

Kuivila, K., and M. Hladick. 2008. Understanding the occurrence and transport of current-use pesticides in the San Francisco estuary watershed. *San Francisco Estuary and Watershed Science* 6(3). http://escholarship.org/uc/item/06n8b36k.

Laetz, C. A., D. H. Baldwin, T. K. Collier, V. Hebert, J. D. Stark, and N. L. Scholz. 2009. The synergistic toxicity of pesticide mixtures: Implications for risk assessment and the conservation of endangered Pacific Salmon. *Environmental Health Perspectives* 117:348-353.

Leenheer, J. A., and J. P. Croue. 2003. Characterizing aquatic dissolved organic matter. *Environmental Science and Technology* 37, 18A-26A.

Lehman, P. W., G. Boyer, C. Hall, S. Waller, and K. Gehrts. 2005. Distribution and toxicity of a new colonial *Microcystis aeruginosa* bloom in the San Francisco Bay Estuary, California. *Hydrobiologia* 541:87-99.

Lehman, P. W., G. Boyer, M. Satchwell, and S. Waller. 2008. The influence of environmental conditions on the seasonal variation of Microcystis cell density and microcystins concentration in San Francisco Estuary. *Hydrobiologia* 600:187-204.

Luoma, S. N., and T. S. Presser. 2000. *Forecasting Selenium Discharges to the San Francisco Bay-Delta Estuary: Ecological Effects of a Proposed San Luis Drain Extension.* U.S. Geological Survey Open-File Report 00-416.

Malamud-Roam, F., and B. L. Ingram. 2004. Late Holocene delta13C and pollen records of paleosalinity from tidal marshes in the San Francisco Bay estuary, California. *Quaternary Research* 62:134-145.

Malamud-Roam, F., M. Dettinger, B. L. Ingram, M. K. Hughes, and J. L. Florsheim. 2007. Holocene climates and connections between the San Francisco Bay Estuary and its watershed: A review. *San Francisco Estuary and Watershed Science* 5(1).

Moyle, P. B. 2002. *Inland Fishes of California*. University of California Press. Berkeley, CA.

Naimo, T. J., J. G. Wiener, W. G. Cope, and N. S. Bloom. 2000. Bioavailability of sediment-associated mercury to Hexagenia mayflies in a contaminated floodplain river. *Canadian Journal of Fisheries and Aquatic Sciences* 57:1092-1102.

Nobriga, M., T. Sommer, F. Feyrer, and K. Fleming. 2008. Long-term trends in summertime habitat suitability for Delta smelt (*Hypomesus transpacificus*). *San Francisco Estuary and Watershed Science* 6(1).

Oros, D. R., W. M. Jarman, T. Lowe, N. David, S. Lowe, and J. A. Davis. 2003. Surveillance for previously unmonitored organic contaminants in the San Francisco Estuary. *Marine Pollution Bulletin* 46:1102–1110.

Ostrach, D. J. 2009. *The Role of Contaminants, within the Context of Multiple Stressors, in the Collapse of the Striped Bass Population in the San Francisco Estuary and Its Watershed*. Year 2 Final Report for DWR Agreement No. 4600004664.

Pacific Institute. 2011. *The Human Costs of Nitrate-contaminated Drinking Water in the San Joaquin Valley*.

Paterson, M. J., J. W. M. Rudd, and V. St. Louis. 1998. Increases in total and methylmercury in zooplankton following flooding of a peatland reservoir. *Environmental Science and Technology* 32:3868-3874.

Paveglio, F. L., and K. M. Kilbride. 2007. Selenium in aquatic birds from Central California. *The Journal of Wildlife Management* 71:2550-2555.

Reclamation (Bureau of Reclamation). 2009. *Grassland Bypass Project, 2010–2019, Environmental Impact Statement and Environmental Impact Report*. http://www.usbr.gov/mp/nepa/documentShow.cfm?Doc_ID=4412.

Saiki, M. K., M. R. Jennings, and W. G. Brumbaugh. 1993. Boron, molybdenum, and selenium in aquatic food chains from the lower San Joaquin River and its tributaries, California. *Archives of Environmental Contamination and Toxicology* 24:307-319.

San Francisco Bay RWQCB (Regional Water Quality Control Board). 2011a. Information compiled from website: Total Maximum Daily Loads (TMDLs) and the 303(d) List of Impaired Water Bodies. Accessed May. http://www.swrcb.ca.gov/sanfranciscobay/water_issues/programs/TMDLs/.

San Francisco Bay RWQCB (Regional Water Quality Control Board). 2011b. *Total Maximum Daily Load Selenium in North San Francisco Bay*. Preliminary Project Report. January.

Santos, M. J., L. W. Anderson, and S. L. Ustin. 2011. Effects of invasive species on plant communities: An example using submersed aquatic plants at the regional scale. *Biological Invasions* 13:443-457.

Shilling, F. 2009. *Characterizing High Mercury Exposure Rates of Delta Subsistence Fishers*. Report for the Central Valley Regional Water Quality Control Board. pp.14. http://www.waterboards.ca.gov/rwqcb5/water_issues/tmdl/central_valley_projects/delta_hg/other_technical_reports/char_high_mercury_mem.pdf.

Skorupa, J. P., and H. M. Ohlendorf. 1991. Contaminants in drainage water and avian risk thresholds. In *The Economics and Management of Water and Drainage in Agriculture*, A. Dinar and D. Zolberman (eds.). Pages 345-368. Kluwer Academic Publishers, Boston.

Stahle, D. W., R. Griffin, M. Cleaveland, J. Edmondson, F. Fye, D. Burnette, J. Abatzoglou, K. Redmond, D. Meko, M. Dettinger, D. Cayan, and M. Therrell. 2011. A tree-ring reconstruction of the salinity gradient in the northern estuary of San Francisco Bay. *San Francisco Estuary and Watershed Science* 9(1).

Stewart, A. R., S. N. Luoma, C. E. Schlekat, M. A. Doblin, and K. A. Hieb. 2004. Food web pathway determines how selenium affects aquatic ecosystems: A San Francisco Bay case study. *Environmental Science and Technology* 38:4519-4526.

SWRCB (State Water Resources Control Board). 2006. *Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary*. SWRCB, California Environmental Protection Agency, Division of Water Rights. December 13.

SWRCB (State Water Resources Control Board). 2010. *The 2008-2010 Integrated Report. Clean Water Act Section 303(d) List of Water Quality Limited Segments*.

SWRCB (State Water Resources Control Board). 2011. Groundwater Ambient Monitoring and Assessment Program, Map of Hydrogeologically Vulnerable Areas. http://www.swrcb.ca.gov/water_issues/programs/gama/docs/hva_update.pdf.

Tetra Tech. 2006a. Conceptual Model for Nutrients in the Central Valley and Sacramento–San Joaquin Delta. http://www.swrcb.ca.gov/centralvalley/water_issues/drinking_water_policy/.

Tetra Tech. 2006b. Conceptual Model for Organic Carbon in the Central Valley and Sacramento–San Joaquin Delta. http://www.swrcb.ca.gov/centralvalley/water_issues/drinking_water_policy/.

Tetra Tech. 2007. Conceptual Model for Pathogens and Pathogen Indicators. http://www.swrcb.ca.gov/centralvalley/water_issues/drinking_water_policy/.

Underwood, E., M. Mulitsch, J. A. Greenberg, M. L. Whiting, S. L. Ustin, and S. C. Kefauver. 2006. Mapping invasive aquatic vegetation in the Sacramento–San Joaquin Delta using hyperspectral imagery. *Ecological Monitoring and Assessment* 121:47-64.

USEPA (U.S. Environmental Protection Agency). 2004. *Comprehensive Surface Water Treatment Rules Quick Reference Guide*. EPA 816-F-04-003. http://water.epa.gov/lawsregs/rulesregs/sdwa/swtr/index.cfm.

USEPA (U.S. Environmental Protection Agency). 2010. *Section 319 Nonpoint Source Success Stories California: Sacramento and Feather Rivers*. http://www.epa.gov/owow_keep/NPS/Success319/state/ca_sac.htm.

USEPA (U.S. Environmental Protection Agency). 2011. Water Quality Challenges in the San Francisco Bay/Sacramento–San Joaquin Delta Estuary. Unabridged Advanced Notice of Proposed Rulemaking.

Werner, I., and J. J. Oram. 2008. Pyrethroid Insecticides Conceptual Model. Sacramento (CA): Delta Regional Ecosystem Restoration Implementation Plan.

Weston, D. P., J. You, and M. J. Lydy. 2004. Distribution and toxicity of sediment-associated pesticides in agriculture-dominated water bodies of California's Central Valley. *Environmental Science and Technology* 38:2752-2759.

Weston, D. P., R. J. Holmes, J. You, and M. J. Lydy. 2005. Aquatic toxicity due to residential use of pyrethroid insecticides. *Environmental Science and Technology* 39:9778–9784.

Weston, D. P., and M. J. Lydy. 2010. Urban and agricultural sources of pyrethroid insecticides to the Sacramento–San Joaquin Delta of California. *Environmental Science and Technology* 44:1833-1840.

Wiener, J. G., and P. J. Shields. 2000. Mercury in the Sudbury River (Massachusetts, USA): pollution history and a synthesis of recent research. *Canadian Journal of Fisheries and Aquatic Sciences* 57:1053-1061.

Wiener, J. G., C. C. Gilmour, and D. P. Krabbenhoft. 2003. *Mercury Strategy for the Bay-Delta Ecosystem: A Unifying Framework for Science, Adaptive Management, and Ecological Restoration*. Final Report to the California Bay Delta Authority. Sacramento, CA. Accessed August 14, 2007. http://science.calwater.ca.gov/pdf/MercuryStrategyFinalReport.pdf.

Wetzel, R. G. 2001. *Limnology: Lake and River Ecosystems*. Third Edition. Academic Press, San Diego, CA.

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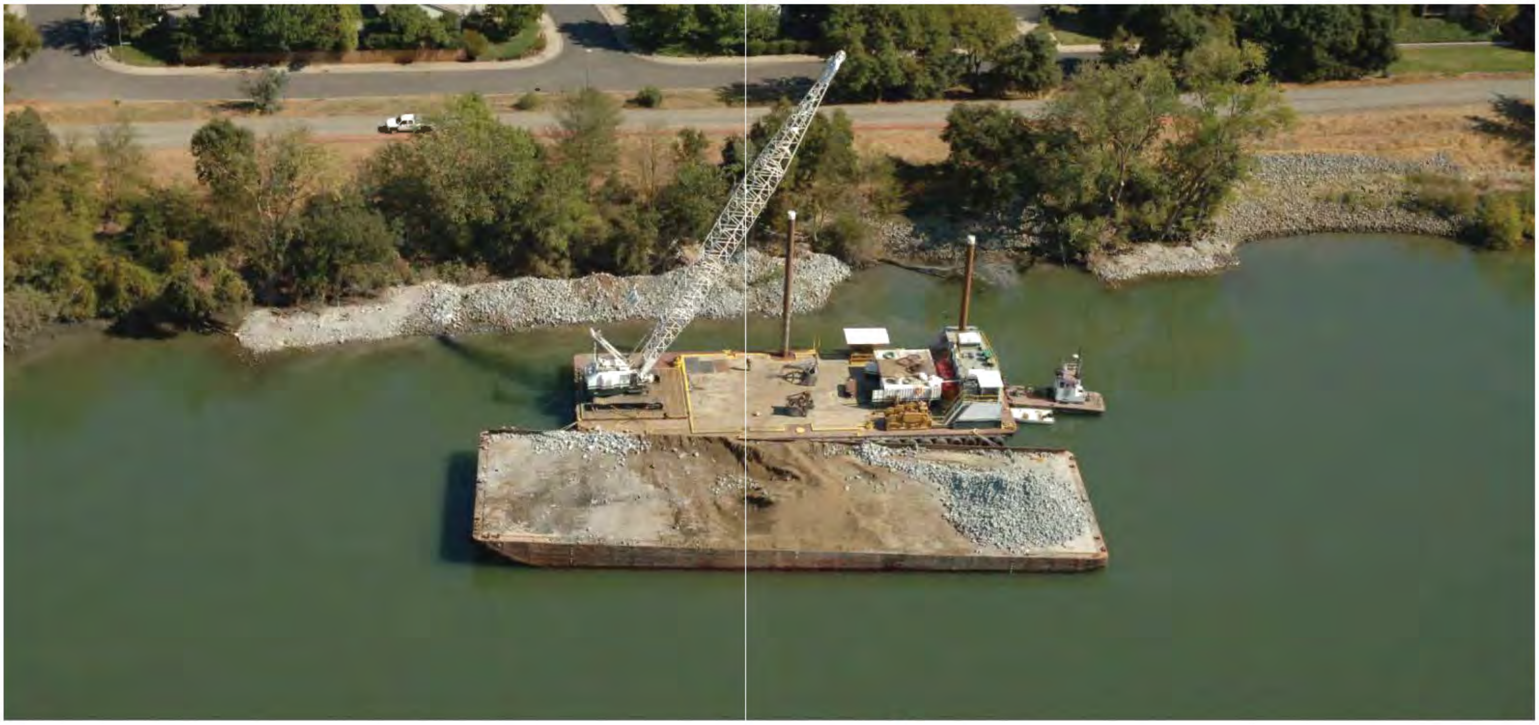
CHAPTER 7

Reduce Risk to People, Property, and State Interests in the Delta



ABOUT THIS CHAPTER

This chapter provides an overview of flood risk in the Sacramento-San Joaquin Delta (Delta), current flood management efforts, and the most pertinent agencies and regulations. It details the Delta Stewardship Council's (Council) core strategies to reduce risk to people, property, and State interests in the Delta. These core strategies form the basis of the four policies and ten recommendations found at the end of the chapter:

- Improve emergency preparedness and response
- Finance and implement flood management activities
- Prioritize flood management investment
- Improve residential flood protection
- Protect and expand floodways, floodplains, and bypasses
- Integrate Delta levees and ecosystem function
- Limit liability

Reducing flood risks in the Delta also relies on locating urban development in the cities where levees are stronger (as proposed in Chapter 5) and retaining rural lands for agriculture, so that development in the most floodprone areas is minimized.

RELEVANT LEGISLATION

Water Code sections 85305, 85306, 85307, and 85309 require the Delta Plan to include or otherwise consider specific components to attempt to reduce risk.

> *85305(a) The Delta Plan shall attempt to reduce risks to people, property, and state interests in the Delta by promoting effective emergency preparedness, appropriate land uses, and strategic levee investments.*
>
> > *(b) The council may incorporate into the Delta Plan the emergency preparedness and response strategies for the Delta developed by the California Emergency Management Agency pursuant to Section 12994.5.*
>
> *85306 The council, in consultation with the Central Valley Flood Protection Board, shall recommend in the Delta Plan priorities for state investments in levee operation, maintenance, and improvements in the Delta, including both levees that are a part of the State Plan of Flood Control and nonproject levees.*
>
> *85307(a) The Delta Plan may identify actions to be taken outside of the Delta, if those actions are determined to significantly reduce flood risks in the Delta.*
>
> > *(b) The Delta Plan may include local plans of flood protection.*
> >
> > *(c) The council, in consultation with the Department of Transportation, may address in the Delta Plan the effects of climate change and sea level rise on the three state highways that cross the Delta.*
> >
> > *(d) The council, in consultation with the State Energy Resources Conservation and Development Commission and the Public Utilities Commission, may incorporate into the Delta Plan additional actions to address the needs of Delta energy development, energy storage, and energy transmission and distribution.*
>
> *85309 The department, in consultation with the United States Army Corps of Engineers and the Central Valley Flood Protection Board, shall consider a proposal to coordinate flood and water supply operations of the State Water Project and the federal Central Valley Project, and submit the proposal to the council for considerations for incorporation into the Delta Plan. In drafting the proposal, the department shall consider all related actions set forth in the Strategic Plan.*

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CHAPTER 7

Reduce Risk to People, Property, and State Interests in the Delta

Reducing flood risks to people, property, and State interests is critical to achieving the Delta Reform Act's coequal goals and protecting the Delta as a place. The Legislature has found that the Delta is "inherently floodprone," and that further improvements and continuing maintenance of the levee system will not resolve all flood risks (Public Resources Code section 29704). Living with risk, whether from floods, earthquakes, fires, coastal storms, or other hazards, is often part of life in California. The Delta's hazards, however, are exceptional because they affect so many State interests, including the reliability of its water supplies, the health of the Delta's ecosystem, and the qualities that make the Delta an attractive place to live, work, and recreate.

To reduce these risks to people, property, and State interests in the Delta, the Delta Reform Act requires that the Delta Plan promote effective emergency response and emergency preparedness, and promote appropriate land use (Water Code section 85305). The Delta Reform Act also directs the Council, in consultation with the Central Valley Flood Protection Board (CVFPB), to recommend priorities for State investments in levee operation, maintenance, and improvements in the Delta, including both levees that are a part of the State Plan of Flood Control and nonproject levees (Water Code section 85306).

The Council envisions a future in which risks of flooding in the Delta are reduced, despite an increase in sea levels and altered runoff patterns. The Council sees a future where Delta residents, local governments, and businesses are better prepared to respond when floods threaten. The Council envisions a future where bypasses are expanded; channels are improved; and strong, well-maintained levees protect local communities—but also protect State interests in a more reliable water supply for California, and a protected and restored Delta ecosystem. These improvements will include new or expanded floodways and bypasses, maintaining and improving levees, and floodproofing new development. The Council envisions that rural areas and the Delta's legacy communities will also be protected from flood risks by careful land use planning that discourages urban development in flood-threatened areas. The Council envisions that local agencies will be better financed and protected through a locally controlled emergency response and flood protection district, with fee assessment authority. State funds for desired projects will be focused at State interests in the Delta, but some of that activity will protect local interests as well. Eliminating flood risks will be impossible, but prudent planning, reasonable land development, and improved flood management will significantly reduce risk, and serve the coequal goals of a more reliable water supply, and a protected and restored Delta ecosystem.

Delta Hazards Threaten Both Coequal Goals and the Delta as a Place

The risks that flooding, earthquakes, and other hazards pose to the Delta imperil California's water supplies and the health of the Delta ecosystem. The channels that convey water through the Delta to users in the Bay Area, San Joaquin Valley, or Southern California, and the islands that prevent saltwater intrusion into Delta water supplies depend upon levees for their preservation. Should the levees that protect these channels fail, the impacts on water supplies could be felt statewide. Improving these Delta levees is an investment in water supply reliability. Another way to reduce these risks is for areas that use Delta water to develop plans for possible interruption of these supplies in a catastrophic event, as recommended in Chapter 3. Integrating water supply and flood control efforts is also important to optimize the management of the multipurpose reservoirs that store water for the Central Valley Project (CVP), State Water Project (SWP), and other water users. For example, a potential benefit of wide flood bypasses leading to the Delta may be greater flexibility in these reservoir operations, creating new opportunities to manage water supplies or generate hydroelectric power.

The Delta levees also affect the health of the ecosystem. Many birds, such as waterfowl or sandhill cranes, thrive in areas that depend on levees for their management. In some locations, careful removal or breaching of levees may create new habitats that benefit fish and wildlife and the ecosystem. Setting levees back deliberately, when feasible, can create both more capacity for flood flows and more habitat for fish and wildlife. But unplanned levee failures often create weed-infested depths that harbor nonnative species rather than refuges for smelt, salmon, or other preferred species. Changes in the area protected by levees also alter water circulation through the Delta, changing the benefit of flows released to protect its ecosystem.

The Delta's residents, farms, and businesses also depend on its levees. They shape the Delta landscape, protecting its farms and communities from destruction. The levee system is the foundation on which the entire Delta economy is built, the Delta Protection Commission's (DPC's) *Economic Sustainability Plan* reports (DPC 2012). Delta residents built the levee system over generations, and they are keenly interested in its maintenance and improvement. (See sidebar, Delta Disaster Recalled, for an example of the consequences of levee failure.)

DELTA DISASTER RECALLED

On a moonlit Wednesday night in June 1972, the San Joaquin River flowed slowly after one of the driest winters on record. It gnawed at the Andrus Island levee 6 miles south of Isleton between Bruno's Yacht Harbor and Spindrift Resort, opening a small hole that grew rapidly. By the time sheriff's deputies arrived on scene shortly after 1 a.m., the river had carved a 100-foot break. By 3 a.m., water covered Highway 12. Shortly after sunrise, the breach had grown to 300 feet, and volunteers were hard at work on a 1.5-mile-long bow levee to protect Isleton.

The battle to save Isleton continued throughout the day, but a rising tide and waves created by 30- to 45-mile-per-hour Delta winds hampered efforts. Within a few hours, officials ordered the evacuation of 1,400 Isleton residents and an additional 1,500 residents of Andrus and Brannan islands. At 9:45 p.m. Thursday, the bow levee breached, and a wall of water rushed into the low-lying residential area of Isleton. Although the city's business district was spared, almost all of Andrus Island and portions of Brannan Island were flooded, in some places up to 20 feet deep.

Then-Governor Ronald Reagan declared the islands a disaster area and asked President Richard Nixon to do the same. Over the next 6 months, the levee was repaired, the 12,000-acre lake that had been Brannan and Andrus Islands was drained, and life began returning to normal. A full year after the levee break, however, more than one-third of the residents had neither moved back into their homes nor begun to rebuild.

Officials estimated that damages were $21.8 million, slightly more than half of that from crop loss and saltwater damage to farmland. The cost for levee repairs was put at $800,000, and $500,000 went to pump the 20 square miles of flooded land dry. More than $1.5 million in federal disaster relief was made available. No definitive cause was ever determined for the levee breach, and a subsequent court case absolved the State of liability (DWR 1973, Sacramento River Delta Historical Society 1996).

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Flood Risk in the Delta

The Delta is an inherently floodprone area. This section provides an overview of the causes and risks of floods in the Delta. The Sacramento and San Joaquin rivers collectively drain approximately 42,500 square miles of land. Before the Delta was modified by levees and other human structures, these rivers' natural flows overflowed the Delta's low-lying islands and floodplains for long periods each spring.

The biggest floods occurred when warm Pacific storms swept in from the west and southwest, picking up moisture over the ocean and causing torrential rains when intercepted by the mountains surrounding the Central Valley. The risks of flooding were increased when large amounts of sediment were discharged to Central Valley rivers during the Gold Rush, choking their channels and raising their beds above their natural levels and surrounding lands.

Today, flooding of the Delta's complex labyrinth of islands and waterways is prevented by its levees. This system of flood control is supplemented by the flood facilities of the Sacramento River and San Joaquin River flood control projects and multipurpose reservoirs such as Shasta, Folsom, and Millerton lakes and Lake Oroville on the Sacramento and San Joaquin rivers and their tributaries, which hold back floodwater and provide water supplies and other benefits described in Chapter 3.

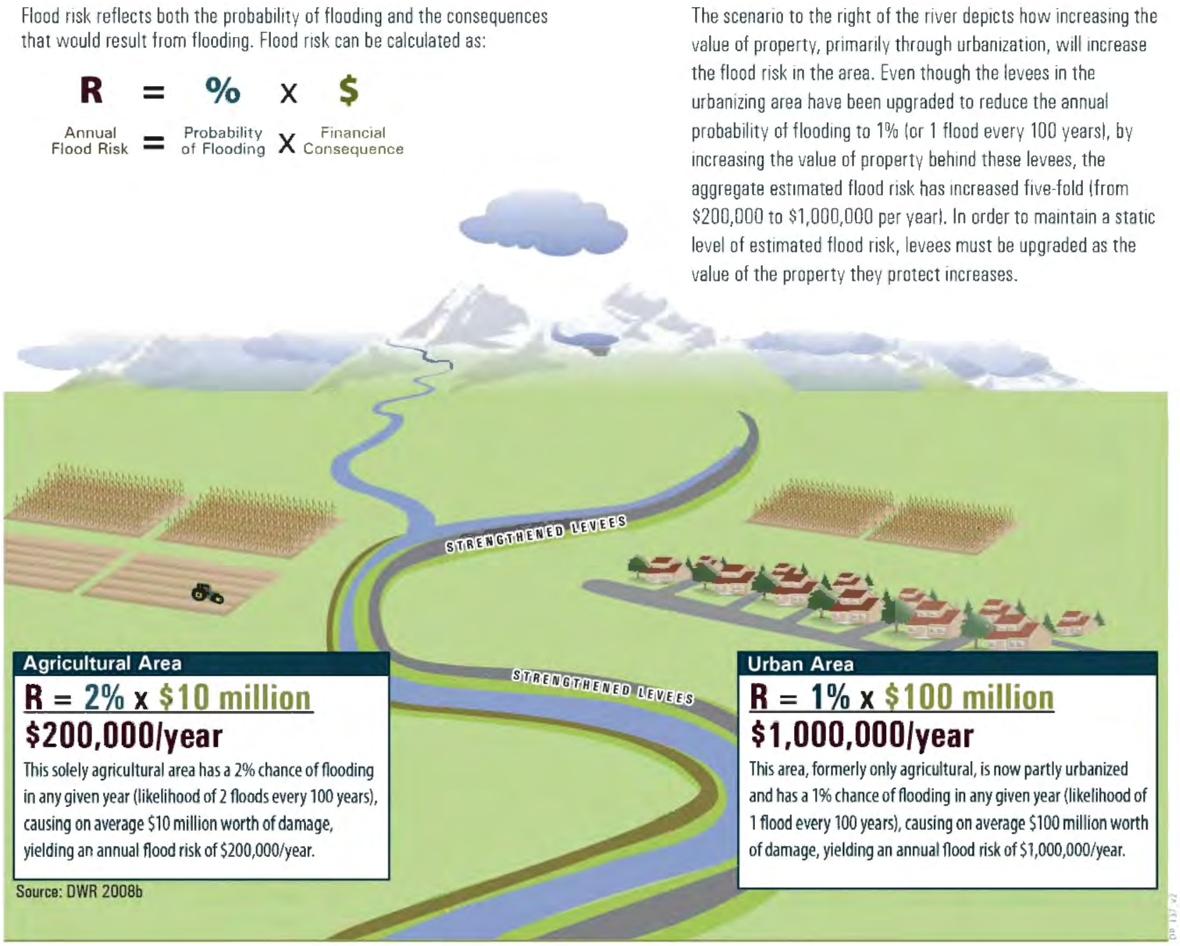
Many Delta levees were initially constructed more than a century ago using primitive materials and equipment. History has shown that structural failures of the levee system occur as a result of extraordinary events, imperfect knowledge, and imperfect materials. Delta levees face potential threats such as large runoff events, extreme high tides, wind-generated waves, earthquakes, subsidence, and sea level rise. Individually, each of these threats is enough to cause serious concern; together, they represent the potential for catastrophic disruption of the Delta and its economic and ecological services.

A mass or even partial failure of the levee system would have real life-and-death impacts and property losses that could total billions of dollars. Delta flooding could interrupt the conveyance of water through the Delta for the SWP, the CVP, in-Delta users, the Contra Costa Water District, the cities of Antioch and Stockton, and others who depend on the Delta for reliable water supplies (see Chapter 3 for a discussion of water supply reliability). Levee failures could also damage key features of the Delta ecosystem, including managed wetlands in Suisun Marsh and habitats of wintering greater sandhill cranes at Staten Island and nearby tracts. Unplanned levee failure could also degrade water quality in the Delta, because tidewaters would flood into the bowl created by subsidence of Delta islands. These failures would draw saltwater from San Francisco Bay and pollute Delta water with flood debris, farm chemicals, and other pollutants.

Levee failures also could flood homes, farms, and businesses, including historic structures in the legacy communities, and interrupt recreation and tourism. As noted in Chapter 5, about 116,000 residential structures are located in the 100-year floodplain of the Delta, mostly near Sacramento, West Sacramento, and Stockton. Also, 8,000 residences are below mean higher high water (DWR 2008b). Serious consequences also could result from flood-related damage to critical infrastructure in the Delta, including radio, cellular telephone, and television transmission towers; electrical transmission lines, including Pacific Gas and Electric Company, Sacramento Municipal Utility District, and Western Area Power Administration lines; natural gas pipelines serving local gas fields and regional transmission systems; petroleum pipelines; three state highways; and three interstate highways (DWR 2011a).

In simplistic terms, the concept of flood risk can be described as the likelihood of a flood event occurring and the consequences of that event. To many, flood risk simply means the chance a storm event will overwhelm the flood control system to some extent. Figure 7-1 illustrates the variables, namely the probability of flooding and the financial consequences. However, there are many other causes of flood risk, and the consequences can be far more complicated than the immediate damage to property.

Understanding Delta Flood Risk



Flood risk reflects both the probability of flooding and the consequences that would result from flooding. Flood risk can be calculated as:

R = % x $

Annual Flood Risk = Probability of Flooding X Financial Consequence

The scenario to the right of the river depicts how increasing the value of property, primarily through urbanization, will increase the flood risk in the area. Even though the levees in the urbanizing area have been upgraded to reduce the annual probability of flooding to 1% (or 1 flood every 100 years), by increasing the value of property behind these levees, the aggregate estimated flood risk has increased five-fold (from $200,000 to $1,000,000 per year). In order to maintain a static level of estimated flood risk, levees must be upgraded as the value of the property they protect increases.

Agricultural Area

R = 2% x $10 million

$200,000/year

This solely agricultural area has a 2% chance of flooding in any given year (likelihood of 2 floods every 100 years), causing on average $10 million worth of damage, yielding an annual flood risk of $200,000/year.

Urban Area

R = 1% x $100 million

$1,000,000/year

This area, formerly only agricultural, is now partly urbanized and has a 1% chance of flooding in any given year (likelihood of 1 flood every 100 years), causing on average $100 million worth of damage, yielding an annual flood risk of $1,000,000/year.

Source: DWR 2008b

Figure 7-1

The best defense against these risks is first to better understand the Delta's flood hazards, and then manage and control those risks to the extent possible through public awareness; adequate emergency management planning; structural and nonstructural improvements, including enforcement of existing flood management regulations; and repairs, rehabilitation, and improvement of levees (including setback levees) and flood channels. Improving our understanding of risks through further evaluation and analysis of the flood control system and the assets it protects is essential to developing a rational, prioritized approach to flood management and public investment.

Floods

Flooding during winter storms that results in high water surface elevations and high winds has been a common cause of levee failures in the Delta. For example, the Sacramento River at Rio Vista may flow in excess of 300,000 cubic feet per second (cfs) during winter and early spring floods, 30 times typical late-summer flows of 10,000 cfs. Peak discharges place high stress on Delta levees and can create flood conditions, especially when coupled with high tides.

The likelihood of levee failures caused by high water is substantial, based on the historical performance of these levees over the last century. During the last century, there have been more than 140 levee failures and island inundations, most of which occurred during flood seasons (DWR 2005). High water in the Delta can overtop levees, as well as increase the hydrostatic pressure on levees and their foundations, causing instability and increasing the risk of failure due to through-levee and/or under-levee seepage. Most levee failures in the Delta have occurred during winter storms and related high-water conditions, often in conjunction with high tides and strong winds.

Earthquakes

The Delta's levees are also at risk from the active seismic zones west of the Delta, including the San Andreas and Hayward faults. Less active faults underlie the Delta. A strong earthquake could damage Delta levees because of the potential for liquefaction of levee embankments and foundations. Saturated levees composed of dredged materials in other parts of the country and the world have performed poorly during moderate to strong earthquake shaking (DWR 2009; Delta Stewardship Council Staff 2010a). If a levee failed during high flows or if a flood were to occur soon after an earthquake, the protected area could be inundated.

The risks of earthquakes causing levee breaches and island inundations in the Delta have long been recognized. A California Department of Water Resources (DWR) report begins:

> *There is a long history of levee failures in the Delta that have resulted in extensive economic damage, but no failures of Delta levees are known to be directly attributable to earthquakes. Even so, two factors indicate a possible bleak picture for the future of many Delta levees. First, no serious causative quakes have occurred on the nearby major faults since the San Francisco earthquake of 1906. Second, the Delta levees of today are vastly different than those in the 1906 Delta, which had limited size and extent. (DWR 1980)*

The DWR Delta Risk Management Strategy Phase 1 study evaluated the performance of Delta levees under various seismic threat scenarios, and analyzed potential consequences for water supply, water quality, ecosystem values, and public health and safety. The study concluded that a major earthquake of magnitude 6.7 or greater in the vicinity of the Delta Region has a 62 percent probability of occurring sometime between 2003 and 2032 (DWR 2009). Figure 7-2 illustrates a potential flood scenario in which a 6.5-magnitude earthquake causes a 20-island failure. Although the probabilistic nature of earthquake prediction makes it difficult to quantify the timing and magnitude of seismic threats, it is important to address the threats posed by earthquakes to the Delta levee system because of the potential adverse effects of such events.

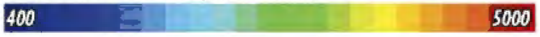
High Tides and Sunny-day Risks

Even without an earthquake or flood, Delta levees can fail during high tides or even on sunny days. Generally, these failures may be the result of a combination of high tide, and pre-existing internal levee and foundation weaknesses caused by burrowing animals, internal erosion of the levee and foundation through time, and human interventions such as dredging or excavation at the toe of the levee (DWR 2008b). Examples of sunny-day failures include the Brannon Andrus Tract in 1972 and Upper Jones Tract in 2004. It is estimated that, based on current conditions, a sunny-day failure would occur once every 9 years on average (DWR and DFG 2008).

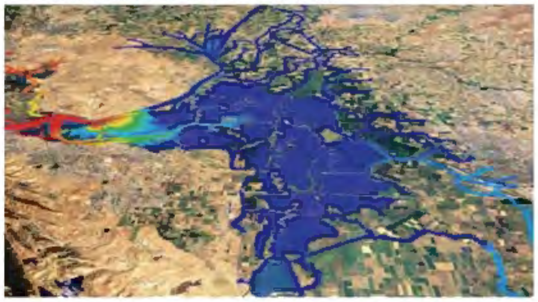
Other hazards that affect the performance of Delta levees include encroachments, penetrations, and burrowing animals. Encroachments such as structures or farming practices on or close to the levee; penetrations of the levee, such as culverts or pipelines; and burrows created by rodents, especially beavers, muskrats, and squirrels, can weaken the structural integrity of levees. Because of unregulated historical construction, levees also contain many hidden hazards. Active programs of inspection, oversight, and maintenance are essential to minimize these hazards.

Simulation of Delta Salinity after a 20-island Failure Caused by a Magnitude 6.5 Earthquake

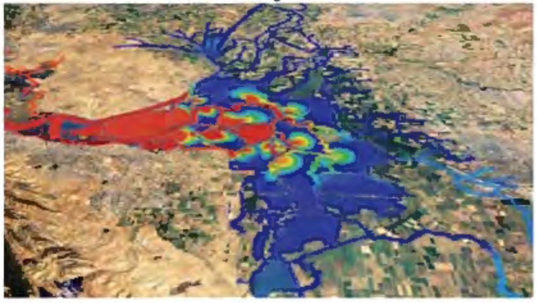
Electrical Conductivity (μmhos/cm)



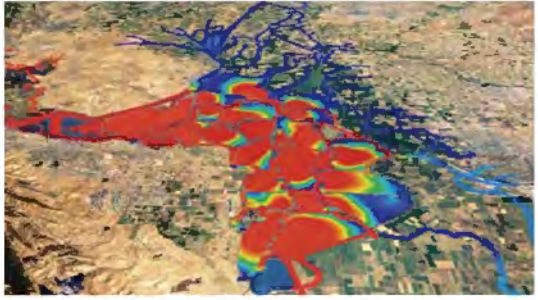
0–6 hours: Islands flood with fresh water



12–24 hours: Salt water intruding into Delta



1–7 days: Salt water throughout Delta



30 days: A saline estuary

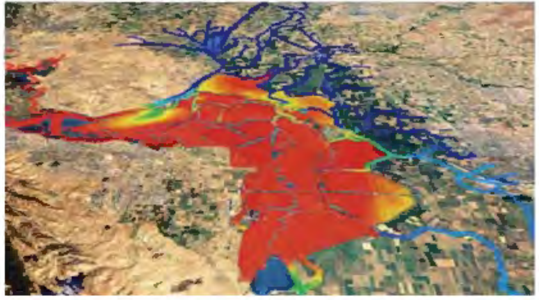


Figure 7-2 *Source: MWD 2010*

Land Subsidence

Because of the land subsidence described in Chapter 5, much of the central Delta is below sea level. Some islands are 12 to 15 feet below sea level, requiring levees 20 to 25 feet in height that act as dikes, holding back water continually rather than only during seasonal floods or extreme tides. As subsidence progresses, accommodation space increases, and levees must be continually maintained, strengthened, and periodically raised to support the increasing hydraulic stresses (Miller 2008, Mount and Twiss 2005). The hydraulic stress also can drive seepage through and under levees, and place levee foundations under more stress. The thinning of the peat soil layer also causes shallow or artesian groundwater conditions. More seepage onto islands will increase the drainage costs associated with additional pumping and decrease levee stability (Deverel and Leighton 2010).

Climate Change and Flood Risk

Climate change has major implications for the Delta, and especially for flood risk management. It is estimated that by the year 2100, sea levels may rise 31 to 69 inches (California Climate Action Team 2010, California Ocean Protection Council 2011), putting additional stress on levees and increasing their risk of failure. Projected changes in the timing and intensity of runoff may increase peak storm runoff and high-frequency flood events (DWR 2008c). Such floods could interrupt water conveyance through the Delta for those who depend on the Delta for water.

Additionally, scientific understanding of large-scale precipitation events is growing, as demonstrated by the ARkStorm scenarios being investigated by the U.S. Geological Survey, which indicate that massive storms and subsequent flooding have occurred and are likely to occur again (USGS 2011). Failure of significant parts of the Delta's flood management system may be unavoidable.

Planning for Flood Management

This section summarizes the current state of flood management planning for the Delta. To reduce the risk of flooding, Delta landowners, local governments, and State and federal agencies have planned and built an extensive levee system in the Delta, and significant flood control works upstream of the Delta. Other government flood control programs plan for emergency response in the event of floods, or help manage flood risks through land use planning, building standards, and flood insurance. The Delta Reform Act refers to these government-sponsored flood control programs in its provisions regarding covered actions (Water Code section 85057.5(a)(4)). The sidebar, What Is a Government-sponsored Flood Control Program?, highlights those programs referenced in statute; and proposed actions in the Delta that will have a significant impact on the implementation of one of these programs may be considered covered actions. Chapter 2 provides details about covered actions.

There are more than 1,000 miles of project and nonproject levees in the Delta and Suisun Marsh. Differences in how levees are classified can influence reports about their length and condition. Approximately 65 percent of the levees in the Delta and all levees in the Suisun Marsh are owned or maintained by local agencies or private owners and are not part of the flood control projects on the Sacramento or San Joaquin rivers. Most of these nonproject levees are maintained by local reclamation districts created and funded by landowners, initially for the purpose of draining (“reclaiming”) Delta islands and tracts. The reclamation districts continue to maintain levees and other water control facilities today. These nonproject levees are defined in Water Code section 12980(e).

Many facilities throughout the Delta also drain rainfall runoff from land into Delta channels. Local cities and districts own and maintain urban storm drains in developed areas. Stockton, Sacramento, West Sacramento, Lathrop, Manteca, and Tracy are Delta cities with storm drainage facilities.

WHAT IS A GOVERNMENT-SPONSORED FLOOD CONTROL PROGRAM?

Any State or federal strategy, project, approval, funding, or other effort that is intended to reduce the likelihood and/or consequence of flooding of real property and/or improvements, including risks to people, property, and State interests in the Delta, that is carried out pursuant to applicable law, including, but not limited to, the following code:

- State Water Resources Law of 1945, Water Code section 12570 et seq.
- Sacramento-San Joaquin River Flood Control Projects (Flood Control Act of 1941, Public Law 77–228)
- Local Plans of Flood Protection (Water Code section 8201)
- Central Valley Flood Protection Plan (Water Code section 9600 et seq.)
- Subventions Program, Special Projects Program (Water Code section 12300 et seq.)
- Way Bill 1973 – Subventions Program, Special Projects Program (Water Code section 12980 et seq.)
- Central Valley Flood Protection Board Authority (California Code of Regulations, Title 23, Division 1)
- National Flood Insurance Program (National Flood Insurance Act of 1968, 42 United States Code 4001 et seq., Public Law 90-448)

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Most Delta islands have a network of agricultural drains and pumps to pump runoff into the Delta channels. Some Delta channels have been dredged to increase their capacity to carry floodwater and to obtain material for levee construction and maintenance.

The flood control projects on the Sacramento and San Joaquin rivers include approximately one-third of the Delta’s levees. Known as “project levees,” they begin on the left bank of the Sacramento River at Sherman Island, and line most of the riverbanks, as well as the Sacramento River Deep Water Ship Channel and some connecting waterways, north to Sacramento and beyond. The Delta Cross Channel’s control gates are an important feature of this levee system, closing during high flows to keep the Sacramento River’s floodwaters out of the central Delta. The flood control project also includes the Yolo Bypass, the broad, managed floodplain in Yolo County west of West Sacramento. The wide bypass, which is confined by project levees, draws floodwater through weirs above Sacramento to lower flood heights on the Sacramento River and its tributaries, discharging back to the Delta above Rio Vista. The Yolo Bypass floods about once every 3 years, between December and February. On the San Joaquin River, project levees line the riverbanks from Old River to Stockton. Figure 7-3 shows the locations of project and nonproject levees in the Delta.

Recent evaluations show that some of the flood control project facilities on the Sacramento and San Joaquin rivers are not adequate. Because the system was intended partly to flush Gold Rush-era sediment from rivers and channels, the project levees were often built close to the riverbanks, and are prone to erosion. Many of the system's channels have inadequate capacity to carry the flows for which they were designed, and many levees do not meet contemporary design standards (DWR 2011c).

The CVFPB, as part of its responsibility to oversee the flood control projects on the Sacramento and San Joaquin rivers, has adopted regulations to control encroachments on the project and some of the streams that flow into it. It also regulates encroachments within designated floodways, which are the channels of a river or other watercourse and the adjacent land areas that convey floodwaters (California Code of Regulations [CCR], Title 23, Division 1, Chapter 1, Article 2, Section 4). In the Delta, designated floodways include the Cosumnes River's floodplain and the confluence of the San Joaquin River and the Stanislaus River upstream from Paradise Cut.

Some levees are neither project levees nor nonproject levees. These "unattributed levees" include hundreds of miles of levees in Suisun Marsh and the Delta, and are not part of any State-financed flood control program. They also include some that are unmaintained along the perimeter of permanently flooded islands and no longer serve flood control or drainage purposes.

Multipurpose reservoirs in the Sacramento and San Joaquin river watersheds that play a role in California's water supply also serve critically important roles in managing floods that affect the Delta. The CVP's Shasta, Folsom, and Millerton lakes and New Melones Reservoir; the SWP's Lake Oroville; and other reservoirs are operated in accordance with flood control rules established by U.S. Army Corps of Engineers (USACE), reserving space to capture flood flows that can be released downstream gradually so that channels are not overwhelmed.

Many studies and planning efforts addressing flood management and emergency preparedness, response, and mitigation are under way, and will be considered by the Council for ongoing Delta flood risk management. These studies, efforts, and programs include the following:

- ***Central Valley Flood Protection Plan* (CVFPP).** This strategic plan for improving the flood control projects on the Sacramento and San Joaquin rivers recommends approaches for reducing flood risk and improving the flood control project, including expansion of the Yolo Bypass and construction of a new San Joaquin River Bypass at Paradise Cut (DWR 2011c) (see sidebar, Central Valley Flood Protection Plan).
- **DWR's FloodSAFE Initiative.** In 2006, DWR launched FloodSAFE California—a multifaceted initiative to improve public safety through integrated flood management.
- **DWR's Delta Levees Program.** This program encompasses both the Delta Levees Maintenance Subventions and Delta Levees Special Flood Control Projects programs, which provide State cost-share funding for Delta levee maintenance and upgrades.
- ***Sacramento-San Joaquin Delta Multi-Hazard Coordination Task Force Report.*** This report responds to Senate Bill (SB) 27 (Water Code section 12994.5), which called for the task force to make recommendations to the Governor about Delta multi-hazard emergency response and recovery issues.

- **USACE Delta Islands and Levees Feasibility Study, Long-Term Management Strategy for Dredging and Dredge Material Placement, Periodic Inspection Program, and Levee Safety Portfolio Risk Management System.** USACE has multiple programs addressing Delta-related flood management issues, including levee safety, levee integrity, and the beneficial reuse of dredged material.
- **CVP and SWP Reoperation Studies.** DWR's Forecast-coordinated Operations Program and Systems Reoperation Program address reservoir operational criteria, as noted in Chapter 3.

The Council will consider the findings of these studies and may incorporate them into future Delta Plan updates. The CVFPP and FloodSAFE include many concepts relevant to flood protection in the Delta. At the federal level, the National Committee on Levee Safety (2009) submitted a report to Congress that outlined the critical components of a National Levee Safety Program, and a high-level timeframe and steps for its creation. It is up to Congress to act on these recommendations, which will be monitored by the Council as they relate to the Delta Plan.

The CVFPB, DWR, and USACE each play unique and critical roles in Delta flood risk management. Because of this, the Council's role in facilitation, coordination, and integration of various agencies and other parties is of particular importance. Frequent, ongoing collaboration with other State, federal, and local agencies to improve communication and coordination is essential to meeting the Delta Plan's flood management objectives.

The Delta's Levees

The levees within the legal Delta protect approximately 740,000 acres of land. They define the Delta's physical characteristics; influence the reliability of its water supplies and its ecosystem health; and are critical to the Delta's residents, farms, businesses, cities, and legacy communities. Because many Delta levees protect land below sea level, they hold back water all day, year-round, rather than only during floods, and so are called "the hardest working levees" in America.

CENTRAL VALLEY FLOOD PROTECTION PLAN

The Central Valley Flood Protection Act of 2008 directed DWR to prepare the CVFPP. The CVFPP is a flood management planning effort that addresses flood risks and ecosystem restoration opportunities in an integrated manner. It specifically proposes a systemwide approach to flood management for the areas currently protected by facilities of the State Plan of Flood Control (SPFC). The CVFPP was adopted by the CVFPB in June 2012. It is expected that the CVFPP will be updated every 5 years thereafter.

The CVFPP proposes a systemwide approach to address the following issues:

- Physical improvements in the Sacramento and San Joaquin river basins
- Urban flood protection
- Small community flood protection
- Rural/Agricultural area flood protection
- System improvements
- Non-SPFC levees
- Ecosystem restoration opportunities
- Climate change considerations

The geographic scope of the CVFPP includes the portions of the Delta covered by the SPFC, including about 65 miles of urban, nonproject levees at Stockton; approximately two-thirds of Delta levees are not addressed in the CVFPP.

The effects of systemwide improvements directed by the CVFPP and the potential of redirected impacts to areas within the Delta will be monitored by the Council to ensure alignment with the coequal goals and the Delta Reform Act. Additionally, the Council may, at its discretion, incorporate those portions of the CVFPP into the Delta Plan to the extent that those portions promote the coequal goals (Water Code section 85350).

The 2012 CVFPP is only a descriptive document, highlighting a planning perspective at a reconnaissance level. Follow-on feasibility studies and project-specific development activities will be conducted over the next several years. The Council will continue to monitor and provide input to those activities to ensure that Delta flood risk issues are considered. Flood system improvement actions undertaken upstream of the Delta are of particular concern if not coupled with in-Delta actions that reduce overall systemwide flood risk.

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Levees in the Delta

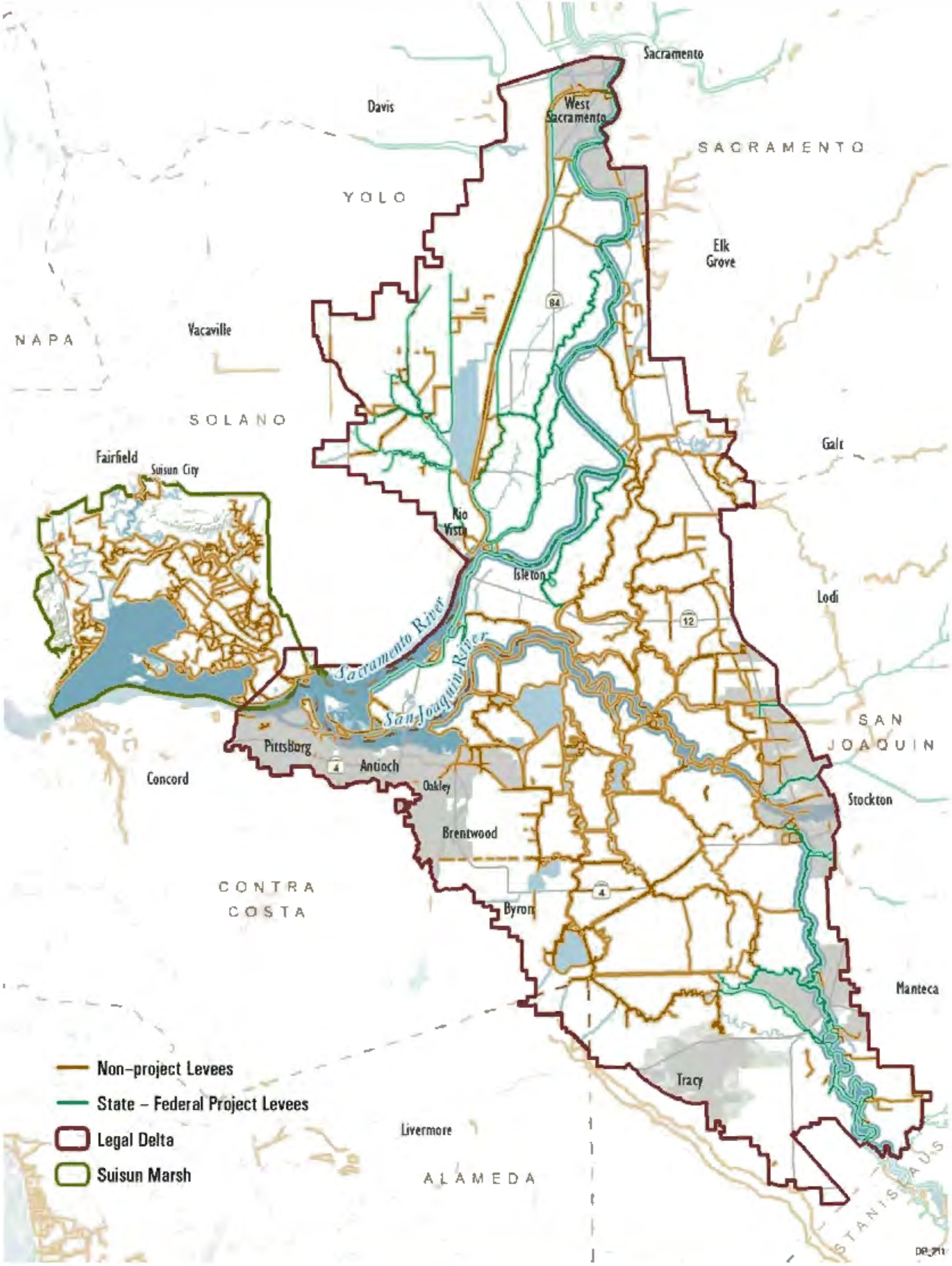


Figure 7-3 *Source: DWR 2011e*

Existing Levee Standards and Guidance

It is more important than ever that the Delta's levees are designed, constructed, and maintained to provide a level of flood risk reduction commensurate with the coequal goals and protection of the Delta's unique values as a place. Over the last few decades, State and federal agencies have developed guidelines and standards for levees. These standards establish minimum criteria for levee design and maintenance. The standards include (1) the level of flood protection California has prescribed for the Central Valley's urban areas, (2) whether sufficient protection is provided by the levees to exempt development financed with federally backed mortgages from requirements to obtain flood insurance, and (3) whether property and infrastructure protected by the levees (including the levees themselves) are eligible for assistance in the event of a catastrophic emergency, including aid from USACE to rehabilitate levees damaged in an emergency or for disaster assistance from the Federal Emergency Management Agency (FEMA).

Four levee standards and guidance applicable to the Delta are discussed below (and shown on Figure 7-4); they are ordered from highest to lowest level of flood protection:

- **DWR 200-year Urban Levee Protection (DWR - 200 Year):** This standard goes beyond criteria for levee height and geometric design to include requirements for freeboard, slope stability, seepage/underseepage, erosion, settlement, and seismic stability (DWR 2011b). It protects against a flood that has a 0.5 percent chance of being equaled or exceeded in any given year (a 200-year level of flood protection). This urban levee standard is the only levee standard that specifically links land uses to levee criteria. State law requires that by 2025, floodprone urban areas with over 10,000 residents must meet this 200-year flood protection standard (Government Code section 65865.5(a)(3)). Compliance likely will be achieved by upgrading levees to meet the 200-year design standard, under development by DWR. Sacramento, West Sacramento, and Stockton are planning levee improvements to attain this level of protection.

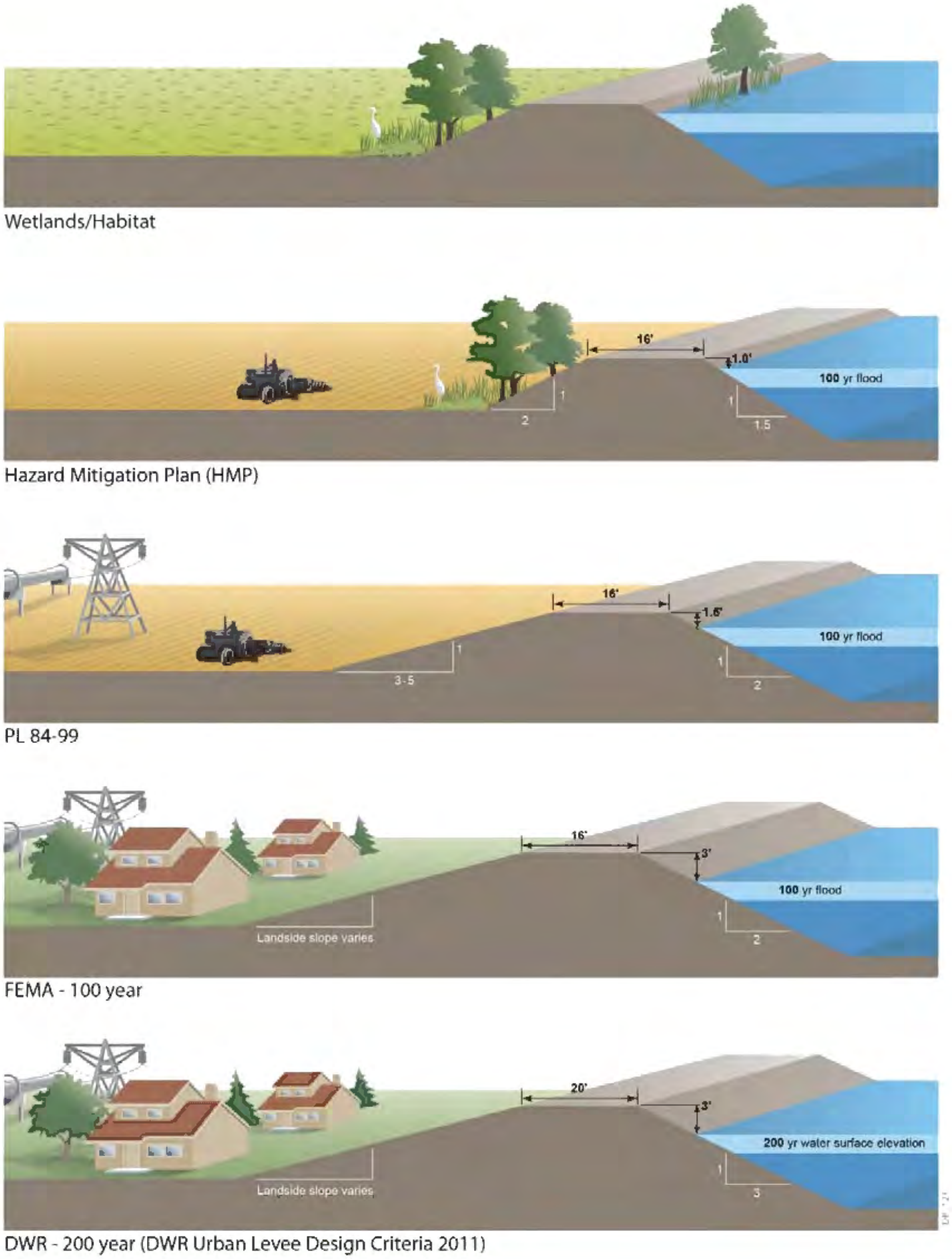
  Very few levees in the Delta meet this standard because most Delta levees do not protect urban areas. Under existing law, rural levees are not required to meet this standard.

- **FEMA 100-year (Base Flood) Protection (FEMA – 100 Year):** This "insurance" standard, often called the "1 percent annual chance flood" level of protection, provides criteria that levees must meet to protect against the flooding that is the basis for FEMA's flood insurance rate maps (44 Code of Federal Regulations 65.10). It is often used with established USACE criteria to prescribe requirements for levee freeboard, slope stability, seepage/underseepage, erosion, and settlement. The standard generally does not address seismic stability. In communities where levees provide this level of flood protection, new developments are not required to meet federal floodproofing standards and can obtain federally guaranteed mortgages without purchasing flood insurance.

  Few Delta levees outside of cities meet this standard, and many urban levees need improvement to meet it.

- **Public Law 84-99 (PL 84-99):** The PL 84-99 standard is a minimum requirement established by USACE for levees that participate in its Rehabilitation and Inspection Program (33 United States Code 701n) (69 Stat. 186). Twenty-five Delta reclamation districts, protecting about 31 percent of the legal Delta's land behind about 516 miles of levees, are at or above this standard, according to a recent report to the Council by DWR (DWR 2012). Delta islands or tracts that meet this standard are eligible for USACE funding for levee rehabilitation, island restoration after flooding, and emergency assistance, provided that the reclamation district is accepted into the USACE's program and passes a rigorous initial inspection and periodic follow-up inspections. Eligibility for PL 84-99 was formerly based primarily on levee geometry with minimum freeboard and maximum steepness of slopes. USACE's periodic

Levee Guidance


Wetlands/Habitat

Hazard Mitigation Plan (HMP)

PL 84-99

FEMA - 100 year

DWR - 200 year (DWR Urban Levee Design Criteria 2011)

Figure 7-4

Source: Adapted from Delta Vision Blue Ribbon Task Force 2008 and DWR 2011b inspection program incorporates other elements into eligibility, including presence of structure encroachments, vegetation, rodent control programs, and more. The standard for levee geometry implies a minimum levee height and a slope stability factor of safety, but is not associated with a level of protection (such as a 100-year flood) and does not address seismic stability. In 1987, USACE developed a Delta-specific standard based on the Delta's particular organic soils and levee foundation conditions. The CALFED Record of Decision set a goal of improving Delta levees to the PL 84-99 standard, as does the DPC Economic Sustainability Plan, but funding has been inadequate to attain this objective.

- **FEMA Hazard Mitigation Plan (HMP) Guidance:** FEMA, DWR, the California Office of Emergency Services (now the California Emergency Management Agency [Cal EMA]), and the Delta levee-maintaining agencies negotiated the HMP guidance to reduce the likelihood of repetitive flood damage to Delta levees and islands, so that FEMA disaster assistance would not be requested repetitively for the same islands after minor floods. Fifty-three of the Delta's reclamation districts, protecting over 47 percent of the legal Delta's acreage, fall below this standard, which 139 miles of Delta levees do not meet (DWR 2012). Local communities that do not meet the HMP guidance are not eligible for FEMA disaster reimbursement for flood fights or assistance if levees fail or islands flood. If even a portion of the levee around an island or tract does not meet the HMP guidance, assistance from FEMA to recover from levee damage is unavailable. Fifteen districts comply with this guidance, but are below the PL 84-99 standard. FEMA and Cal EMA have a memorandum of understanding, updated in 2010, that sets forth the requirements for FEMA public assistance funding for emergency flood fighting, emergency repair, permanent restoration, and/or replacement of eligible damaged nonproject levees within Delta reclamation districts (Cal EMA and FEMA 2010). The guidance is based on geometric criteria for the levees. The HMP guidance, negotiated between 1983 and 1987, was intended as an interim guidance, but has not been adjusted using subsequent or projected flood elevations.

No State standards currently address design criteria for flood protection of the state highways and interstate highways that traverse the Delta. Federal standards require that interstate highways must be protected from 50-year flood events to qualify for Federal Highway Administration funds (23 Code of Federal Regulations 650.115). Because most roads in the Delta were constructed before these standards were developed, they do not meet the standards. For example, sections of State Route 12 are 10 feet or more below sea level. A flood on the islands this highway traverses could interrupt transportation and trade, and put motorists at risk.

Levees and Ecosystem Function

Historically, most discussion of levees has emphasized reducing flood risks to life and property. However, habitat and ecosystem values and functions can provide multiple benefits, and must be considered in flood management planning and actions. For example, the CVFPP includes a conservation framework and strategy that outline how environmental elements can be integrated into flood management activities and provide an environmental guide for flood project planning. Setting levees back from the riverbank can expand flood conveyance capacity and reduce flood risk while providing ecosystem restoration and recreational opportunities (USACE 2002). Setback levees also allow opportunities for construction of an improved levee foundation and section using modern design and construction practices, thereby reducing risk of failure.

Much discussion has occurred on how to more effectively accommodate ecosystem function with the current levee system, highlighting the following issues (Healey and Mount 2007):

- Current levees tend to be narrow, with steep waterside slopes that provide little upland habitat value.

- Setback levees may provide habitat value and increased levee integrity.
- Levees can be used to promote specific habitat types (such as waterfowl habitat) by ensuring that some areas of freshwater marsh are sustained.
- Where lands are not heavily subsided, levees can allow for multiple land uses including habitat management and wildlife-friendly agriculture.
- Allowing levees to fail on deeply subsided islands would not generate any obvious ecological benefits.
- Subsidence reversal on deeply subsided islands would rely on levees to appropriately manage water levels during tule growth.

As management efforts in the Delta proceed, it will be important to consider ecosystem functions and their interactions with the levee system, as discussed in Chapter 4. An example where these interactions are already being debated is the USACE's current policy requiring removal of vegetation from levees. Scientific support for and against this policy is mixed. Concerns with maintaining woody vegetation on levees include difficulties with inspection and flood fighting, potential for root holes, and trees toppling from erosion. Other evidence, however, suggests that woody shrubs and small trees on levees enhance levee structural integrity while providing environmental benefits. A study on a channel levee along the Sacramento River concluded that roots reinforced the levee soil and increased shear resistance by providing increased stability against slope failures (Shields and Gray 1992). In either case, the widespread removal of vegetation from Delta levees could have significant adverse environmental impacts that are not well understood.

Floodplains and Channels

Floodplains and channels that provide the capacity to carry and store flood flows are critical for managing flood risks, and for overall Delta water management and ecosystem integrity. The CVFPB and FEMA both play roles in designating floodways and floodplains to accommodate flood flows.

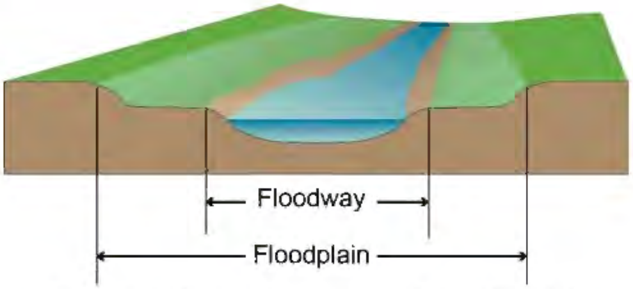
The CVFPB regulates encroachment in floodplains by designating floodways in the Sacramento River and San Joaquin River drainages, including the Delta (Water Code section 8609). A "designated floodway" is the channel of the stream and that portion of the adjoining floodplain, as shown on Figure 7-5, reasonably required to provide for the passage of a specified flood. It may also be the floodway between existing levees as determined by the CVFPB.

The CVFPB regulates encroachments within designated floodways and regulated streams through its permitting authority. The encroachment permit process applies to all projects, existing and proposed (including habitat restoration projects), within State/federal flood control project levees, designated floodways, bypasses, and regulated streams (CCR, Title 23, Division 1). The CVFPB should be consulted prior to the consideration of any projects that may be in a designated floodway in the Delta. Appendix L includes a map of the CVFPB's jurisdictional areas in the Delta.

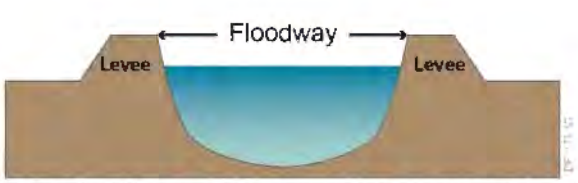
Additionally, under the National Flood Insurance Program, FEMA maps floodplains that have a 1 percent chance of flooding in any year (a 100-year flood). FEMA works with participating communities to regulate development within these floodplains according to federal regulations. No new construction, substantial improvements, or other development (including fill) may be permitted within specified flood zones on the community's Flood Insurance Rate Map unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than 1 foot at any point within the community.

In some flood channels and bypasses, dredging may have benefits because it increases channel capacity and also provides material that can be used for levee maintenance and other flood risk management activities. Because some

Conceptual Diagrams of Floodways



Conceptual Diagram of a Floodway within a Floodplain



Conceptual Diagram of Floodway within a Leveed Channel

Figure 7-5 The floodway is the channel of the stream and that portion of the adjoining floodplain reasonably required to provide for the passage of a specified flood; it is also the floodway between existing levees as determined by the CVFPB or the Legislature.

Source: FEMA 2006

portions of the Delta are within a tidal pool and other areas are riverine, the efficacy of dredging must be addressed on a site-specific basis and cannot simply be considered useful on a Delta-wide basis.

The benefits and impacts of dredging Delta channels are being investigated by a consortium of federal and State agencies, including U.S. Environmental Protection Agency, USACE, DWR, and the Regional Water Quality Control Boards, under the Delta Dredged Sediment Long-Term Management Strategy (LTMS) Program. The LTMS is designed to improve operational efficiency and coordination of the collective and individual agency decision-making responsibilities resulting in approved dredging and dredged material management actions in the Delta. Approved dredging and dredged material management actions will take place in a manner that protects and enhances Delta water quality, identifies appropriate opportunities for the beneficial reuse of Delta sediments for levee rehabilitation and ecosystem restoration, and establishes safe disposal for materials that cannot be reused (USACE 2007).

Investment in Reducing Risk

Because the Delta's levees protect residents; agricultural land; water supplies; and energy, communications, and transportation facilities, the State has invested considerable funding in Delta levees over several decades through various legislative actions. Legislation sponsored by Senator Howard Way in 1973 established the Delta Levees Maintenance Subventions Program, SB 34 (1988) established the Delta Levees Special Flood Control Projects Program, and Assembly Bill 360 (1996) extended these two programs and initiated a requirement for net habitat enhancement. Bond measures passed since the late 1990s have provided sizeable but one-time funding for levee maintenance, repair, and improvements. Propositions 84 and 1E provided substantial public financing toward most of the recent Delta levee projects. An estimated $700 million of State taxpayer money has been spent by DWR on Delta levee maintenance and improvements since the Delta levee funding programs began in the 1970s. This includes $274 million of bond funds that are encumbered for future Delta levee projects. Funding to improve levees that protect urban and urbanizing areas within the Delta is currently provided by the State via the Early Implementation Program managed by DWR.

The Delta's project levees are authorized as part of the federal flood control project and so are eligible for federal funding (as well as the maintenance subventions mentioned below). The CVFPB serves as the nonfederal partner to USACE for the Delta's project levees.

State investments for nonproject levees in the legal Delta are distributed according to guidelines and criteria of the Delta Levees Maintenance Subventions Program or Delta Levees Special Flood Control Projects Program. These two programs provide State matching funds for maintaining and improving Delta levees. Local agencies in the legal Delta receive partial reimbursement for levee maintenance and rehabilitation from the State when funding is available. Currently, the State contributes up to 75 percent of qualifying costs for maintenance of many Delta levees. Local levee-maintaining agencies provide local cost-share matches, and both local and State efforts contribute to Delta flood risk reduction by maintaining continuous efforts to preserve Delta levees. It is often difficult for local agencies to raise funds for the local cost share of State and federal assistance programs. Funding assistance provided by the Delta Levees Maintenance Subventions Program is governed by guidelines developed by DWR and adopted by the CVFPB. State funds are not available for levee maintenance or improvement in most of Suisun Marsh.

Although the State has contributed the majority of costs for maintaining and improving Delta nonproject levees for many years, the concept of shared responsibility with local landowners is key to the long-term success of the Delta levee system. Neither the State nor the federal government is legally obligated to pay the full cost of Delta flood protection projects. The continued participation and financial support of local reclamation districts is essential. As noted in the Delta Reform Act's Section 85003(b), "Delta property ownership developed pursuant to the federal Swamp Land Act of 1850, and state legislation enacted in 1861, and as a result of the construction of levees to keep previously seasonal wetlands dry throughout the year. That property ownership, and the exercise of associated rights, continue to depend on the landowners' maintenance of those nonproject levees and do not include any right to state funding of levee maintenance or repair."

Prioritizing State Investment in Levees

The Delta Reform Act requires that State investments in Delta levees be prioritized to reduce risks to people, property, and State interests in the Delta (Water Code sections 85305(a) and 85306). Prioritizing investment is necessary to ensure that limited public funds are expended responsibly for improvements critical to State interests, rather than simply applying one objective to all Delta levees regardless of priority. These priorities, in combination with the Delta Reform Act directive that State agencies act consistently with the Delta Plan, will ensure that State spending on Delta levees reflects these priorities in the future. The Delta Reform Act provides that activities of the Council in determining priorities for State levee investments in Delta levees do not increase the State's liability for flood protection in the Delta or its watershed (Water Code section 85032(j)).

This Delta Plan outlines a process to prioritize State investments in levee operation, maintenance, and improvements in the Delta. It is also important to prioritize interim actions while longer-term guidelines are being established. Interim actions taken should consider and, where feasible, incorporate habitat and ecosystem values and enhancement in their development and implementation. This will allow for a more coordinated, effective approach to reducing Delta flood risk and prioritizing both immediate and long-term State investments. This approach will also take into account future actions that may be proposed through other planning efforts such as the CVFPP and Bay Delta Conservation Plan.

To effectively prioritize State investments in levees, a framework is needed to adequately assess Delta flood risk. This framework should include the following steps:

- Assess existing Delta levee conditions. Initially, a sufficient understanding of the current status of Delta levees is needed to establish baseline conditions against which future risk reduction efforts can be gauged. Because Delta levee conditions change, it is critical to conduct periodic assessments so that maintenance and improvement actions can be directed rationally. Assessment methods should be used that provide sufficient information to portray a reasonable snapshot of conditions.
- Develop an economics-based risk analysis for each Delta tract and island. This analysis must address several critical parameters, including life safety, private property, impacts on State water supply, critical infrastructure,

Delta water quality, ecosystem values, and systemwide integrity. Accepted risk analysis methods should be used, such as those developed by USACE (1996, 2006). This analysis could include "expected annual damage" assessments as a metric for analyzing flood risk. This approach, which integrates the likelihood and consequences of flooding, provides values that are useful for comparing flood risk at various locations and for ranking alternative levee projects.

- Conduct ongoing Delta flood risk analyses in an open manner for the public. Baseline and subsequent analytical efforts should always be conducted in manner open to scrutiny, with results being readily available for decision makers, interested parties, and the general public. Flood risk analyses will need to take into account future actions that may be proposed through other planning efforts such as the CVFPP and Bay Delta Conservation Plan.
- Develop an updated understanding of Delta hydrology. An updated understanding of water surface elevations in the Delta is critical for levee design purposes and should be addressed.

The approach must be based on sound scientific and engineering principles, and incorporate appropriate economic and hydrologic data.

As these long-term priorities for State investments in levee operation, maintenance, and improvements are developed, State funds for Delta levee projects should focus on the interim priorities set forth in RR P1, including the following actions:

- Provide a 200-year level of flood protection for existing urban and adjacent urbanizing areas (Water Code section 9600 et seq.).
- Improve the levees that protect aqueducts crossing the Delta and the freshwater pathway to Clifton Court Forebay, as depicted on Figure 7-6, to improve the reliability of these water supplies.
- Improve other Delta levees not specifically planned for ecosystem restoration to the FEMA HMP guidance level to ensure that the Delta's reclamation districts are eligible for public funding for emergency flood fighting, emergency repair, permanent restoration, and/or replacement of eligible damaged nonproject levees.
- Continue to fund and implement the Delta Levees Maintenance Subventions Program to maintain Delta levees.

In addition, the Delta Plan proposes creating a regional agency to assist with the planning, implementation, and financing of Delta flood risk reduction activities (see RR R2). Local levee-maintaining agencies have managed the financing and ongoing maintenance, rehabilitation, and repair of Delta levees, and have improved the levels of levee integrity, reducing overall Delta flood risk. Although the State has provided financial assistance over several decades, these programs have been funded primarily through State general obligation bonds, which face an uncertain future. The unencumbered bond funds that remain available for Delta levee projects total only $123 million.

An alternative funding mechanism could provide a more stable, long-term approach to funding in which local participation by all beneficiaries of flood risk management is more broadly incorporated. A regional flood risk management district with fee assessment authority could address a variety of Delta flood risk-related activities, including levee maintenance and improvements; regional flood management planning; flood facilities inspections; data collection; risk notification; and emergency preparedness planning, response, and mitigation. A regional flood risk management district could complement reclamation district activities. Because two ballot measures, Propositions 218 (1996) and 26 (2010) (discussed in Chapter 8), have raised the approval thresholds for new fees and taxes, the proposed regional assessment district will need to be broadly supported.

Delta Flood Management Facilities

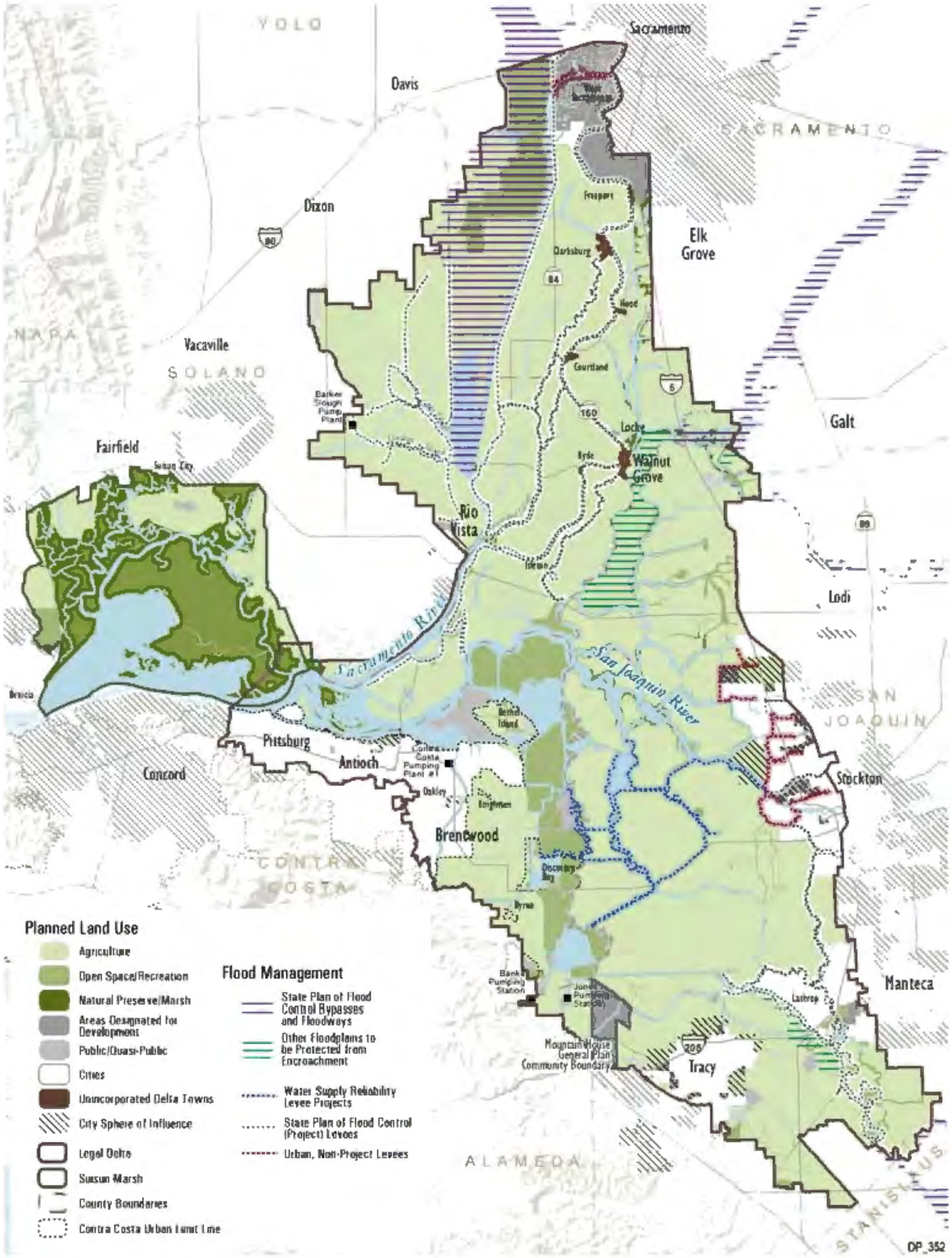


Figure 7-6

The map shows land uses designated by city and county general plans. Within cities' spheres of influences, the map shows land use designations proposed in city general plans, where available. In cases where cities have not proposed land uses within their spheres of influence, the map shows land uses designated by county general plans.

Sources: City of Benicia 2003, Contra Costa County 2008, Contra Costa County 2010, DWR 2011b, DWR 2011c, DWR 2011d, City of Fairfield 2008, Jones & Stokes 2007, City of Lathrop 2012, City of Manteca 2012, Mountain House Community Services District 2008, City of Rio Vista 2001, SACOG 2009, City of Sacramento 2008, Sacramento County 2011, Sacramento County 2012, Sacramento County 2013, San Joaquin County 2008a, San Joaquin County 2008b, Solano County 2008a, Solano County 2008b, South Delta Levee Protection and Channel Maintenance Authority 2011, City of Stockton 2011a, City of Stockton 2011b, City of Suisun City 2011, City of Tracy 2011a, City of Tracy 2011b, City of West Sacramento 2010, Yolo County 2010a, Yolo County 2010b.

Planning for Floodplain Land Use

The most important step in reducing risk to people in the Delta is to stop putting more people at risk behind levees that do not meet minimum modern standards for flood protection. Actions that increase the demand for higher public spending on flood risk reduction and exacerbate flood risk (for example, urbanizing floodprone areas) should be discouraged.

The DPC *Land Use and Resource Management Plan for the Primary Zone of the Delta* also includes important policies to limit development in floodprone areas of the Primary Zone:

> *Local governments shall carefully and prudently carry out their responsibilities to regulate new construction within flood hazard areas to protect public health, safety, and welfare. These responsibilities shall be carried out consistent with applicable regulations concerning the Delta, as well as the statutory language contained in the Delta Protection Act of 1992. Increased flood protection shall not result in residential designations or densities beyond those allowed under zoning and general plan designations in place on January 1, 1992, for lands in the Primary Zone. (DPC 2010)*

As noted in Chapter 5, the legacy community of Bethel Island warrants a special note because of its flood hazards. About 2,100 people reside on the island in about 1,300 residences concentrated on the south central shoreline and four mobile home parks. The island, which is below sea level, is surrounded by approximately 15 miles of levees, limiting the drainage of floodwaters in the event of a levee breach. A single road, Bethel Island Road, links the island to the mainland at the city of Oakley, complicating emergency response or evacuation in the event of flooding. Because developments on Bethel Island are proposed to be served by the Bethel Island Municipal Improvement District or other adjacent public services, the entire island is within the urban limit line adopted by Contra Costa voters in 2006. The high flood risks on the island and the restricted evacuation opportunities, however, indicate the island has greater hazards to lives and property than the Delta's other areas designated for development. For this reason, it is not excluded from the Delta Plan policy prohibiting new subdivisions unless adequate flood protection is provided. This is consistent with provisions of the Contra Costa County General Plan, which require that development other than a single home on existing parcels await resolution of several issues, including improvement of the community's public services, levees, and emergency evacuation routes.

As described in Chapter 5, urban residential, commercial, and industrial uses should be located in cities, other urban areas, and their spheres of influence, where strong levees can be provided, rather than in rural lands protected only by nonproject levees. Outside of these urban and urbanizing areas and the legacy communities, the Delta Plan prohibits major subdivisions of five or more parcels where 200-year flood protection is not available. Recognizing legacy community needs for incidental growth to maintain their unique cultural values, development within community boundaries should continue consistent with existing general plans, and federal and local flood protection laws. Appendix B provides maps of Delta community boundaries. Maintaining most of the Delta in rural, agricultural land use, as described in Chapter 5, complements policies that reduce the number of properties and the population exposed to high flood risks.

Finally, the participation of Delta counties and cities in the National Flood Insurance Program brings with it a requirement that all residential, commercial, agricultural, and industrial buildings comply with FEMA floodproofing standards, including elevating structure ground floors above the 100-year flood elevation. Examples of floodproofing are shown on Figure 7-7.

Examples of Floodproofing

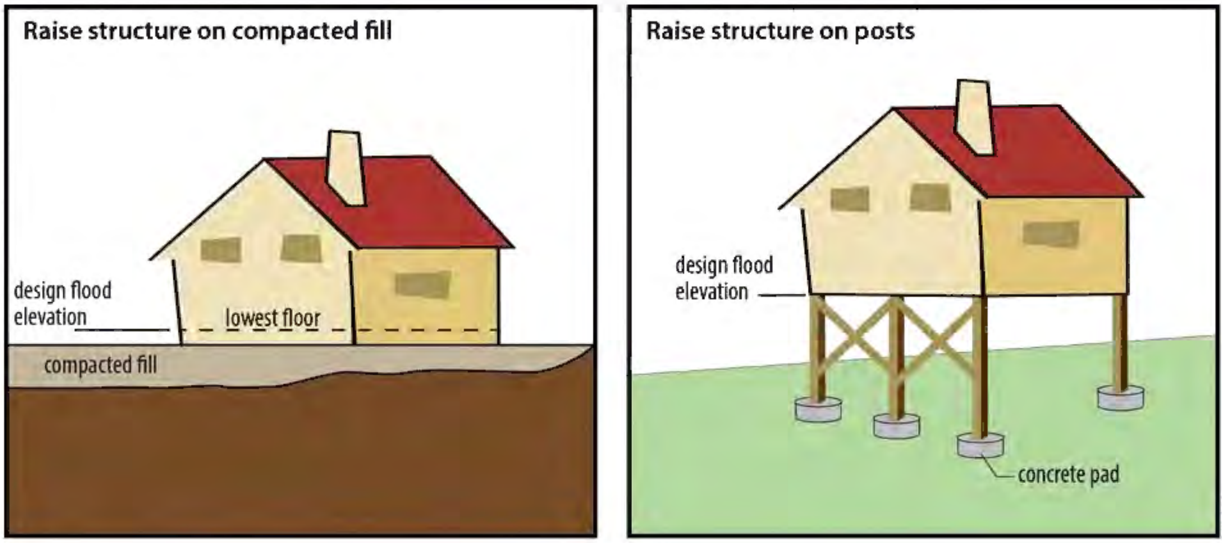


Figure 7-7

Floodproofing in accordance with the National Flood Insurance Program can be achieved through several methods. The illustration on the left shows an example of floodproofing by constructing the lowest floor within a structure above the design flood elevation. The illustration on the right shows floodproofing by raising the bottom of the structure above the design flood elevation.

Source: FEMA 1994; FEMA 2001

Emergency Preparedness and Response

Even with the best-engineered levees, channels, and floodways, a residual risk from flooding will always remain; flood risk can never be eliminated. Although investment in flood protection infrastructure can considerably reduce the likelihood of a catastrophic levee failure, failures are inevitable and will require well-coordinated and carefully developed emergency response efforts. To reduce response time and optimize effectiveness of response efforts, such plans need to leverage the unique capabilities of each agency with a mission in the Delta. This section provides an overview of the agencies and planning involved in emergency preparedness and response in the Delta.

Responsibilities for preparing for, declaring, and responding to flood emergencies are distributed among local, State, and federal agencies. Federal agencies with authority include USACE and FEMA. In California, State and local responsibilities fall to county offices of emergency services, local reclamation districts, Cal EMA, and DWR. In a Delta flood emergency, the response efforts by local and State emergency management professionals are guided by California's Standardized Emergency Management System (SEMS). SEMS was established by Government Code section 8607(a), and provides for effective management of multiagency and multijurisdictional emergencies in California, including flood emergencies. This system consists of five organizational levels, which are activated as necessary: (1) field response, (2) local government, (3) operational area, (4) regional, and (5) State. These levels are activated stepwise as the events warrant additional response and resources, meaning that each level of emergency responder contacts the next level above them should they deem the emergency beyond their capabilities to control. Federal resources are called upon if State resources are exhausted or additional assistance is needed. SEMS incorporates the functions and principles of the Incident Command System, the Master Mutual Aid Agreement, existing mutual aid systems, the operational area concept, and multiagency or interagency coordination. A detailed discussion of SEMS can be found in Cal EMA SEMS Guidelines (Cal EMA 2009). Local governments must use SEMS to be eligible for funding of their response-related personnel costs under State disaster assistance programs.

At the State level, Cal EMA's *California Emergency Plan* is the current guiding plan for all State emergencies. The California Emergency Plan incorporates and complies with the principles and requirements found in federal and State laws, regulations, and guidelines. Cal EMA typically defers to DWR for emergency management during floods. DWR emergency flood management actions are guided by its 2007 *Interim Flood Emergency Operations Plan*. DWR is in the process of developing its Delta Flood Emergency Preparedness Response and Recovery Program (EPRRP), which will be the overall guiding flood emergency management program for DWR activities for project and nonproject levees in the Delta. The Delta Flood EPRRP consists of three components: (1) the plan for flood emergency preparedness, response, and recovery actions in the Delta; (2) multiagency plan coordination, which coordinates DWR's plan with the plans of other Delta flood response agencies; and (3) response facilities implementation, which includes the development of flood emergency response facilities in the Delta.

At the federal level, USACE has a standing All-Hazards Emergency Response Plan and standing contracts for emergency response work in the Delta region, and is ready to assist the State, as requested through PL 84-99. These existing plans and procedures are considered in DWR's flood emergency operations plans and are a critical part of the Delta Flood EPRRP Plan. FEMA is responsible for coordinating the response of several federal agencies to a large natural disaster that overwhelms the resources of State and local authorities. The primary duty of FEMA is to ensure services to disaster victims through operational planning and integrated preparedness measures.

Following a flood disaster, various federal programs can provide disaster assistance. USACE has specific criteria concerning eligibility for assistance under PL 84-99. FEMA's HMP criteria must be met to be eligible for its assistance (Delta Stewardship Council Staff 2010b).

To further address emergency preparedness and response issues in the Delta, the Legislature passed SB 27 (Water Code section 12994.5) to develop and implement multi-hazard preparedness and response strategies for the Delta. This legislation required the Office of Emergency Services (now Cal EMA) to establish the Sacramento-San Joaquin Delta Multi-Hazard Coordination Task Force. Led by Cal EMA, the task force consisted of representatives from the DPC, DWR, and representatives of the five Delta counties. The task force was directed to do the following:

- Make recommendations to the Secretary of Cal EMA relating to the creation of an interagency unified command system organizational framework, in accordance with the guidelines of the National Incident Management System and SEMS.
- Coordinate the development of a draft emergency preparedness and response strategy for the Delta region for submission to the Secretary of Cal EMA. Where possible, the strategy shall use existing interagency plans and planning processes of the involved jurisdictions and agencies that are members of the DPC.
- Develop and conduct all-hazard emergency response exercises and training in the Delta that are designed to test or facilitate implementation of regional coordination protocols.

The recommendations being prepared by the task force will likely play an important role in planning efforts for the Delta, and will be considered in the Delta Plan. When this Delta Plan was written, the task force recommendations had been approved by the Secretary of Cal EMA and forwarded to the Governor.

San Joaquin County has developed flood contingency maps and urban evacuation maps as part of its coordinated flood emergency planning efforts. These maps and plans could be used as an example by other Delta counties, and State and federal agencies to prepare a Delta-wide emergency response plan.

Liability Concerns

USACE and other federal agencies are generally afforded some immunity from liability for damages from flood events under the concept of sovereign immunity and provisions of the Flood Control Act of 1928 (33 United States Code section 702c). Congress provided immunity to federal agencies for some but not all tort damages. However, this immunity does not apply to nonfederal agencies.

As the risks of levee failure and corresponding damage increase, California's courts have generally exposed public agencies, and the State specifically, to significant financial liability for flood damages (DWR 2005). The most notable recent court decision on flood liability was the California Court of Appeal decision in *Paterno v. State of California* (2003) (113 Cal. App. 4th 998). The court found the State was liable for damages caused by the failure of a project levee on the Yuba River that the State did not design, build, or even directly maintain. This decision makes it possible that the State will ultimately be held responsible for the structural integrity of much of the federal flood control system in the Delta and Central Valley. The *Paterno v. State of California* decision will ultimately cost State taxpayers approximately $464 million in awarded damages.

In *Arreola v. County of Monterey* (2002) (99 Cal. App. 4th 722), the court held local agencies and the California Department of Transportation (Caltrans) liable for 1995 flood damages to property owners that resulted from a failure to properly maintain levees of the Pajaro River project.

The California *Draft FloodSAFE Strategic Plan* states, "Local communities are responsible for land use decisions, but generally have not been found liable for failure of the flood protection system. Continued local actions to approve development within floodplains may increase flood risk, even if levees and other flood protection improvements are made. This creates liability issues which the State is concerned about. Legislation passed in 2007 addresses the need to connect land use planning with diligent and factual consideration of flood risks for areas of proposed development" (DWR 2008a).

In 2007, the Legislature amended the Water Code to address local community liability for approving development in floodprone areas. It provides that "a city or county may be required to contribute its fair and reasonable share of the property damage caused by a flood to the extent that the city or county has increased the state's exposure to liability for property damage by unreasonably approving new development in a previously undeveloped area that is protected by a state flood control project" (Water Code sections 8307(a) and (b)).

Ultimately, however, it is important to note that the State does not own, operate, control, or maintain nonproject levees, and does not have authority to do so. The Delta levee subventions program grants financial assistance to local reclamation districts for their levees. The State conducts evaluations to make sure subventions program funds have been spent appropriately, but not to ensure the quality of the work or the stability or structural integrity of nonproject levees. Rather, the nonproject levees are the sole responsibility of the reclamation districts, and the State is not liable for damages caused by their failure.

POLICIES AND RECOMMENDATIONS

These policies and recommendations are based on the Council's core strategies for reducing flood risks in the Delta, which are:

- Improve emergency preparedness and response
- Finance and implement flood management activities
- Prioritize flood management investment
- Improve residential flood protection
- Protect and expand floodways, floodplains, and bypasses
- Integrate Delta levees and ecosystem function
- Limit liability

Reducing flood risks also relies on locating urban development in the Delta's cities where levees are stronger, as discussed in Chapter 5, and retaining rural lands for agriculture, so that development in the most floodprone areas is minimized.

Improve Emergency Preparedness and Response

To effectively and reliably reduce risks to people, property, and State interests in the Delta, a multifaceted strategy of coordinated emergency preparedness, appropriate land use planning, and prioritized investment in flood protection infrastructure is necessary (Water Code sections 85305(a) and 85306). Federal, State, and local governments—and Californians—must be prepared for a variety of emergency situations.

The recommendations prepared by the Sacramento-San Joaquin Delta Multi-Hazard Coordination Task Force will likely play an important role in planning efforts for the Delta, and will be considered by the Council for incorporation in future updates of the Delta Plan.

Problem Statement

Levee failures and flooding can and will place human life and property in danger, and can have potentially significant implications for the State's water supply and infrastructure, and the health of the Delta ecosystem. Appropriate emergency preparedness and response planning and implementation activities need to be initiated.

Policies

No policies with regulatory effect are included in this section.

Recommendations

RR R1. Implement Emergency Preparedness and Response

The following actions should be taken by January 1, 2014, to promote effective emergency preparedness and response in the Delta:

- *Responsible local, State, and federal agencies with emergency response authority should consider and implement the recommendations of the Sacramento-San Joaquin Delta Multi-Hazard Coordination Task Force (Water Code section 12994.5). Such actions should support the development of a regional response system for the Delta.*
- *In consultation with local agencies, the California Department of Water Resources should expand its emergency stockpiles to make them regional in nature and usable by a larger number of agencies in accordance with California Department of Water Resources' plans and procedures. The California Department of Water Resources, as a part of this plan, should evaluate the potential of creating stored material sites by "over-reinforcing" west Delta levees.*
- *Local levee-maintaining agencies should consider developing their own emergency action plans, and stockpiling rock and flood-fighting materials.*
- *State and local agencies, and regulated utilities that own and/or operate infrastructure in the Delta should prepare coordinated emergency response plans to protect the infrastructure from long-term outages resulting from failures of the Delta levees. The emergency procedures should consider methods that also would protect Delta land use and ecosystem.*

Finance and Implement Local Flood Management Activities

The responsibility for securing funding for Delta levee maintenance, repairs, and improvements lies with the numerous local levee-maintaining agencies (primarily reclamation districts). Funding is generated through property assessments of local landowners and also is provided by the State under programs administered by DWR (the Delta Levees Special Flood Control Projects and Delta Levees Maintenance Subventions programs). These programs provide State matching funds for addressing Delta flood risk; however, many other entities that benefit from flood risk management are not assessed, nor do they contribute to maintenance and upkeep of Delta levees, including owners of regional infrastructure that crosses the Delta. The duty of providing for Delta flood risk management should be borne by all entities benefitting from these actions, and an equitable methodology of defining and apportioning assessments should be developed and implemented.

Local levee-maintaining agencies have managed the financing and ongoing maintenance, rehabilitation, and repair of Delta levees, and have improved the levels of levee integrity, reducing overall Delta flood risk. Although financial assistance has been provided by the State over several decades, these programs have most recently been funded exclusively through State general obligation bond financing, which faces an uncertain future. The development of an alternative funding mechanism and authority would provide for a more stable, long-term funding approach in which local participation by all beneficiaries of flood risk management is more broadly incorporated. Propositions 218 (1996) and 26 (2010) raised the approval thresholds for new fees and taxes; these thresholds may make it more difficult for a proposed regional assessment district to gain revenue authority.

The establishment of a regional flood risk management district with fee assessment authority could address a variety of Delta flood risk-related activities, including levee maintenance and improvements; regional flood management planning; flood facilities inspections; data collection; risk notification; and emergency preparedness planning, response, and mitigation. Establishing a more centralized and responsive entity could provide a mechanism for addressing issues at the individual district level and for the Delta region overall for the long term.

Problem Statement

No mechanism exists for ensuring that costs of levee maintenance are borne by all beneficiaries. Current financing of levee operations and maintenance is not well coordinated, and future funding sources are uncertain. Financing of local levee operations, maintenance, emergency preparedness and response, and related data collection and reporting efforts would benefit from greater coordination and integration.

Policies

No policies with regulatory effect are included in this section.

Recommendations

RR R2. Finance Local Flood Management Activities

The Legislature should create a Delta Flood Risk Management Assessment District with fee assessment authority (including over State infrastructure) to provide adequate flood control protection and emergency response for the regional benefit of all beneficiaries, including landowners, infrastructure owners, and other entities that benefit from the maintenance and improvement of Delta levees, such as water users who rely on the levees to protect water quality.

This district should be authorized to:

- *Identify and assess all beneficiaries of Delta flood protection facilities.*
- *Develop, fund, and implement a regional plan of flood management for both project and nonproject levees of the Delta, including the maintenance and improvement of levees, in cooperation with the existing reclamation districts, cities, counties, and owners of infrastructure and other interests protected by the levees.*
- *Require local levee-maintaining agencies to conduct annual levee inspections per the California Department of Water Resources subventions program guidelines, and update levee improvement plans every 5 years.*
- *Participate in the collection of data and information necessary for the prioritization of State investments in Delta levees consistent with RR P1.*
- *Notify residents and landowners of flood risk, personal safety information, and available systems for obtaining emergency information before and during a disaster on an annual basis.*
- *Potentially implement the recommendations of the Sacramento-San Joaquin Delta Multi-Hazard Coordination Task Force (Water Code section 12994.5) in conjunction with local, State, and federal agencies, and maintain the resulting regional response system and components and procedures on behalf of SEMS jurisdictions (reclamation district, city, county, and State) that would jointly implement the regional system in response to a disaster event.*
- *Identify and assess critical water supply corridor levee operations, maintenance, and improvements.*

RR R3. Fund Actions to Protect Infrastructure from Flooding and Other Natural Disasters

- *The California Public Utilities Commission should immediately commence formal hearings to impose a reasonable fee for flood and disaster prevention on regulated privately owned utilities with facilities located in the Delta. Publicly owned utilities should also be encouraged to develop similar fees. The California Public Utilities Commission, in consultation with the Delta Stewardship Council, the California Department of Water Resources, and the Delta Protection Commission, should allocate these funds among State and local emergency response and flood protection entities in the Delta. If a new regional flood management agency is established by law, a portion of the local share would be allocated to that agency.*
- *The California Public Utilities Commission should direct all regulated public utilities in their jurisdiction to immediately take steps to protect their facilities in the Delta from the consequences of a catastrophic failure of levees in the Delta, to minimize the impact on the State's economy.*
- *The Governor, by Executive Order, should direct State agencies with projects or infrastructure in the Delta to set aside a reasonable amount of funding to pay for flood protection and disaster prevention. The local share of these funds should be allocated as described above.*

Prioritize Flood Management Investment

A method is needed for prioritizing State funds for use in operating, maintaining, and improving Delta levees with a systemwide approach. Although the State has expended millions of dollars since the early 1970s on Delta levees, almost half of the Delta's acreage is not protected by levees that meet the HMP guidance today. Efforts by landowners, reclamation districts, and other parties using local resources to perform levee upgrades, beyond the standards that may be funded by the State, are encouraged and would be consistent with the goal of reducing Delta flood risk. The Delta Reform Act provides that activities of the Council in determining priorities for State investments in Delta levees do not increase the State's liability for flood protection in the Delta or its watershed.

Problem Statement

The Delta Reform Act (Water Code section 85306) requires the Delta Plan to recommend priorities for State investments in Delta levees, including project and nonproject levees. Currently, no comprehensive method exists to prioritize State investments in Delta levee operations, maintenance, and improvement projects. Without a prioritization methodology, the apportionment of public resources into levees may not occur in a manner that reflects a broader, long-term approach.

Policies

RR P1. Prioritization of State Investments in Delta Levees and Risk Reduction

(a) Prior to the completion and adoption of the updated priorities developed pursuant to Water Code section 85306, the interim priorities listed below shall, where applicable and to the extent permitted by law, guide discretionary State investments in Delta flood risk management. Key priorities for interim funding include emergency preparedness, response, and recovery as described in paragraph (1), as well as Delta levees funding as described in paragraph (2).

(1) Delta Emergency Preparedness, Response, and Recovery: Develop and implement appropriate emergency preparedness, response, and recovery strategies, including those developed by the Delta Multi-Hazard Task Force pursuant to Water Code section 12994.5.

(2) Delta Levees Funding: The priorities shown in the following table are meant to guide budget and funding allocation strategies for levee improvements. The goals for funding priorities are all important, and it is expected that over time, the California Department of Water Resources must balance achievement of those goals. Except on islands planned for ecosystem restoration, improvement of nonproject Delta levees to the Hazard Mitigation Plan (HMP) standard may be funded without justification of the benefits. Improvements to a standard above HMP, such as that set by the U.S. Army Corps of Engineers under Public Law 84-99, may be funded as befits the benefits to be provided, consistent with the California Department of Water Resources' current practices and any future adopted investment strategy.

Priorities for State Investment in Delta Integrated Flood Management Categories of Benefit Analysis

Goals	Localized Flood Protection	Levee Network	Ecosystem Conservation
1	Protect existing urban and adjacent urbanizing areas by providing 200-year flood protection.	Protect water quality and water supply conveyance in the Delta, especially levees that protect freshwater aqueducts and the primary channels that carry fresh water through the Delta.	Protect existing and provide for a net increase in channel-margin habitat.
2	Protect small communities and critical infrastructure of statewide importance (located outside of urban areas).	Protect floodwater conveyance in and through the Delta to a level consistent with the State Plan of Flood Control for project levees.	Protect existing and provide for net enhancement of floodplain habitat.
3	Protect agriculture and local working landscapes.	Protect cultural, historic, aesthetic, and recreational resources (Delta as Place).	Protect existing and provide for net enhancement of wetlands.

(b) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers a proposed action that involves discretionary State investments in Delta flood risk management, including levee operations, maintenance, and improvements. Nothing in this policy establishes or otherwise changes existing levee standards.

23 CCR Section 5012
NOTE: Authority cited: Section 85210(i), Water Code.
Reference: Sections 85020, 85300, 85305, and 85306, Water Code.

Recommendations

RR R4. Actions for the Prioritization of State Investments in Delta Levees

The Delta Stewardship Council, in consultation with the California Department of Water Resources, the Central Valley Flood Protection Board, the Delta Protection Commission, local agencies, and the California Water Commission, should develop funding priorities for State investments in Delta levees by January 1, 2015. These priorities shall be consistent with the provisions of the Delta Reform Act in promoting effective, prioritized strategic State investments in levee operations, maintenance, and improvements in the Delta for both levees that are a part of the State Plan of Flood Control and nonproject levees. Upon completion, these priorities shall be considered for incorporation into the Delta Plan.

The priorities should identify guiding principles, constraints, recommended cost share allocations, and strategic considerations to guide Delta flood risk reduction investments, supported by, at a minimum, the following actions to be conducted by the California Department of Water Resources, consistent with available funding:

- *An assessment of existing Delta levee conditions. This should include the development of a Delta levee conditions map based on sound data inputs, including, but not limited to:*
    - *Geometric levee assessment*
    - *Flow and updated stage-frequency analysis*
- *An island-by-island economics-based risk analysis. This analysis should consider, but not be limited to, values related to protecting:*
    - *Island residents/life safety*
    - *Property*
    - *Value of Delta islands' economic output, including agriculture*
    - *State water supply*
    - *Critical local, State, federal, and private infrastructure, including aqueducts, state highways, electricity transmission lines, gas/petroleum pipelines, gas fields, railroads, and deep water shipping channels*
    - *Delta water quality*
    - *Existing ecosystem values and ecosystem restoration opportunities*
    - *Recreation*
    - *Systemwide integrity*
- *An ongoing assessment of Delta levee conditions. This should include a process for updating Delta levee assessment information on a routine basis.*

This methodology should provide the basis for the prioritization of State investments in Delta levees. It should include, but not be limited to, the public reporting of the following items:

- *Tiered ranking of Delta islands, based on economics-based risk analysis values*
- *Delta levee conditions status report, including a levee conditions map*
- *Inventory of Delta infrastructure assets*

Improve Residential Flood Protection

To reduce the risk to lives, property, and State interests in the Delta, additional standards are needed to address new residential development. Sea level rise, subsidence, and new residential development combine to potentially put many more lives at risk. The policies in this section are designed to reduce risk while preserving the Delta's unique character and agricultural way of life. These policies should be construed as those required to provide the minimum level of flood protection, and should not be viewed as encouraging development in floodprone Delta areas. Flood insurance, and awareness of local emergency preparedness and response policies is strongly encouraged for all who live in floodprone areas of the Delta.

Consistent with existing law, urban development in the Primary Zone should remain prohibited. Urban development in the Secondary Zone should be confined to existing urban spheres of influence where the 200-year design standard will be fully implemented by 2025. The 2007 flood risk management legislation (SB 5) contained provisions affecting city and county responsibilities relating to local planning requirements, such as general plans, development agreements, zoning ordinances, tentative maps, and other actions (Government Code sections 65865.5, 65962, and 66474.5). Future land use decisions should not permit or encourage construction of significant numbers of new residences in the nonurban Delta. For the legacy communities in the Delta, structures developed in these areas are required to meet the legal standard of a 100-year minimum level of flood protection. However, developing and maintaining adequate flood protection remains difficult.

Problem Statement

Continued residential development without adequate flood protection increases risk to lives, property, and State interests in the Delta. Flood risks are expected to grow in light of anticipated climate change effects related to peak flows and sea level rise.

Policies

The appendices referred to in the policy language below are included in Appendix B of the Delta Plan.

RR P2. Require Flood Protection for Residential Development in Rural Areas

(a) New residential development of five or more parcels shall be protected through floodproofing to a level 12 inches above the 100-year base flood elevation, plus sufficient additional elevation to protect against a 55-inch rise in sea level at the Golden Gate, unless the development is located within:

(1) Areas that city or county general plans, as of May 16, 2013, designate for development in cities or their spheres of influence;

(2) Areas within Contra Costa County's 2006 voter-approved urban limit line, except Bethel Island;

(3) Areas within the Mountain House General Plan Community Boundary in San Joaquin County; or

(4) The unincorporated Delta towns of Clarksburg, Courtland, Hood, Locke, Ryde, and Walnut Grove, as shown in Appendix 7.

(b) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers a proposed action that involves new residential development of five or more parcels that is not located within the areas described in subsection (a).

23 CCR Section 5013
NOTE: Authority cited: Section 85210(i), Water Code.
Reference: Sections 85020, 85300, 85305, and 85306, Water Code.

Protect and Expand Floodways, Floodplains, and Bypasses

Local land use policies guiding development in floodways are not consistent across Delta counties. Floodways have not been established for many of the channels in the Delta by FEMA or by the CVFPB. In light of these inconsistencies, the Delta Plan addresses these issues and highlights the need for the protection of floodplains and floodways consistent with improved flood protection. Over the next 100 years, Delta floodways may expand and deepen because of sea level rise and changing precipitation patterns. Development in existing or potential future designated floodplain or bypass locations in the Delta or upstream of the Delta can permanently eliminate the availability of these areas for future floodplain usage. It is important to identify floodplain areas now for immediate protection and eventual integration into the flood protection system.

Problem Statement

The carrying capacity of the existing flood control system is diminished by encroachments into floodways, critical floodplains, and existing floodplain or bypass locations in the Delta. Local land use policies guiding development in floodways are not consistent across Delta counties. The existing system is already at suboptimal capacity. Expected changes in sea level rise and runoff patterns due to climate change are expected to exacerbate the problem.

Policies

RR P3. Protect Floodways

(a) *No encroachment shall be allowed or constructed in a floodway, unless it can be demonstrated by appropriate analysis that the encroachment will not unduly impede the free flow of water in the floodway or jeopardize public safety.*

(b) *For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers a proposed action that would encroach in a floodway that is not either a designated floodway or regulated stream.*

23 CCR Section 5014
NOTE: Authority cited: Section 85210(i), Water Code.
Reference: Sections 85020, 85300, 85302, and 85305, Water Code.

RR P4. Floodplain Protection

(a) *No encroachment shall be allowed or constructed in any of the following floodplains unless it can be demonstrated by appropriate analysis that the encroachment will not have a significant adverse impact on floodplain values and functions:*

(1) *The Yolo Bypass within the Delta;*

(2) *The Cosumnes River-Mokelumne River Confluence, as defined by the North Delta Flood Control and Ecosystem Restoration Project (McCormack-Williamson), or as modified in the future by the California Department of Water Resources or the U.S. Army Corps of Engineers (California Department of Water Resources 2010); and*

(3) *The Lower San Joaquin River Floodplain Bypass area, located on the Lower San Joaquin River upstream of Stockton immediately southwest of Paradise Cut on lands both upstream and downstream of the Interstate 5 crossing. This area is described in the Lower San Joaquin River Floodplain Bypass Proposal, submitted to the California Department of Water Resources by the partnership of the South Delta Water Agency, the River Islands Development Company, Reclamation District 2062, San Joaquin Resource Conservation District, American Rivers, the American Lands Conservancy, and the Natural Resources Defense Council, March 2011. This area may be modified in the future through the completion of this project.*

(b) *For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers a proposed action that would encroach in any of the floodplain areas described in subsection (a).*

(c) *This policy is not intended to exempt any activities in any of the areas described in subsection (a) from applicable regulations and requirements of the Central Valley Flood Protection Board.*

23 CCR Section 5015
NOTE: Authority cited: Section 85210(i), Water Code.
Reference: Sections 85020, 85300, 85302, and 85305, Water Code.

Recommendations

RR R5. Fund and Implement San Joaquin River Flood Bypass

The Legislature should fund the California Department of Water Resources and the Central Valley Flood Protection Board to evaluate and implement a bypass and floodway on the San Joaquin River near Paradise Cut that would reduce flood stage on the mainstem San Joaquin River adjacent to the urban and urbanizing communities of Stockton, Lathrop, and Manteca in accordance with Water Code section 9613(c).

RR R6. Continue Delta Dredging Studies

The current efforts to maintain navigable waters in the Sacramento River Deep Water Ship Channel and Stockton Deep Water Ship Channel, led by the U.S. Army Corps of Engineers and described in the Delta Dredged Sediment Long-Term Management Strategy (USACE 2007, Appendix K), should be continued in a manner that supports the Delta Plan and the coequal goals. Appropriate dredging throughout other areas in the Delta for maintenance purposes, or that would increase flood conveyance and provide potential material for levee maintenance or subsidence reversal should be implemented in a manner that supports the Delta Plan and coequal goals. Coordinated use of dredged material in levee improvement, subsidence reversal, or wetland restoration is encouraged.

RR R7. Designate Additional Floodways

The Central Valley Flood Protection Board should evaluate whether additional areas both within and upstream of the Delta should be designated as floodways. These efforts should consider the anticipated effects of climate change in its evaluation of these areas.

Integrate Delta Levees and Ecosystem Function

Setback levees can provide additional levee system stability, more complex land-water interface structure, and shaded riverine aquatic habitat that benefit ecosystem function in appropriate settings. They can also provide flood control benefits in those areas of the Delta not subject to strong tidal influences where channel capacity improvements can actually increase flood-carrying capacity. Not all locations are amenable or useful for setback levee placement. Each site should be investigated for its potential to provide ecological benefits consistent with levee integrity.

Problem Statement

Criteria for the development and implementation of setback levees in the Delta have not yet been developed by relevant agencies. These criteria are needed to provide appropriate guidance when considering setback levee siting and design. Currently, agencies have no consistent method for determining the appropriateness of setback levee incorporation as they relate to habitat enhancement and flood control benefit.

Policies

No policies with regulatory effect are included in this section.

Recommendations

RR R8. Develop Setback Levee Criteria

The California Department of Water Resources, in conjunction with the Central Valley Flood Protection Board, the California Department of Fish and Game, and the Delta Conservancy, should develop criteria to define locations for future setback levees in the Delta and Delta watershed.

Limit State Liability

The Delta Reform Act requires that the Delta Plan attempt to reduce risks to people, property, and State interests in the Delta by, among other things, recommending priorities for State investments in levee operation, maintenance, and improvements in the Delta, including project and nonproject levees (Water Code sections 85305, 85306, and 85307). The law expressly states that these provisions do not affect the liability of the State for flood protection in the Delta or its watershed (Water Code section 85032(j)). Consequently, no action taken by a State agency as required or recommended by, or otherwise in furtherance of, this Delta Plan shall affect State flood protection liability in the Delta or its watershed. Therefore, the Legislature should consider requiring an adequate level of flood insurance for residences, businesses, and industries in floodprone areas.

Problem Statement

As the risks of levee failure and corresponding damage increase, California courts have generally exposed public agencies and the State, specifically, to significant financial liability for flood damages. DWR's 2005 white paper recommends one way that the State should reduce its liability is to require houses and businesses to have flood insurance (DWR 2005).

Policies

No policies with regulatory effect are included in this section.

Recommendations

RR R9. Require Flood Insurance

The Legislature should require an adequate level of flood insurance for residences, businesses, and industries in floodprone areas.

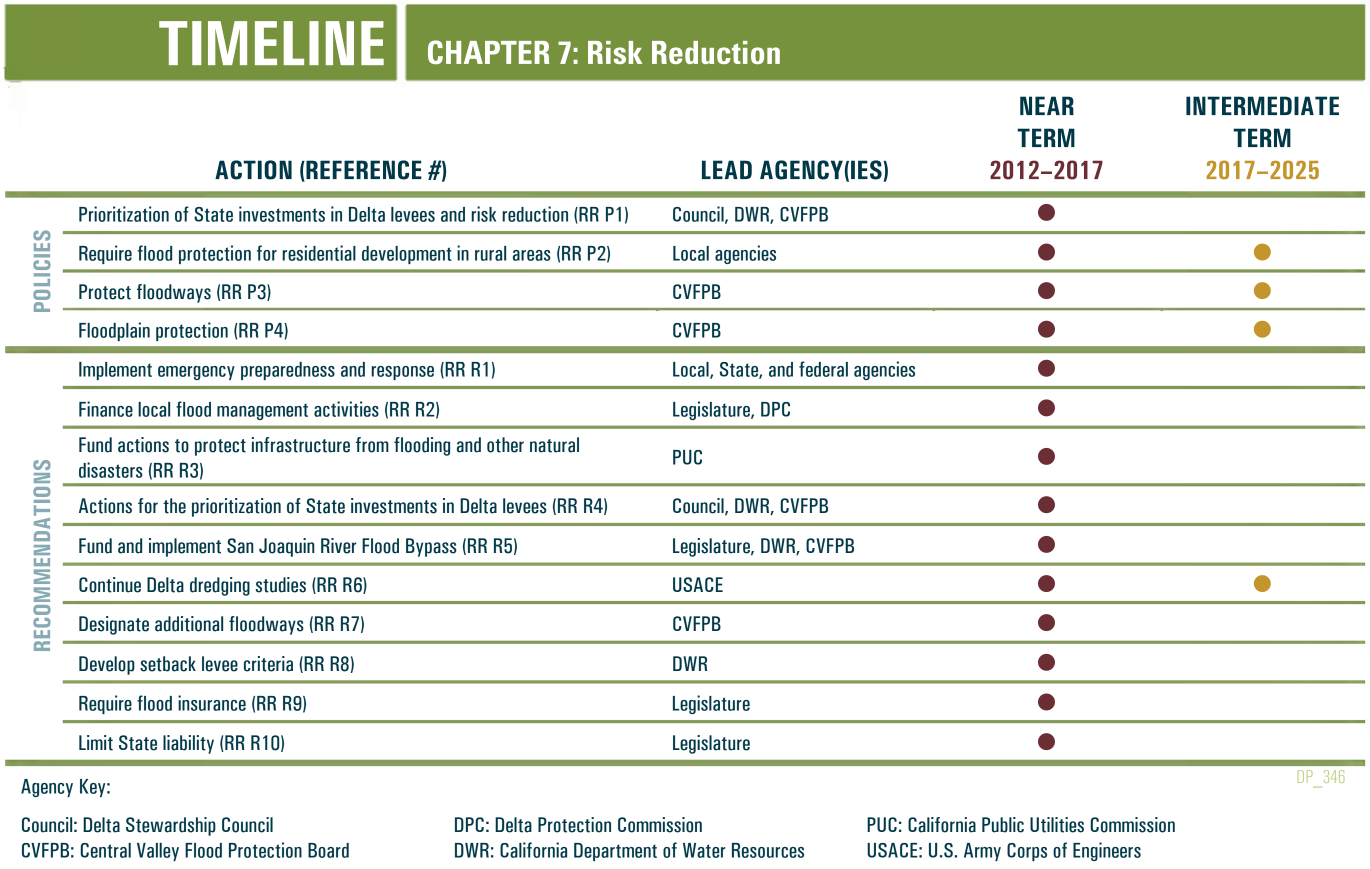
RR R10. Limit State Liability

The Legislature should consider statutory and/or constitutional changes that would address the State's potential flood liability, including giving State agencies the same level of immunity with regard to flood liability as federal agencies have under federal law.

Timeline for Implementing Policies and Recommendations

Figure 7-8 lays out a timeline for implementing the policies and recommendations described in the previous section. The timeline emphasizes near-term and intermediate-term actions.

Timeline for Implementing Policies and Recommendations



TIMELINE CHAPTER 7: Risk Reduction

	ACTION (REFERENCE #)	LEAD AGENCY(IES)	NEAR TERM 2012–2017	INTERMEDIATE TERM 2017–2025
POLICIES	Prioritization of State investments in Delta levees and risk reduction (RR P1)	Council, DWR, CVFPB	●	
	Require flood protection for residential development in rural areas (RR P2)	Local agencies	●	●
	Protect floodways (RR P3)	CVFPB	●	●
	Floodplain protection (RR P4)	CVFPB	●	●
RECOMMENDATIONS	Implement emergency preparedness and response (RR R1)	Local, State, and federal agencies	●	
	Finance local flood management activities (RR R2)	Legislature, DPC	●	
	Fund actions to protect infrastructure from flooding and other natural disasters (RR R3)	PUC	●	
	Actions for the prioritization of State investments in Delta levees (RR R4)	Council, DWR, CVFPB	●	
	Fund and implement San Joaquin River Flood Bypass (RR R5)	Legislature, DWR, CVFPB	●	
	Continue Delta dredging studies (RR R6)	USACE	●	●
	Designate additional floodways (RR R7)	CVFPB	●	
	Develop setback levee criteria (RR R8)	DWR	●	
	Require flood insurance (RR R9)	Legislature	●	
	Limit State liability (RR R10)	Legislature	●	

Agency Key:

Council: Delta Stewardship Council
CVFPB: Central Valley Flood Protection Board
DPC: Delta Protection Commission
DWR: California Department of Water Resources
PUC: California Public Utilities Commission
USACE: U.S. Army Corps of Engineers

Figure 7-8

Issues for Future Evaluation and Coordination

The following list of issues should be considered in future updates of the Delta Plan. These and other issues will need to be considered as additional information and materials become available. The various activities called for in this Delta Plan, as well as issues that arise from other planning efforts, such as the Central Valley Flood Protection Plan, will be considered. Additional areas of interest and concern related to flood risk in the Delta may deserve consideration in the development of future Delta Plan updates, including:

- **Reoperation of Upstream Reservoirs and Peak Flow Attenuation:** Reservoir operations upstream of the Delta can have substantial impacts on flood flows through the Delta; therefore, operation procedures among government agencies should be well coordinated and, where possible, focused more on flexibility to prevent flooding in the Delta. Water Code section 85309 directs DWR to develop a proposal to coordinate flood and water supply operations with appropriate State and federal agencies, and this shall be considered by the Council for future inclusion in the Delta Plan.
- **Utility Corridor Consolidation:** An attempt to consolidate infrastructure into "utility corridors" as facilities are added and upgraded over time should be further investigated to determine whether this can allow for better management of flood risk consequences to these critical assets.
- **State Highways and Sea Level Rise:** The Council will consult with Caltrans regarding the potential effects of climate change and sea level rise on the three state highways that cross the Delta (Water Code section 85307 (c)).

Science and Information Needs

The Delta system and its influencing factors are not static; therefore, research is needed to better understand dynamic issues such as climate change, seismicity, sea level rise, subsidence, and other areas. Continuing investigations into the science, engineering, and economic aspects of the Delta are critical to adaptively managing for expected and unexpected changes, and can provide decision makers and stakeholders with key information for future planning and decision making. Specifically, additional information will be needed in the following areas:

- The interaction between Delta levees and ecosystem function
- Sea level rise: impacts on, and incorporation into, flood risk reduction standards
- Climate change: effects of altered hydrology on levee system integrity
- Effects of seismicity on levee integrity
- Updated flood stage-probability functions
- Potential for subsidence reversal and carbon sequestration from growing native marsh plants
- Understanding the impacts on Delta flood management from upstream flood management infrastructure operations, including reservoir operations
- Technologies for assessing levee integrity

Efforts to address these needs and others that arise during Delta Plan implementation should be undertaken in a systematic fashion so that information developed and lessons learned can be incorporated into future Delta Plan updates.

Performance Measures

Development of informative and meaningful performance measures is a challenging task that will continue after the adoption of the Delta Plan. Performance measures need to be designed to capture important trends and to address whether specific actions are producing expected results. Efforts to develop and track performance measures in complex and large-scale systems like the Delta are commonly multiyear endeavors. The recommended output and outcome performance measures listed below are provided as examples and subject to refinement as time and resources allow. Final administrative performance measures are listed in Appendix E and will be tracked as soon as the Delta Plan is completed.

Output Performance Measures

- New residential development takes into account sea level rise in flood protection planning and development. (RR P2)
- Delta land acreage and the number of reclamation districts with levees below HMP are reduced. (RR P1)
- Freshwater aqueducts passing through the Delta and the primary freshwater channel pathways through the Delta are protected by levees that provide adequate protection against floods and other risks of failure. (RR P1)
- Responsible local, State, and federal agencies with emergency response authority implement the recommendations of the Sacramento-San Joaquin Delta Multi-Hazard Coordination Task Force (Water Code section 12994.5). (RR R1)
- DWR and the CVFPB construct a bypass and floodway on the San Joaquin River near Paradise Cut. (RR R5)

Outcome Performance Measures

- No lives are lost in the Delta as a result of flood emergencies, and economic damages associated with Delta flood emergencies decrease. (RR R1)
- Emergency response and recovery costs are eligible for FEMA reimbursement. (RR P1)
- Water deliveries to East Bay Municipal Utilities District, Contra Costa Water District, the CVP, and the SWP are not interrupted by floods or earthquakes. (RR P1)

References

California Climate Action Team. 2010. *State of California Sea-Level Rise Interim Guidance Document.* Developed by the Sea-Level Rise Task Force of the Coastal and Ocean Working Group, with science support provided by the Ocean Protection Council's Science Advisory Team and the California Ocean Science Trust. October.

Cal EMA (California Emergency Management Agency). 2009. *SEMS Guidelines: Standard Emergency Management System.* November.

Cal EMA and FEMA (California Emergency Management Agency and Federal Emergency Management Agency). 2010. *Memorandum of Understanding Regarding Criteria for Public Assistance Eligibility for Reclamation Districts in the Sacramento/San Joaquin Legal Delta.* February.

California Ocean Protection Council. 2011. *Resolution of the California Ocean Protection Council on Sea Level Rise.* Adopted March 11.

City of Benicia. 2003. General Plan land use designations within Suisun Marsh. Digitized into GIS format by AECOM from City of Benicia Land Use map in 2012.

City of Fairfield. 2008. General Plan land use designations within Suisun Marsh. Received from the City of Fairfield in 2012.

City of Lathrop. 2012. General Plan Land Use map for the City of Lathrop. October. Site accessed March 14, 2013. http://www.ci.lathrop.ca.us/cdd/documents/.

City of Manteca. 2012. General Plan land use designations in GIS format. Received by Eryn Pimentel, AECOM, from Jeffrey Davis, City of Manteca, on September 4.

City of Rio Vista. 2001. General Plan land use designations in electronic non-GIS format. http://www.riovistacity.com/images/Documents/chapter_04.pdf. Accessed 2009.

City of Sacramento. 2008. General Plan land use designations in electronic GIS format. Site accessed 2009. http://www.cityofsacramento.org/gis/data.html.

City of Stockton. 2011a. GIS layers for city spheres of influence. Site accessed April 14, 2011. http://www.stocktongov.com/services/gis/mapdatDat.html.

City of Stockton. 2011b. General Plan land use designations in GIS format and General Plan land use designations within Suisun Marsh (digitized into GIS format by AECOM from Land Use map in 2012). Site accessed April 14, 2011. http://www.stocktongov.com/services/gis/mapdatDat.html.

City of Suisun City. 2011. General Plan land use designations within Suisun Marsh. Digitized into GIS format by AECOM from Land Use map in 2012.

City of Tracy. 2011a. General Plan land use designations provided in GIS format. Delivered via file transfer protocol from Victoria Lombardo, Senior Planner, City of Tracy, to Jessica Law, Urban and Environmental Planner, AECOM, on March 10, 2011.

City of Tracy. 2011b. City of Tracy SOI provided in GIS format. Delivered via file transfer protocol from Victoria Lombardo, Senior Planner, City of Tracy, to Jessica Law, Urban and Environmental Planner, AECOM, on March 10, 2011.

City of West Sacramento. 2010. General Plan land use designations in GIS format. Site accessed December 28, 2010. http://www.cityofwestsacramento.org/services/gis/downloads.cfm.

Contra Costa County. 2008. GIS layer for Urban Limit Line for Contra Costa County. October. Site accessed June 27, 2011. http://ccmap.us/Details/asp?Product=134490.

Contra Costa County. 2010. GIS layer for City Spheres of Influence in Contra Costa County. January. Site accessed January 28, 2011. https://www.ccmap.us/catalog.asp?UserChoice=2&Layercntrl=0000000000000000000000.

Delta Stewardship Council Staff. 2010a. *Flood Risk White Paper*. October 18. http://deltacouncil.ca.gov/docs/delta-plan/2010-10-18/flood-risk-white-paper.

Delta Stewardship Council Staff. 2010b. *Emergency Preparedness and Response White Paper.* November 10. http://deltacouncil.ca.gov/sites/default/files/documents/files/Delta_Emergency_Management_White_Paper_2011_11_08.pdf.

Delta Vision Blue Ribbon Task Force. 2008. *Delta Vision Strategic Plan.* Sacramento, CA. October.

Deverel, S. and D. Leighton. 2010. Historic, Recent, and Future Subsidence, Sacramento–San Joaquin Delta, California, USA. *San Francisco Estuary and Watershed Science.* August.

DPC (Delta Protection Commission). 2012. *Economic Sustainability Plan for the Sacramento-San Joaquin Delta.* January 19.

DPC (Delta Protection Commission). 2010. *Land Use and Resource Management Plan for the Primary Zone of the Delta.* Adopted February 25.

DWR (California Department of Water Resources). 1973. Bulletin 69-72. California High Water 1971-72.

DWR (California Department of Water Resources). 1980. Seismicity hazards in the Sacramento-San Joaquin Delta. Central District. C-105124. October.

DWR (California Department of Water Resources). 2005. *Flood Warnings: Responding to California's Flood Crisis.* White paper. http://www.water.ca.gov/pubs/flood/flood_warnings___responding_to_california's_flood_crisis/011005floodwarnings.pdf.

DWR (California Department of Water Resources). 2008a. *Draft FloodSAFE Strategic Plan.* May 28.

DWR (California Department of Water Resources). 2008b. *Delta Risk Management Strategy (DRMS) 30 Phase 1, Risk Analysis Report, Final.* Prepared by URS Corporation/Jack R. Benjamin & 31 Associates, Inc. Prepared for DWR, USACE, and California Department of Fish and Game. December. http://www.water.ca.gov/floodmgmt/dsmo/sab/drmsp/phase1_information.cfm.

DWR (California Department of Water Resources). 2008c. *Managing an Uncertain Future: Climate Change Adaptation 13 Strategies for California's Water.* Sacramento, CA.

DWR (California Department of Water Resources). 2009. *Delta Risk Management Strategy Final Phase 1 Report.* March.

DWR (California Department of Water Resources). 2010. *North Delta Flood Control and Ecosystem Restoration Project Final Environmental Impact Report.* Sacramento, CA. October.

DWR (California Department of Water Resources). 2011a. *Delta Risk Management Strategy Phase 2 Report.* June.

DWR (California Department of Water Resources). 2011b. *Draft Urban Levee Design Criteria.* November 15.

DWR (California Department of Water Resources). 2011c. *Central Valley Flood Protection Plan* (Public Draft). December.

DWR (California Department of Water Resources). 2011d. Floodplain inundation and floodways in the vicinity of the Sacramento-San Joaquin delta.

DWR (California Department of Water Resources). 2011e. Locations and attributes of levees in California as maintained by the DWR California Levee Database.

DWR (California Department of Water Resources). 2012. *Report to Delta Stewardship Council on the Department of Water Resources' Delta Levees Program.* March 15.

DWR and DFG (California Department of Water Resources and California Department of Fish and Game). 2008. *A Report Pursuant to Requirements of Assembly Bill 1200, Laird, Risks and Options to Reduce Risks to Fishery and Water Supply Uses of the Sacramento/San Joaquin Delta.* January.

FEMA (Federal Emergency Management Agency). 1994. Mitigation of Flood and Erosion Damage to Residential Buildings in Coastal Areas. FEMA 257. October.

FEMA (Federal Emergency Management Agency). 2001. *Ensuring that Structures Built on Fill In or Near Special Flood Hazard Areas Are Reasonably Safe from Flooding in Accordance with the National Flood Insurance Program.* FIA-TB-10. May.

FEMA (Federal Emergency Management Agency). 2006. *National Flood Insurance Program (NFIP) Floodplain Management Requirements: A Study Guide and Desk Reference for Local Officials.* Unit 3: NFIP Flood Studies and Maps. Figure 3-6. Site accessed July 7, 2011. http://www.fema.gov/library/viewRecord.do?id=2165.

Healey, M., and J. Mount. 2007. *Delta Levees and Ecosystem Function.* CALFED Bay-Delta Program.

Jones & Stokes. 2007. *Draft Environmental Impact Report North Delta Flood Control and Ecosystem Restoration Project.* Volume 2-Figures. November.

Miller, Robin. 2008. *Subsidence Reversal in a Re-established Wetland in the Sacramento-San Joaquin Delta, California, USA.* U.S. Geological Survey.

Mount, J., and R. Twiss. 2005. *Subsidence, Sea Level Rise, Seismicity in the Sacramento–San Joaquin Delta.*

Mountain House Community Services District. 2008. Mountain House Zoning map. September 18, 2008. Site accessed July 27, 2011. http://www.ci.mountainhouse.ca.us/master-plan.asp.

MWD (Metropolitan Water District of Southern California). 2010. 6.5 Magnitude Earthquake Causing 20-Island Failure. Modeling and graphics developed by Resource Management Associates and 34 North for the Metropolitan Water District of Southern California.

National Committee on Levee Safety. 2009. *Draft: Recommendations for a National Levee Safety Program.* January 15. http://www.nfrmp.us/ncls/docs/NCLS-Recommendation-Report_012009_DRAFT.pdf.

SACOG (Sacramento Area Council of Governments). 2009. GIS layer for Spheres of Influence in SACOG region. December. Site accessed January 28, 2011. http://sacog.org/mapping/clearinghouse/Mapping Center.

Sacramento County. 2011. General Plan land use designations in GIS format. Site accessed 2012. http://www.sacgis.org/GISDataPub/Data/.

Sacramento County. 2012. Letter from Sacramento County to the Delta Stewardship Council, Re: Revised Maps of the Unincorporated Delta Communities. November 20.

Sacramento County. 2013. Sacramento County Online Map, Sacramento County, California. http://generalmap.gis.saccounty.net/JSViewer/county_portal.aspx Accessed March 10, 2013.

Sacramento River Delta Historical Society. 1996. Andrus Island. *Sacramento River Delta Historical Society Newsletter.* Vol. 16, No. 2. December.

San Joaquin County. 2008a. City of Lathrop sphere of influence map. March 4. Site accessed February 3, 2011. http://www.sjgov.org/lafco/SOI%20Maps/Lathrop_Sphere_new%202008.pdf.

San Joaquin County. 2008b. City of Manteca sphere of influence map. October 29. Site accessed February 3, 2011. http://www.co.san-joaquin.ca.us/lafco/Manteca%20MSR/Manteca_Sphere.pdf.

Shields, F.D., and D.H. Gray. 1992. Effects of woody vegetation on sandy levee integrity. Journal of the American Water Resources Association 28:917–931.

Solano County. 2008a. GIS layer for City Spheres of Influence in Solano County. May. Site accessed August 10, 2011. http://regis.solanocounty.com/data.html.

Solano County. 2008b. General Plan land use designations provided in GIS format. Obtained 2009.

South Delta Levee Protection and Channel Maintenance Authority. 2011. *Lower San Joaquin Flood Bypass Proposal.* March.

USACE (U.S. Army Corps of Engineers). 1996. EM 1110-2-1619. *Risk-based Analysis for Flood Damage Reduction Studies.* August 1.

USACE (U.S. Army Corps of Engineers). 2002. *Sacramento and San Joaquin River Basins California Comprehensive Study, Interim Report.* Sacramento District.

USACE (U.S. Army Corps of Engineers). 2006. ER 1105-2-101. *Risk Analysis for Flood Damage Reduction Studies.* January 3.

USACE (U.S. Army Corps of Engineers). 2007. *Delta Dredged Sediment Long-Term Management Strategy (Pinole Shoal Management Area).* Study Work Plan. Management Committee Review Draft. San Francisco District. May 9.

USGS (U.S. Geological Survey). 2011. Atmospheric rivers, floods and the water resources of California. Water 3(2):445-478. http://www.mdpi.com/2073-4441/3/2/445.

Yolo County. 2010a. General Plan land use designations in GIS format. Site accessed 2010. http://www.yolocounty.org/Index.aspx?page=823.

Yolo County. 2010b. Yolo County General Plan 2030 layer provided in GIS format. Delivered via file transfer protocol from Marcus Neuvert, GIS Specialist, Yolo County DITT, to Dillon Cowan, Staff Engineer, CH2M HILL, Inc., on July 1.

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CHAPTER 8

Funding Principles to Support the Coequal Goals

ABOUT THIS CHAPTER

This chapter provides background information on federal, State of California (State), and local spending for water supply, water quality, flood management, and Delta ecosystem purposes. It proposes the development of a comprehensive finance plan to implement the Delta Plan. It also sets forth guiding principles for the development of a finance plan and proposes near-term funding for support of the Delta Protection Commission, Sacramento-San Joaquin Delta Conservancy, and the Delta Stewardship Council (Council).

A 5-year budget is included in Appendix M. And, as described in Chapter 2, successful implementation of the Delta Plan will depend upon many independent agency authorities and actions under the coordination and leadership of the Council.

CHAPTER 8

Funding Principles to Support the Coequal Goals

In establishing the coequal goals, the Delta Reform Act affirmatively reset spending priorities for the Delta ecosystem and water management. Inherent in the coequal goals is a new governance structure (primarily the Council), which the Legislature intended to have the "authority, responsibility, accountability, scientific support, and adequate *and secure funding to achieve these objectives*." The Council was directed to develop a long-term, legally enforceable management plan for the Delta, and in implementing the Delta Plan, to "direct actions across State agencies," in part through the establishment of an Interagency Implementation Committee. Additionally, as addressed in the preceding Delta Plan chapters, the Delta Reform Act set forth a number of policy objectives and other requirements for how the Delta Plan must be developed and what it must contain, ranging from broad guidance on types of projects the Plan should promote, to specific performance measures for evaluating progress on ecosystem restoration. Accordingly, the Council set forth several priority recommendations and regulatory policies, which together make up this Delta Plan.

The Delta Reform Act does not require the development of a financing plan for the implementation of the Delta Plan; however, given the current economic climate, recent uneven funding for water and ecosystem investment, and the critical nature of what is at stake should the coequal goals fail to be achieved, the Council affirmed the need for a financing plan and is committed to its development.

As the Public Policy Institute of California succinctly stated in its 2011 report on water management in California, "Although money alone is not sufficient for successful water management, it is necessary" (Public Policy Institute of California 2011). In introducing any discussion on financing, particularly in the public sector, it is necessary to acknowledge the political and economic context. America is currently suffering a severe recession, and California's economy has fared even worse. The State has experienced a multiyear budget crisis in which annual spending exceeds available revenue. As a result, financing infrastructure and new programs has become immensely challenging for State and local governments.

Today's economic conditions may limit the ability to adequately finance a full range of water and ecosystem improvements necessary to achieve the coequal goals in the near term. However, the planning timeframe for the Delta Plan runs to the year 2100, and decisions on long-term, sustainable financing for water, ecosystem, and flood protection cannot be delayed much longer without grave and expensive consequences. A long planning horizon allows near-term foundational steps to be taken now toward improving the situation and for implementing agencies to stage actions, policies, and projects over time consistent with an adaptive management structure based on science. Additionally, some activities to implement the Delta Plan are currently funded or can be undertaken with no additional cost, and many of the actions called for in the Delta Plan are certain to result in significant long-term cost savings.

Because of the complex nature of the policy issues and of certain funding and finance methods, a comprehensive and supportable Delta Plan finance plan will take time to develop. Thorough research is needed to identify entities that may be assessed user or stressor fees, determine appropriate levels for these fees, establish tiered fee structures, calculate the public benefits, and work through the legal implications of any financing strategy, including the practical effects of Propositions 218 and 26 on State and local financing mechanisms.

Background

Since the CALFED Bay-Delta Program was instituted in 1995 to restore ecological health and improve water management in the Delta, significant expenditures have been made in the Delta. An estimated $400 million has been spent annually, on average, by federal, State, and local water users.

Traditionally, the State has financed water infrastructure with general obligation bonds. These bonds were approved by the voters, and repayment is guaranteed by the State's general taxing power. With respect to State Water Project (SWP) debt, however, even though repayment was secured by taxes, general obligation bonds were paid back primarily by the water contractors. Since 2000, California voters have authorized $19.4 billion in water-related general obligation bonds spread over six separate bonds (LAO 2008). Several of these bonds authorize expenditures for a multitude of purposes, including assorted water projects, parkland acquisition, habitat restoration, and local assistance grants. One benefit of financing water projects with general obligation bonds is that any expenditure made for a public purpose is repaid by taxpayers, the primary beneficiaries. Currently, remaining fund balances for active bond accounts total approximately $2.2 billion out of the authorized total of $19.4 billion, only a portion of which is for Delta-related spending.

Table 8-1 summarizes the current balances for general obligation bonds by individual bond act related to water, ecosystem restoration, and flood protection. It is important to note that these remaining balances are not fungible; that is, statute generally dictates the specific types of projects or programs on which funds can be spent.

Currently scheduled for the November 2014 ballot, the Safe, Clean, and Reliable Drinking Water Supply Act of 2012 would authorize, upon voter approval, the issue and sale of $11.14 billion in general obligation bonds for financing drought relief projects, water supply reliability projects, Delta sustainability projects, water system improvements, watershed and conservation protection programs, groundwater protection and water quality projects, and water recycling projects. Key Delta projects include $2.25 billion for protection of water supplies from catastrophic levee failure, drinking water quality improvements, levee and flood control facilities improvements, lost property tax replacement, ecosystem restoration, and contaminants reduction.

General Obligation Bonds – California (as of January 2013)

TABLE 8-1

Bond Act (Year)	Authorized ($ Thousands)	Committed ($ Thousands)	Balance ($ Thousands)
Proposition 12 (2000)	2,024,486	6,189	18,456
Proposition 13 (2000)	2,103,000	1,823,874	279,126
Proposition 40 (2002)	2,471,600	16,556	26,536
Proposition 50 (2002)	3,382,630	0	0
Proposition 1E (2006)	4,090,000	4,024,354	65,646
Proposition 84 (2006)	5,388,000	5,080,840	307,160
Total	**$19,378,411**	**$17,221,349**	**$2,157,062**

Although general obligation bonds have been an important part of how California has funded water and ecosystem projects in the past, because of the uncertainty regarding voter approval of future bonds, a more sustainable and long-term financing approach for water, ecosystem, flood protection, and related projects is needed. As new revenue sources are developed, the use of revenue bonds may become more prevalent. For example, the SWP routinely sells and redeems revenue bonds to pay the costs of planning and construction, bond interest, and project operating expenses, as do many local agencies.

Federal-level expenditures in California in recent years have declined as grant programs for wastewater treatment in the late 1970s and 1980s expired, and flood control spending was reduced. It is likely that large federal budget deficits for the foreseeable future will preclude any increases in federal funds for California water projects.

Although State-level expenditures for water-related programs and projects in recent years have been almost entirely funded with general obligation bonds, this contrasts somewhat with the financing methods available to local agencies. Although many of these agencies have at times issued general obligation bonds and revenue bonds, it is more common for them to establish stable income streams by charging dedicated fees to ratepayers to pay the costs of infrastructure projects including water treatment and wastewater systems.

The ability of local agencies to fund flood control and stormwater projects, however, is specifically governed by the provisions of Proposition 218, approved by California voters in 1996. Under Proposition 218, direct voter approval by a majority of property owners or a two-thirds vote of the general public is required to raise funds for these purposes. Results of local Proposition 218 elections in recent years have been mixed, with some agencies gaining voter approval and others falling short of funding needed for local projects. For example, Sacramento voters successfully approved new assessments for flood control projects in 2007, but 1 year later, voters in Orinda (East Bay Area) and Burlingame (Bay Area) failed to approve new assessments for the same purpose (Public Policy Institute of California 2011).

A companion measure, Proposition 26, approved by voters in 2010, effectively raised voting requirements for most State and local regulatory fees from a simple majority to a two-thirds majority. Regulatory fees with a broad public purpose are considered taxes and are subject to a two-thirds vote of the Legislature. Local agencies are also required to seek a two-thirds vote of the general public.

The best available information shows that total annual federal, State, and local spending on water and wastewater treatment in California is approximately $24 billion (see Table 8-2). Operations, maintenance, and capital expenditures for water infrastructure consume significant economic resources in California. This total likely includes some overlap, but the expenditures are significant. Other sources cite higher expenditures for some of these categories. During development of the finance plan, this table will be updated to reflect the most recent data.

Bay Delta Conservation Plan

Described in various sections of this Delta Plan, the Bay Delta Conservation Plan (BDCP) is a massive water and ecosystem public works planning process under way in the Delta. The Council supports the completion of the BDCP according to the provisions set forth in the Delta Reform Act. The scope or type of any water facility improvements, related Delta ecosystem mitigation, and other habitat improvements to be included is very preliminary at this time. The BDCP's ongoing planning costs are currently funded by State and federal water contractors. Currently available information from the BDCP indicates that, once it is completed, the first 5 years of implementation will require between $5.7 and $5.9 billion total for capital outlay, of which approximately $5.2 billion is for water conveyance. Additionally, the BDCP estimates that $3.6 billion total plus $46 million annually will be required for Delta ecosystem

Annual Budgets/Expenditures in California for Selected Agencies

TABLE 8-2

Agency	Budget/Expenditures Operating ($ Millions)	Capital ($ Millions)	Source
Local cities, counties, and special districts water	10,100	2,000	California State Controller 2011a, 2011b, 2011c
Local cities, counties, and special districts wastewater	5,400	1,100	California State Controller 2011a, 2011b, 2011c
Local cities, counties, and special districts flood control	1,000	300	California State Controller 2011a, 2011b, 2011c
California Department of Water Resources	2,267	232	California Department of Finance 2012
State Water Resources Control Board	714		California Department of Finance 2012
California Department of Fish and Wildlife	381		California Department of Finance 2012
Bureau of Reclamation	300		Bureau of Reclamation 2008
U.S. Army Corps of Engineers	100	100	U.S. Army Corps of Engineers 2008
Total	**$20,262**	**$3,732**	

restoration (BDCP Steering Committee 2010). The BDCP will include a funding plan that will address estimated implementation costs and sources of funding that will be relied upon to cover these costs. The sidebar, Bay Delta Conservation Plan Costs and Existing Funding Sources, provides additional background information about the BDCP.

Overview of Current State and Federal Delta-related Expenditures

The CALFED Bay-Delta Program was incorporated into the Council in 2010. However, some program elements endure because bond funds are dedicated by law for CALFED purposes. Additionally, the CALFED program is still referenced in federal statutes. For these reasons, an annual cross-cut budget showing State and federal expenditures for active CALFED programs and projects is developed each January.

Because the cross-cut budget includes State and federal expenditure details on all the CALFED programs, those data can be summarized to show expenditures for program elements displayed in the budget. The results are shown in Table 8-3.

Annual State and Federal Expenditures in California by Program Element (2012–2013)

TABLE 8-3

Program Element	California	Federal	Total
Governance	$21,145,596	$20,490,000	$41,635,596
Water Supply Reliability	$161,523,833	$18,774,000	$180,297,833
Ecosystem Restoration	$64,119,524	$92,275,000	$156,394,524
Water Quality	$6,368,631	$5,000,000	$11,368,631
Risk Reduction/Levee Integrity	$8,949,231	$45,560,000	$54,509,231
Total	**$262,106,815**	**$182,099,000**	**$444,205,815**

BAY DELTA CONSERVATION PLAN COSTS AND EXISTING FUNDING SOURCES

Potential future funding sources for the BDCP will likely compete with funding required for implementation of some elements of the Delta Plan, and for the plans and projects of State, federal, and local agencies. The Council does not consider any funding source to be solely available for the BDCP, or for any other program or plan. They are solely considered to be options at this stage.

Based on current information from the BDCP, the approximate costs of a facility and related ecosystem improvements needed for State and federal approval are approximately $15.8 to $16.7 billion in capital costs and an additional $4.9 to $5.6 billion in operating costs over the 50-year permit period. These costs are divided among the BDCP's four primary functions—water conveyance, habitat restoration, management of other stressors, and program oversight—as shown in the table below. The Council notes that preliminary cost estimates are just that: preliminary. Going forward, refined estimates will be required to complete this planning process.

Options for BDCP Funding

The BDCP is premised on the pledge of participating State and federal water contractors to pay the full cost of any new Delta export facility and the associated Delta ecosystem mitigation required to meet the requirements imposed on the BDCP by federal and State laws. Habitat and ecosystem restoration activities, beyond mitigation requirements, are considered to provide a general benefit to the State and should be funded accordingly.

Prior to completion of the BDCP and a full understanding of the Delta ecosystem improvements related to the BDCP, it is impossible to project the detailed funding options that might be necessary. However, it is highly likely that user fees, revenue bonds, and sources other than the State General Fund will be the primary sources of funding.

Summary of BDCP Costs and Existing Funding Sources ($ millions)

	Bay Delta Conservation Plan[a]		
Program Function	**Capital Costs**	**Operating Costs**	**Total**
Water Conveyance[b]	$12,691	$2,936	$15,627
Habitat Restoration[c]	$3,108–$4,009	$346–$437	$3,454–$4,446
Other Stressors[c]	$12–$15	$1,213–$1,679	$1,225–$1,694
Program Oversight[c]		$404–$548	$404–$548
Total	$15,811–$16,715	$4,899–$5,600	$20,710–$22,315

[a] Over 50-year permit period [b] Midpoint cost estimate [c] Range of low-high estimate given

Source: BDCP Steering Committee, 2010

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A Delta Finance Plan

The Council proposes to initiate development of a finance plan following adoption of the Delta Plan. This process will require the active participation of the Interagency Implementation Committee described in Chapter 2. Financing and funding mechanisms to be considered in developing the finance plan are included in Appendix N.

Guiding Principles

A finance plan to fund the Delta Plan should follow these principles:

- The finance plan should first consider currently available funds that can legally support expenditures for Delta-related projects. Spending priorities should be established that address near-term funding requirements as contained in this Delta Plan.
- Implementation of the Delta Plan will undoubtedly require an array of funding sources, including new funding sources and new statutory authority. Broad-based financing and diversity in funding sources will enhance revenue stability. Likewise, State and federal funds for activities that implement the Delta Plan must be reserved for public benefits not otherwise required for project mitigation or required by law for other purposes. Appendix N describes potential funding sources.
- The Delta Plan recommends many projects that have multiple benefits; this increases opportunities to blend fund sources and builds on the tradition of past investments in multipurpose water projects with diversified fund sources.
- A clear and analytically based methodology for assessing public benefits should be evaluated and implemented.
- Targeted finance plans should be developed for major Delta Plan plans and projects (ecosystem restoration, flood risk reduction, regional water supply investments, science, administration, and water conveyance). Beneficiaries and stressors should be identified in each of these areas, and user fees should be developed to match these stressors and beneficiaries with planned investments in each of these areas.
- Economic and financial analyses should be done as early as possible during the planning of large capital projects. This will assist agencies in the design of cost-effective projects and will help ensure that the projects are actually completed and implemented. Financial analyses should account for all of the costs of a project, both direct and indirect, including acquisition, planning, capital and interest, mitigation, science and monitoring, and operations and maintenance.

User Fees

- User fees, including beneficiary fees and stressor fees, are essential and should be established to support the coequal goals and the implementation of the Delta Plan.
- The “beneficiaries pay” principle is a common financing approach for water projects. The challenge is to determine the beneficiaries and design a cost-allocation method scaled to the benefit.
- A companion principle to “beneficiaries pay” is “stressors pay.” Human activity that causes negative operational or environmental impacts should be assessed a fee, or otherwise charged, to repair the damage. An example of the stressors pay approach might be a surcharge on pesticides that are found to negatively impact the Delta ecosystem. Capital construction projects, whether for water reliability purposes or Delta ecosystem improvements, should be undertaken simultaneously with the development of beneficiary and user fees. Delay in establishing beneficiaries/stressors fee structures will inevitably delay any needed capital improvement projects. The development of information related to financing (such as the identification of beneficiaries and stressors, and detailed financing scenarios) should be undertaken simultaneously with the development of major capital decisions so that it can inform planning efforts.

- The finance plan should include mechanisms to ensure that user fees are legally dedicated to their intended purpose. Given State and federal budget constraints, statutory protections must be enacted to assure users that their assessments will not be diverted to other purposes.
- The finance plan should include opportunities to generate revenue when planning projects, where possible, to ensure long-term financing stability.
- To the extent possible, user fees should be based on the amount of water used or, for stressors, the volume of contaminants discharged. Tiered fee structures also should be explored where applicable.
- Long-term, stable funding approaches, such as the Delta Flood Risk Management Assessment District recommended in Chapter 7 or other beneficiary user fees, should be established to support the Delta Levees Maintenance Subventions Program, Delta Levees Special Flood Control Projects Program, and implementation of the Central Valley Flood Protection Plan.

Near-term and Annual Funding Requirements

The following items describe activities that must be addressed and funded as soon as possible. They describe the urgent need to immediately address the steps needed to achieve the coequal goals, begin implementation of the Delta Plan, and establish annual funding for key Delta agencies:

- **Urgent expenditures for water supply reliability and ecosystem protection.** Immediate steps should be taken to protect the existing Delta water export system from flood risks and carry out ecosystem improvements being implemented pursuant to existing mitigation commitments of the SWP and the Central Valley Project. Those immediate needs are discussed in the various chapters of the Delta Plan.
- **Create a regional Delta Flood Risk Management Assessment District.** The Legislature should create a regional district with the authority to assess fees on Delta levee beneficiaries, including landowners, infrastructure owners, and other entities, to fund flood control protection, including levee maintenance and improvement, and emergency response, as recommended in Chapter 7.
- **Fund a strong Delta Science Program.** Funding is needed for continued operation of the Independent Science Board, development of the proposed Delta Science Plan, the State's share of the Interagency Ecological Program, and other activities that support a strong science foundation for Delta Plan implementation. Funding for the Interagency Ecological Program should continue from participating agencies.
- **Fund urban and agricultural water management plans.**
- **Continue the existing operational duties imposed by the Delta Reform Act.** The Act created the Council (which includes the Delta Science Program and Independent Science Board) and the Sacramento-San Joaquin Delta Conservancy, and modified the duties of the Delta Protection Commission. Future estimated annual operating costs for these agencies are provided in Appendix M.
- **Fees for services.** The Legislature should grant authority to the Council to assess fees to cover the costs of providing specified services related to covered actions, specifically early consultations and reviewing appeals of consistency certifications.

POLICIES AND RECOMMENDATIONS

Administrative performance measures for the following recommendations can be found in Appendix E.

FP R1 Conduct Current Spending Inventory

An inventory of current State and federal spending on programs and projects that do or may achieve the coequal goals will be conducted. Data sources to be used include the CALFED cross-cut budget, State bond balance reports, and the annual State budget, among others. Consideration will be given to selecting an independent agency (which could include a nongovernmental organization) to conduct the inventory.

FP R2 Develop Delta Plan Cost Assessment

Costs will be assigned to the projects and programs proposed in the Delta Plan (Chapters 2 through 7), and sources of funding will be identified.

FP R3 Identify Funding Gaps

Current State and federal funding gaps will be identified that are determined to hinder progress toward meeting the coequal goals.

Timeline for Implementing Recommendations

Figure 8-1 lays out a timeline for implementing the recommendations described in the previous section.

Timeline for Implementing Recommendations

TIMELINE **CHAPTER 8: Funding Principles to Support the Coequal Goals**

	ACTION (REFERENCE #)	LEAD AGENCY	NEAR TERM 2012–2017	INTERMEDIATE TERM 2017–2025
RECOMMENDATIONS	Conduct current spending inventory (FP R1)	Council	●	
	Develop Delta Plan cost assessment (FP R2)	Council	●	
	Identify funding gaps (FP R3)	Council	●	

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Agency Key:
Council: Delta Stewardship Council

Figure 8-1

References

BDCP Steering Committee (Bay Delta Conservation Plan Steering Committee). 2010. *Progress Report on the Bay Delta Conservation Plan.* November 18.

Bureau of Reclamation. 2008. Fiscal Year 2009 Budget for the U.S. Bureau of Reclamation. Accessed May 18, 2011. http://www.usbr.gov/budget/2009/CONTENTS.pdf.

California Department of Finance. 2012. 2012-13 California Budget. http://ebudget.ca.gov/.

California State Controller. 2011a. *Cities Annual Report*, Fiscal Year 2008-09. Accessed May 18, 2011. http://www.sco.ca.gov/Files-ARD-Local/LocRep/cities_reports_0809cities.pdf.

California State Controller. 2011b. *Counties Annual Report*, Fiscal Year 2008-09. Accessed May 18, 2011. http://www.sco.ca.gov/Files-ARD-Local/LocRep/counties_reports_0809counties.pdf.

California State Controller. 2011c. *Special Districts Annual Report*, Fiscal Year 2008-09. Accessed May 18, 2011. http://www.sco.ca.gov/Files-ARD-Local/LocRep/districts_reports_0809_specialdistricts.pdf.

LAO (California Legislative Analyst's Office). 2008. *California's Water: An LAO Primer*.

Public Policy Institute of California. 2011. *Managing California's Water: From Conflict to Resolution*.

U.S. Army Corps of Engineers. 2008. Fiscal Year 2009 Civil Works Budget for the U.S. Army Corps of Engineers. Accessed May 18, 2011. http://www.usace.army.mil/CECW/PID/Documents/budget/budget2009.pdf.

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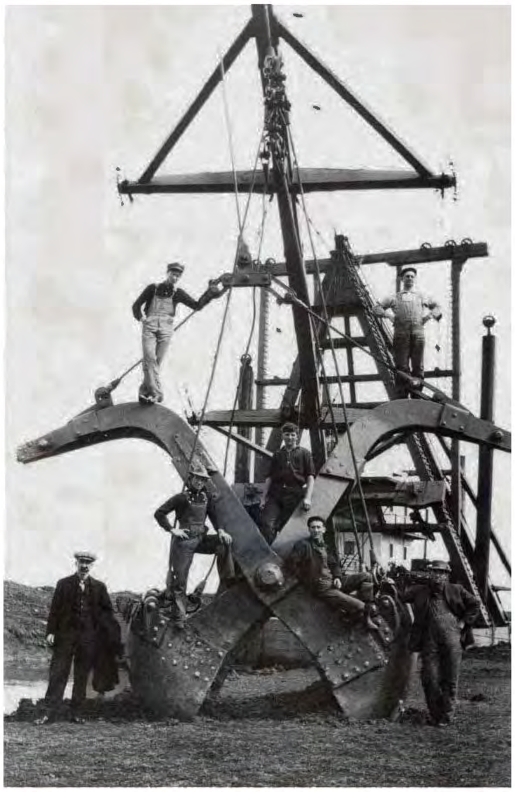
Glossary



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Glossary

The first section of this glossary provides definitions that appear in 23 California Code of Regulations section 5001. The second section provides definitions and explanations of key terms, acronyms, and abbreviations used in the Delta Plan.

Definitions in 23 California Code of Regulations Section 5001

As used in this division, the terms listed below shall have the meanings noted:

(a) "Adaptive management" means a framework and flexible decision-making process for ongoing knowledge acquisition, monitoring, and evaluation leading to continuous improvement in management planning and implementation of a project to achieve specified objectives.

(b) "Agricultural water management plan" means a plan prepared, adopted, and updated by an agricultural water supplier pursuant to the Agricultural Water Management Planning Act, Water Code section 10800 et seq.

(c) "Agricultural water supplier" under the Water Code refers to both agricultural retail water suppliers and agricultural wholesale water suppliers, but not the California Department of Water Resources or the United States Bureau of Reclamation, and includes both of the following:

(1) A water supplier, either publicly or privately owned, providing water to 10,000 or more irrigated acres, excluding recycled water; and

(2) A water supplier or contractor for water, regardless of the basis of the water right, that distributes or sells water for ultimate resale to customers.

(d) "Base Flood" means the flood that has a 1-percent probability of being equaled or exceeded in any given year (also referred to as the 100-year flood).

(e) "Base Flood Elevation" (BFE) means the water surface elevation associated with the base flood.

(f) "Best available science" means the best scientific information and data for informing management and policy decisions. Best available science shall be consistent with the guidelines and criteria found in Appendix 1A.

(g) "Central Valley Flood Protection Board" or "Board" means the Central Valley Flood Protection Board (formerly The Reclamation Board) of the Resources Agency of the State of California as provided in Water Code section 8521.

(h) "Coequal goals" means the two goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem. The coequal goals shall be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place. In addition, "achievement" for the purpose of determining whether a plan, program, or project meets the definition of a ''covered action'' under section 5001(j) is further defined as follows:

(1) "Achieving the coequal goal of providing a more reliable water supply for California" means all of the following:

(A) Better matching the state's demands for reasonable and beneficial uses of water to the available water supply. This will be done by promoting, improving, investing in, and implementing projects and programs that improve the resiliency of the state's water systems, increase water efficiency and conservation, increase water recycling and use of advanced water technologies, improve groundwater management, expand storage, and improve Delta conveyance and operations. The evaluation of progress toward improving reliability will take into account the inherent variability in water demands and supplies across California;

(B) Regions that use water from the Delta watershed will reduce their reliance on this water for reasonable and beneficial uses, and improve regional self-reliance, consistent with existing water rights and the State's area-of-origin statutes and Reasonable Use and Public Trust Doctrines. This will be done by improving, investing in, and implementing local and regional projects and programs that increase water conservation and efficiency, increase water recycling and use of advanced water technologies, expand storage, improve groundwater management, and enhance regional coordination of local and regional water supply development efforts; and

(C) Water exported from the Delta will more closely match water supplies available to be exported, based on water year type and consistent with the coequal goal of protecting, restoring, and enhancing the Delta ecosystem. This will be done by improving conveyance in the Delta and expanding groundwater and surface storage both north and south of the Delta to optimize diversions in wet years when more water is available and conflicts with the ecosystem are less likely, and limit diversions in dry years when conflicts with the ecosystem are more likely. Delta water that is stored in wet years will be available for water users during dry years, when the limited amount of available water must remain in the Delta, making water deliveries more predictable and reliable. In addition, these improvements will decrease the vulnerability of Delta water supplies to disruption by natural disasters, such as, earthquakes, floods, and levee failures.

(2) "Achieving the coequal goal of protecting, restoring, and enhancing the Delta ecosystem" means successfully establishing a resilient, functioning estuary and surrounding terrestrial landscape capable of supporting viable populations of native resident and migratory species with diverse and biologically appropriate habitats, functional corridors, and ecosystem processes.

(3) "Achieving the coequal goals in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place" means accepting that change, including change associated with achieving the coequal goals, will not cease, but that the fundamental characteristics and values that contribute to the Delta's special qualities and that distinguish it from other places can be preserved and enhanced while accommodating these changes. In this regard, the following are core strategies for protecting and enhancing the unique values that distinguish the Delta and make it a special region:

(A) Designate the Delta as a special place worthy of national and state attention;

(B) Plan to protect the Delta's lands and communities;

(C) Maintain Delta agriculture as a primary land use, a food source, a key economic sector, and a way of life;

(D) Encourage recreation and tourism that allow visitors to enjoy and appreciate the Delta and that contribute to its economy;

(E) Sustain a vital Delta economy that includes a mix of agriculture, tourism, recreation, related industries and business, and vital components of state and regional infrastructure; and

(F) Reduce flood and other risks to people, property, and other interests in the Delta.

(i) "Commercial recreational visitor-serving uses" means a land use designation that describes visitor-serving uses, accommodations, restaurants, and shops, that respect the rural character and natural environmental setting. These uses also include campgrounds and commercial recreational facilities.

(j)(1) "Covered action" means a plan, program, or project that meets all of the following criteria (which are collectively referred to as covered action screening criteria):

(A) Is a "project," as defined pursuant to section 21065 of the Public Resources Code;

(B) Will occur, in whole or in part, within the boundaries of the Delta or Suisun Marsh;

(C) Will be carried out, approved, or funded by the State or a local public agency;

(D) Will have a significant impact on achievement of one or both of the coequal goals or the implementation of government-sponsored flood control programs to reduce risks to people, property, and State interests in the Delta; and

(E) Is covered by one or more provisions of the Delta Plan, which for these purposes, means one or more of the regulatory policies contained in Article 3.

(2) ''Covered action'' does not include any plan, program, or project that is exempted pursuant to Water Code section 85057.5(b).

(3) A State or local public agency that proposes to carry out, approve, or fund a plan, program, or project that may be subject to this Chapter must determine whether that proposed plan, program, or project is a covered action. That determination, which is subject to judicial review, must be reasonable, made in good faith, and consistent with the Delta Reform Act and this Chapter.

(4) Nothing in the application of the definition of a "covered action" shall be interpreted to authorize the abrogation of any vested right whether created by statute or by common law.

(k) "Delta" means the Sacramento-San Joaquin Delta as defined in section 12220 of the Water Code and the Suisun Marsh, as defined in section 29101 of the Public Resources Code.

(l) "Delta Plan" means the comprehensive, long-term management plan for the Delta to further the achievement of the coequal goals, as adopted by the Delta Stewardship Council in accordance with the Sacramento-San Joaquin Delta Reform Act of 2009.

(m) "Designated Floodway" means those floodways, as defined in California Code of Regulations, Title 23, section 4(i), under the jurisdiction of the Central Valley Flood Protection Board.

(n) "Encroachment" means any obstruction or physical intrusion by construction of works or devices, planting or removal of vegetation, or by any means for any purpose, into or otherwise affecting a floodway or floodplain.

(o) "Enhancement" or "enhancing," for purposes of section 5001(h)(2), means improving existing desirable habitat and natural processes. Enhancement may include, by way of example, flooding the Yolo Bypass more often to support native species or to expand or better connect existing habitat areas. Enhancement includes many fish and wildlife management practices, such as managing wetlands for waterfowl production or shorebird habitat, installing fish screens to reduce entrainment of fish at water diversions, or removing barriers that block migration of fish to upstream spawning habitats.

(p) "Feasible" means capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors.

(q) "Floodplain" means any land area susceptible to being inundated by flood waters from any source.

(r) "Floodplain values and functions" has the same meaning as set forth in 33 Code of Federal Regulations section 320.4(l)(1).

(s) "Floodproofing" means any combination of structural and nonstructural additions, changes, or adjustments appropriate for residential structures, which reduce or eliminate risk of flood damage to real estate, improved real property, or structures with their contents.

(t) "Floodway" means the portion of the floodplain that is effective in carrying flow (that is, the channel of a river or other watercourse and the adjacent land areas that convey flood waters).

(u) "Government-sponsored flood control program to reduce risks to people, property, and State interests in the Delta" means any State or federal strategy, project, approval, funding, or other effort that is intended to reduce the likelihood and/or consequences of flooding of real property and/or improvements, including risks to people, property, and State interests in the Delta, that is carried out pursuant to applicable law, including, but not limited to the following:

(1) State Water Resources Law of 1945, Water Code section 12570 et seq.;

(2) Sacramento-San Joaquin River Flood Control Projects (Flood Control Act of 1941, P.L. 77-228);

(3) Local Plans of Flood Protection prepared pursuant to the Local Flood Protection Planning Act (Water Code section 8200 et seq.), that are consistent with the Central Valley Flood Protection Plan pursuant to Water Code section 9612;

(4) Central Valley Flood Protection Plan (Water Code section 9600 et seq.);

(5) Subventions Program, Special Projects Program (Water Code section 12300 et seq.);

(6) Way Bill 1973-Subventions Program, Special Projects Program (Water Code section 12980 et seq.);

(7) Central Valley Flood Protection Board Authority (California Code of Regulations, Title 23, Division 1); and

(8) National Flood Insurance Program (National Flood Insurance Act of 1968, 42 U.S.C. 4001 et seq., P.L. 90-448).

(v) "Nonnative invasive species," for purposes of section 5009, means species that establish and reproduce rapidly outside of their native range and may threaten the diversity or abundance of native species through competition for resources, predation, parasitism, hybridization with native populations, introduction of pathogens, or physical or chemical alteration of the invaded habitat.

(w) "Nonproject levee" means a local levee owned or maintained by a local agency or private owner that is not a project facility under the State Water Resources Law of 1945, Chapter 1 (commencing with Water Code section 12570) and Chapter 2 (commencing with section 12639 of Part 6 of the Water Code).

(x) "Project levee" means a federal flood control levee that is a project facility under the State Water Resources Law of 1945, Chapter 1 (commencing with Water Code section 12570) and Chapter 2 (commencing with section 12639 of Part 6 of the Water Code).

(y) "Proposed action" means a plan, program, or project that meets the covered action screening criteria listed in section 5001(j)(1)(A) through (D). Proposed action is also a "covered action," and therefore subject to compliance with the regulatory policies contained in Articles 2 and 3—if the proposed action meets the covered action screening criterion listed in section 5001(j)(1)(E).

(z) "Protection" or "protecting," for purposes of section 5001(h)(2), means preventing harm to the ecosystem, which could include preventing the conversion of existing habitat, the degradation of water quality, irretrievable conversion of lands suitable for restoration, or the spread of invasive nonnative species.

(aa) "Regulated stream" means those streams identified in Table 8.1 of California Code of Regulations, Title 23, section 112, under the jurisdiction of the Board.

(bb) "Restoration" or "restoring," for purposes of section 5001(h)(2), has the same meaning as in Water Code section 85066. Restoration actions may include restoring interconnected habitats within the Delta and its watershed, restoring more natural Delta flows, or improving ecosystem water quality.

(cc) "Setback levee" means a new levee constructed behind an existing levee which allows for removal of a portion of the existing levee and creation of additional floodplain connected to the stream. In the Delta, a "setback levee" may not necessarily result in removal of the existing levee.

(dd) "Significant impact" for the purpose of determining whether a project meets the definition of a "covered action" under section 5001(j)(1)(D) means a substantial positive or negative impact on the achievement of one or both of the coequal goals or the implementation of a government-sponsored flood control program to reduce risks to people, property, and State interests in the Delta, that is directly or indirectly caused by a project on its own or when the project's incremental effect is considered together with the impacts of other closely related past, present, or reasonably foreseeable future projects. The following categories of projects will not have a significant impact for this purpose:

(1) "Ministerial" projects exempted from CEQA, pursuant to Public Resources Code section 21080(b)(1);

(2) "Emergency" projects exempted from CEQA, pursuant to Public Resources Code section 21080(b)(2) through (4);

(3) Temporary water transfers of up to one year in duration. This provision shall remain in effect only through December 31, 2016, and as of January 1, 2017, is repealed, unless the Council acts to extend the provision prior to that date. The Council contemplates that any extension would be based upon the California Department of Water Resources' and the State Water Resources Control Board's participation with stakeholders to recommend measures to reduce procedural and administrative impediments to water transfers and protect water rights and environmental resources by December 31, 2016. These recommendations should include measures to address potential issues with recurring transfers of up to 1 year in duration and improved public notification for proposed water transfers;

(4) Other projects exempted from CEQA, unless there are unusual circumstances indicating a reasonable possibility that the project will have a significant impact under Water Code section 85057.5(a)(4), as further defined by this section. Examples of unusual circumstances could arise in connection with, among other things:

(A) Local government general plan amendments for the purpose of achieving consistency with the Delta Protection Commission's Land Use and Resource Management Plan; and,

(B) Small-scale habitat restoration projects, as referred to in CEQA Guidelines, section 15333 of Title 14 of the California Code of Regulations, proposed in important restoration areas, but which are inconsistent with the Delta Plan's policy related to appropriate habitat restoration for a given land elevation (section 5006 of this Chapter).

(ee) "Urban area" means a developed area in which there are 10,000 residents or more.

(ff) "Urbanizing area" means a developed area or an area outside of a developed area that is planned or anticipated to have 10,000 residents or more within the next 10 years.

(gg) "Urban water management plan" means a plan prepared, adopted, and updated by an urban water supplier pursuant to the Urban Water Management Planning Act, Water Code section 10610 et seq.

(hh) "Urban water supplier" refers to both "urban retail water suppliers" and "urban wholesale water suppliers":

(1) "Urban retail water supplier" means a water supplier, either publicly or privately owned, that directly provides potable municipal water to more than 3,000 end users or that supplies more than 3,000 acre-feet of potable water annually at retail for municipal purposes.

(2) "Urban wholesale water supplier" means a water supplier, either publicly or privately owned, that provides more than 3,000 acre-feet of potable water annually at wholesale for municipal purposes.

(ii) "Water supplier" refers to both "urban water suppliers" and "agricultural water suppliers," but for purposes of section 5003, does not include agricultural water suppliers during the time that they may be exempted by section 10853 of the Water Code from the requirements of Parts 2.55 and 2.8 of Division 6 of the Water Code.

23 CCR Section 5001
NOTE: Authority cited: Section 85210(i), Water Code.
Reference: Sections 85057.5, 85059, 85058, 85066, 85020, 85054, 85052, 85302(g), 85308, 85300, 10608.12, and 10853, Water Code.

Key Terms, Acronyms, and Abbreviations Used in the Delta Plan

Term	Definition
100-year flood	A flood event having a 1-in-100 chance of being equaled or exceeded in any given year.
200-year flood	A flood event having a 1-in-200 chance of being equaled or exceeded in any given year.
AB	Assembly Bill
acre-foot	The volume of water that would cover 1 acre of land to a depth of 1 foot; equal to 43,560 cubic feet or 325,851 gallons.
accommodation space	The space in the Delta that lies below sea level and is filled with neither sediment nor water.
Act	See Sacramento-San Joaquin Delta Reform Act of 2009
ACWA	Association of California Water Agencies
administrative procedure	Procedures adopted by the Delta Stewardship Council (Council), in accordance with Water Code section 85225.30, that govern how the Council considers appeals with respect to the following: (1) Adequacy of certifications of consistency with the Delta Plan submitted to the Council by a State or local agency pursuant to Water Code section 85225.10, and (2) Determinations by the California Department of Fish and Wildlife that the Bay Delta Conservation Plan has met the requirements of Water Code section 85320 for inclusion in the Delta Plan.
advanced treatment	Any treatment of sewage that goes beyond the secondary or biological water treatment stage and includes the removal of nutrients, including phosphorus, nitrogen, and a high percentage of suspended solids.
Aeration Facility	Demonstration Dissolved Oxygen Aeration Facility
agricultural water use	Water used for farming, horticulture, or ranching including irrigation, stock watering, or support of vegetation for range grazing. This includes water used for irrigation and nonirrigation purposes. Irrigation water use includes the artificial application of water on land to promote the growth of crops and pasture, or to maintain vegetative growth in recreational lands, parks, and golf courses. Nonirrigation water use includes water used for livestock, which includes water for stock watering, feedlots, and dairy operations, and fish farming and other farm requirements.
agricultural water use efficiency	Defined by California Department of Water Resources as the ratio of applied water to the amount of water required to sustain agricultural productivity. Efficiency is increased through the application of less water to achieve the same beneficial productivity or by achieving more productivity while applying the same amount of water.
AGWA	Association of Groundwater Agencies
anadromous fish	Fish that are born in fresh water, migrate to the ocean to mature, and then return to fresh water to spawn.

Term	Definition
anticipated future stressors	Stressors that require preparation and planning for mitigation in advance of their onset (for example, future land subsidence, urban expansion, and new invasions by nonnative species).
artesian water	A groundwater aquifer under positive pressure. In some cases, the hydrostatic equilibrium elevation of the groundwater is higher than the elevation of the surrounding ground surface. When an artesian aquifer is penetrated by a well, the water level will rise above the top of the aquifer, and even flow out of the ground.
AWWA	American Water Works Association
BAFF	bio-acoustic fish fence
base camp	A park, resort, or town that provides services (for example, park rangers, interpretation, and boat rentals) and facilities (for example, parking, restrooms, picnic sites, boat ramps, and campgrounds). The mix of facilities is determined by adjacent recreation opportunities and nearby public and private facilities.
basin plan	A water quality control plan for a specific basin or region in California. It includes a comprehensive program of actions designed to preserve, enhance, and restore water quality in that basin. The basin plan is the master water quality control planning document for the regional boards. It describes beneficial uses of surface water and groundwater, and establishes water quality objectives to protect those uses.
Bay Plan	San Francisco Bay Plan
Bay-Delta Plan	Bay-Delta Water Quality Control Plan
BCDC	San Francisco Bay Conservation and Development Commission
BDCP	Bay Delta Conservation Plan
beneficial uses	Uses of the waters of the state that include domestic, municipal, agricultural, and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves.
beneficiaries	Entities that benefit from using the resources of the Delta, including water supply, conveyance, and recreation.
benthic	The collection of organisms living on or in sea, lake, or river bottoms.
best management practices (BMPs)	Methods or techniques found to be the most effective and practical means of achieving an objective, such as water conservations. BMPs include, but are not limited to, structural and nonstructural controls, and operation and maintenance procedures. Examples of water conservation BMPs include tiered rate structures and water-efficient plumbing and irrigation systems.
bioaccumulation	The process by which a chemical is taken up by an aquatic organism, both from direct exposure to water and through the consumption of food containing the chemical.
biological opinion	A document stating the opinion of the U.S. Fish and Wildlife Service or the National Marine Fisheries Service as to whether or not federal action is likely to jeopardize the continued existence of a threatened or endangered species, or result in the destruction or adverse modification of critical habitat.

Term	Definition
biomagnify, biomagnification	The sequence of processes in an ecosystem by which higher concentrations of a particular chemical, a pesticide for example, are reached in organisms higher up the food chain, generally through a series of prey-predator relationships.
BMP	See best management practices
bypass	An area of land or a large, constructed structure designed to convey excess floodwaters from a river or stream in order to reduce the risk of flooding on the natural river or stream near a city or other population center.
Cal EMA	California Emergency Management Agency
Caltrans	California Department of Transportation
CARB	California Air Resources Board
carbon sequestration	The process of removing carbon from the atmosphere and storing it. Trees and plants, for example, absorb carbon dioxide, release the oxygen, and store the carbon in their biomass. The stored biomass may eventually turn to peat, other soil-borne organic matter, and fossil fuels such as coal or petroleum that will continue to store the carbon until the fuels are burned.
CASGEM	California Statewide Groundwater Elevation Monitoring Program
CCR	*California Code of Regulations*
CDFA	California Department of Food and Agriculture
centrarchids	Small, carnivorous, freshwater, spiny-finned fishes of North America usually having a laterally compressed body and metallic luster (for example, largemouth bass, smallmouth bass, spotted bass, bluegill, warmouth, redear sunfish, green sunfish, white crappie, and black crappie).
certification of consistency	The written certification to the Delta Stewardship Council, with detailed findings, that a covered action is consistent with the Delta Plan. Certifications of consistency are submitted to the Delta Stewardship Council by the State or local agency that is proposing to carry out, fund, or approve a covered action under the California Environmental Quality Act (Water Code section 85225 et seq.).
CEQA	California Environmental Quality Act
cfs	cubic feet per second
channelization	(1) Natural or intentional straightening and deepening of streams through dredging or construction of levees. (2) A marsh-drainage tactic that can disturb fish and wildlife habitats, aggravate flooding, and decrease the capacity to absorb pollution without suffering damage.
climate change	Any significant change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended period (decades or longer). Climate change may result from (1) natural factors, including changes in the sun's intensity or changes in the Earth's orbit around the sun, (2) natural processes within the climate system (such as changes in ocean circulation), or (3) human activities that change the composition of the atmosphere (for example, through burning fossil fuels) and land surfaces (for example, deforestation, reforestation, urbanization, and desertification).

Term	Definition
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CNRA	California Natural Resources Agency
CO_2	carbon dioxide
COA	Coordinated Operating Agreement
conceptual model	An explicit description of mental models, knowledge, and hypotheses about the structure and function of a system or process.
conjunctive management	The coordinated and planned management of both surface water and groundwater resources to maximize efficient water use. Water is stored in groundwater basins for future use by intentionally recharging the basin during years of above-average surface water supply. Surface water and groundwater resources typically differ significantly in their availability, quality, management requirements, and development and use costs. Managing both resources together, rather than in isolation from one another, allows water managers to use the advantages of both resources for maximum benefit.
conveyance	The movement of water from one place to another. Conveyance infrastructure includes natural watercourses as well as canals, pipelines, and control structures including weirs. Examples of natural watercourses include streams, rivers, and groundwater aquifers. Conveyance facilities range in size from small, local, end-user distribution systems to large systems that deliver water to or drain areas covering multiple hydrologic regions. Conveyance facilities require associated infrastructure including pumping plants, power supply, diversion structures, fish ladders, and fish screens.
Council	Delta Stewardship Council
critical habitat	Specific areas, both occupied and unoccupied, that are essential to the conservation of a listed species and that may require special management considerations or protection (as defined in Section 3 of the federal Endangered Species Act).
current stressors	Stressors that result from ongoing human activities that can, in some cases, be eliminated (for example, fish entrainment at water diversions).
CVFPB	Central Valley Flood Protection Board
CVFPP	Central Valley Flood Protection Plan
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
CV-SALTS	Central Valley Salinity Alternatives for Long-Term Sustainability Program
CWA	Clean Water Act
CZMA	Coastal Zone Management Act of 1972
DBW	California Department of Boating and Waterways
DDT	dichlorodiphenyltrichloroethane

Term	Definition
dedicated (or developed) water	Defined by California Department of Water Resources (DWR) as water distributed among urban and agricultural uses, used for protecting and restoring the environment, or storage in surface water and groundwater reservoirs. In any year, some of the dedicated supply includes water that is used multiple times (reuse) and water that is held in storage from previous years. DWR identifies California's average annual dedicated water supply as 85 million acre-feet. *See also: total water use.*
Delta	Sacramento-San Joaquin Delta
Delta Conservancy	Sacramento–San Joaquin Delta Conservancy
Delta Ecological Management Zone	The Delta conservation strategy adopted by the Department of Fish and Wildlife as the *Ecosystem Restoration Program Conservation Strategy for Restoration of the Sacramento-San Joaquin Delta Ecological Management Zone and the Sacramento and San Joaquin Valley Regions.*
Delta exports	Describes, in general terms, any water diverted from the Delta for use outside the Delta, including water pumped by the State Water Project and Central Valley Project pumping plants, Contra Costa Water District, and other agencies. The term must be precisely defined when applied to specific studies or analyses.
Delta Flood Risk Management Assessment District	As proposed in the Delta Plan, an assessment district authorized to set fees on State and local infrastructure to generate funds for levee maintenance and surveys; adequate flood control protection; and emergency response for the benefit of landowners, infrastructure owners, and other entities that benefit from the maintenance and improvement of Delta levees, including water users who rely on the levees to protect water quality.
Delta Independent Science Board (Delta ISB)	Established by the Sacramento-San Joaquin Delta Reform Act of 2009, the Delta ISB is a standing board of nationally and internationally prominent scientists with appropriate expertise to evaluate the broad range of scientific programs that support adaptive management of the Delta. The Delta ISB will provide oversight of the scientific research, and monitoring and assessment programs that support adaptive management of the Delta through periodic reviews of each of those programs. The overall objective of Delta ISB oversight is to help make the science underlying Bay-Delta programs, the application of that science, and the technical aspects of those programs the best they can be (Water Code section 85280 et seq.).
Delta ISB	See Delta Independent Science Board
Delta Levee Special Flood Control Projects	A California Department of Water Resources program, authorized in Water Code sections 12300 through 12314, that provides financial assistance to local levee-maintaining agencies for rehabilitating levees in the Delta.
Delta Multi-Hazard Coordination Task Force	A task force established to address emergency preparedness and response issues in the Delta by enabling the development and implementation of multi-hazard preparedness and response strategies for the Delta. Led by the California Emergency Management Agency (Cal EMA), the task force consisted of representatives from the Delta Protection Commission, California Department of Water Resources, and representatives of the five Delta counties. The passage of Senate Bill 27 in 2008 required Cal EMA, formerly the Office of Emergency Services, to establish the task force.

Term	Definition
Delta Primary Zone	The Sacramento-San Joaquin River Delta land and water area of primary State concern and statewide significance that does not encompass either the urban limit line or sphere of influence line of any local government general plan or study existing as of January 1, 1992. The precise boundary lines of the Primary Zone include the land and water areas as shown on the map titled "Delta Protection Zones" on file with the California State Lands Commission. Where the boundary between the Primary Zone and Secondary Zone is a river, stream, channel, or waterway, the boundary line is the middle of that river, stream, channel, or waterway. The Primary Zone consists of approximately 500,000 acres (Public Resources Code section 29728).
Delta Reform Act	See Sacramento-San Joaquin Delta Reform Act of 2009
Delta Secondary Zone	All the Delta land and water area within the boundaries of the Delta not included within the Primary Zone, subject to the land use authority of local government, and that includes the land and water areas as shown on the map titled "Delta Protection Zones" on file with the State Lands Commission. The Secondary Zone consists of approximately 238,000 acres (Public Resources Code section 29731).
Delta Vision	Delta Vision Blue Ribbon Task Force
Delta watershed	The watershed of the Sacramento River Hydrologic Region and the San Joaquin River Hydrologic Region as described in the California Water Plan Update 2005, Bulletin 160-05 (Water Code section 85060).
demand management measures	Water conservation measures, programs, and incentives that prevent the waste of water and promote the reasonable use and reuse of available supplies.
desalination	A water treatment process for the removal of salt from water for beneficial use. Source water can be brackish (low salinity) or sea water.
DFG	California Department of Fish and Game
DFW	California Department of Fish and Wildlife (formerly the California Department of Fish and Game)
diversion	A process which, having return flow and consumptive use elements, turns water from a given path. Removal of water from its natural channel for human use. Use of part of a streamflow as a water supply. Channel constructed across the slope for the purpose of intercepting surface runoff, changing the accustomed course of all or part of a stream. A structural conveyance (or ditch) constructed across a slope to intercept runoff flowing down a hillside and divert it to some convenient discharge point.
DO	dissolved oxygen
DOC	California Department of Conservation
DPC	Delta Protection Commission
DPH	California Department of Public Health
DRERIP	Delta Regional Ecosystem Restoration Implementation Plan
drinking water quality	Drinking water quality standards are adopted by the California Department of Public Health (DPH) Drinking Water Program pursuant to the California Safe Drinking Water Act. The standards apply to public drinking water systems and to water delivered to customers, and are enforceable by DPH and local health departments.

Term	Definition
drought	Hydrologic conditions during a defined period, greater than 1 dry year, when precipitation and runoff are much less than average.
DWR	California Department of Water Resources
DWR 200 Year	DWR 200-year Urban Levee Protection
EAD	See expected annual damage
ecosystem	A biotic community and its physical environment, considered as an integrated unit. Implied within this definition is the concept of a structural and functional whole unified through life processes. An ecosystem may be characterized as a viable unit of community and interactive habitat. Ecosystems are hierarchical and can be viewed as nested sets of open systems in which physical, chemical, and biological processes form interactive subsystems. Some ecosystems are microscopic, and the largest comprises the biosphere. Ecosystem restoration can be directed at different-sized ecosystems within the nested set, and many encompass multiple states, more localized watersheds, or a smaller complex of aquatic habitat.
ecosystem enhancement	The improvement of existing desirable habitat and natural processes. Enhancement might include flooding the Yolo Bypass more often, at times, to support native species, or expand or better connect existing habitat areas. Enhancement also includes many fish and wildlife management practices, including managing wetlands for waterfowl production or shorebird habitat, installing fish screens to reduce entrainment of fish at water diversions, or removing barriers that block migration of fish to upstream spawning habitats.
ecosystem protection	Preventing harm to an ecosystem, which could include preventing the conversion of existing habitat, the degradation of water quality, irretrievable conversion of lands suitable for restoration, or the spread of invasive nonnative species.
ecosystem restoration	The application of ecological principles to restore a degraded or fragmented ecosystem and return it to a condition in which its biological and structural components achieve a close approximation of its natural potential, taking into consideration the physical changes that have occurred in the past and the future impact of climate change and sea level rise (Water Code section 85066).
Ecosystem Restoration Program Conservation Strategy	Describes the Ecosystem Restoration Program (ERP) priorities and actions for Stage 2 of the CALFED Bay-Delta Program (summarized in Appendix B). It identifies biologically promising ecosystem restoration opportunities in the Sacramento-San Joaquin Delta Ecological Management Zone and the Sacramento Valley and San Joaquin Valley regions, and it provides the rationale for restoration actions specific to each of these regions. It further provides the conceptual framework and process to guide the refinement, evaluation, prioritization, implementation, monitoring, and review of ERP actions.
ecosystem water quality	The Delta ecosystem is affected by a variety of pollutants discharged into Delta and tributary waters. Pollutants of concern affecting Delta biological species and ecosystem processes include nutrients, pesticides, mercury, selenium, and other persistent bioaccumulative toxic substances. Newly identified pollutants of potential concern (often referred to as emerging contaminants) also should be investigated.
EIR	environmental impact report

Term	Definition
endangered species	As defined by the California Endangered Species Act, an endangered species is a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that is in serious danger of becoming extinct throughout all, or a significant portion, of its range due to one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, or disease. Any species determined by the Fish and Game Commission as endangered on or before January 1, 1985, is an endangered species (Fish and Game Code section 2062).
entrainment	Defined by the National Marine Fisheries Service as "the incidental trapping of any life stage of fish within waterways or structures that carry water being diverted for anthropogenic use."
environmental water	Minimum flow levels of a specific quality that are needed in order to assure the continued viability of fish and wildlife resources for a particular water body. This water is used to maintain and enhance the beneficial uses related to the preservation and enhancement of fish, wildlife, and other aquatic resources or preserves as specified in the Porter-Cologne Water Quality Control Act.
environmental water use	Water dedicated to instream environmental needs.
EPRRP	Emergency Preparedness Response and Recovery Program
ERP	Ecosystem Restoration Program
ESA	Endangered Species Act
ESP	The Delta Protection Commission's *Economic Sustainability Plan for the Sacramento-San Joaquin Delta*
estuary	A place where fresh and salt water mix, such as a bay, salt marsh, or where a river enters an ocean.
expanded water supply reliability element	Additional information water suppliers should include in their water supply reliability element, starting in 2015, as part of the update of any urban water management plan, agricultural water management plan, integrated water management plan, or other plan that provides equivalent information on the supplier's planned investments in water conservation and water supply development. This expanded water supply reliability element must detail how water suppliers are improving regional self-reliance and reducing reliance on the Delta through investments in local and regional programs and projects, and must document actual and projected reductions in reliance on Delta exports. At a minimum, the water reliability element must include the following: (1) A plan for possible interruption of Delta water supply due to catastrophic events. (2) A plan for implementation of anticipated investments in water conservation, water efficiency, and water supply development. (3) Evaluation of regional water balance. (4) Conservation-oriented water rate structure.
expected annual damage (EAD)	A metric for analyzing flood risk that integrates the likelihood and consequences of flooding. Generally defined as the average annual flood damages (in dollars) weighted by the probability that a flood will occur in any given year. The U.S. Army Corps of Engineers describes EAD mathematically in *Manual No. 1110-2-1619, Risk-Based Analysis for Flood Damage Reduction Studies*, August 1, 1996.
FEMA	Federal Emergency Management Agency
FEMA 100 Year	FEMA 100-year (Base Flood) Protection

Term	Definition
flood risk	The likelihood and consequence of inundation by floodwaters. Consequences may include direct or indirect economic costs, loss of life, environmental impacts, or other specified measures of flood effect. Flood risk is a function of (1) loading, which is the frequency and magnitude of flood discharge or stage; (2) limits to exposure to the loading due to flood defense measures; and (3) consequence. Therefore, flood management actions may reduce risk by changing loading, exposure, or consequence. For clarity, flood risk is commonly quantified within an identified area for a specified climate condition, land use condition, and with a flood management system (existing or planned) in place.
flow criteria	The development of specific criteria by the State Water Resources Control Board for flows for the Delta ecosystem, including the volume, quality, and timing of water necessary for the Delta ecosystem under different conditions (Water Code section 85086(c)(1)).
flow objectives	Where protection of beneficial uses requires specific flow volumes at certain times, regional water quality control boards may establish flow objectives in water quality control plans. They differ from typical water quality objectives in that they are implemented by the State Water Resources Control Board through modifications and limitations of existing or future water rights to make sure these flows are met.
flow regime	The regulation of ecological processes in river ecosystems: the magnitude, frequency, duration, timing, and rate of change of hydrologic conditions (Poff and Ward 1989, Richter et al. 1996, Walker 1995). These components can be used to characterize the entire range of flows and specific hydrologic phenomena, including floods or low flows, that are critical to the integrity of river ecosystems. Furthermore, by defining flow regimes in these terms, the ecological consequences of particular human activities that modify one or more components of the flow regime can be considered explicitly.
flow requirements	The amount of water required for instream use by agreement, water rights permit, or State/federal law.
freeboard	The height of the physical top of a levee or floodwall above the median design water surface elevation.
gateway	A community, landmark, or signage on the edge of the Delta or Suisun Marsh that serves as a gateway providing information to visitors about recreation opportunities available in the area and equipping them with supplies.
general obligation bond	A bond issued by the State where the principal and interest is paid out of the General Fund. This is different than a revenue bond, where the principal and interest is paid out of a specific dedicated revenue source.
globally determined stressors	Stressors that result from large-scale human activities or natural processes that cannot be eliminated or mitigated within a limited purview and require larger-scale planning and adaptation (such as global climate change and human population growth).
GPCD	gallons per capita daily
groundwater basin	An alluvial aquifer or a stacked series of alluvial aquifers with reasonably well-defined boundaries in a lateral direction and having a definable bottom.
groundwater management plan	A comprehensive written document developed for the purpose of groundwater management and adopted by an agency having appropriate legal or statutory authority.

Term	Definition
groundwater overdraft	The condition of a groundwater basin in which the amount of water withdrawn by pumping exceeds the amount of water that recharges the basin over a period of years during which water supply conditions approximate average conditions.
groundwater remediation	The extraction of contaminated groundwater from an aquifer followed by treatment and (1) replacement in the aquifer or (2) use for agricultural or municipal purposes.
groundwater storage	Defined three ways depending on the context: (1) the quantity of water beneath the land surface that fills the pore spaces of the alluvium, soil, or rock formation; (2) the volume of usable physical space available to store water in the pore spaces of the alluvium, soil, or rock formation beneath the land surface; or (3) the act of storing water in the pore spaces of the alluvium, soil, or rock formation beneath the land surface.
HAB	harmful algal bloom
habitat	The location and the living and nonliving surroundings where a particular plant or animal lives. Habitat includes the presence of a group of particular environmental conditions surrounding an organism including air, water, soil, mineral elements, moisture, temperature, and topography.
Habitat Conservation Plan (HCP)	A plan prepared under the Endangered Species Act by nonfederal parties in order to obtain permits for incidental taking of threatened and endangered species. The HCP describes ways to maintain, enhance, and protect a given habitat type needed to protect species. The plan usually includes measures to minimize impacts, and might include provisions for permanently protecting land, restoring habitat, and relocating plants or animals to another area.
habitat restoration	The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning the majority of natural functions to the lost or degraded native habitat.
Hazard Mitigation Plan (HMP)	Refers to levee guidance negotiated between various federal, State, and local agencies to assist in reducing the likelihood of repetitive flood damage to Delta levees and islands. This guidance provides geometric levee design criteria that, if maintained, make a Delta levee-maintaining agency eligible for federal disaster assistance funds in the event of a flood emergency.
HCP	See Habitat Conservation Plan
HGMP	Hatchery and Genetic Management Plans
HMP	See Hazard Mitigation Plan
hydraulic mining	The use of high-pressure jets of water to dislodge rock material or move sediment.
hydrodynamics	The description of the change in flow or motion of a liquid.
hydrologic region	A geographical division of the state based on local hydrologic basins. The California Department of Water Resources divides California into 10 hydrologic regions, corresponding to the state's major water drainage basins: North Coast, San Francisco Bay, Central Coast, South Coast, Sacramento River, San Joaquin River, Tulare Lake, North Lahontan, South Lahontan, and Colorado River.
IEP	Interagency Ecological Program
incidental take permit	A permit issued by federal fisheries agencies that authorizes take of listed species incidental to otherwise lawful projects.

Term	Definition
instream flow	The use of water within its natural watercourse as specified in a contract, a water rights permit, a court order, a Federal Energy Regulatory Commission license, or other documentation. Instream flows support natural ecosystems, create habitat for plants and animals, and may provide additional benefits including recreation. *See also: flow requirements*.
integrated regional water management	A collaborative effort to manage all aspects of water resources in a specified region. Integrated regional water management crosses jurisdictional, watershed, and political boundaries; involves multiple agencies, stakeholders, individuals, and groups; and attempts to address the issues and differing perspectives of all entities involved through mutually beneficial solutions.
integrated regional water management plan (IRWMP)	At a minimum, an integrated regional water management plan describes the major water-related objectives and conflicts within a region; considers a broad variety of water management strategies; identifies an appropriate mix of water demand and supply management alternatives; provides water quality protections and environmental stewardship actions to provide a long-term, reliable, and high-quality water supply; protects the environment; and identifies disadvantaged communities in the region taking into account the water-related requirements of those communities.
invasive species	An alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health (Executive Order 13112, 1999).
land reclamation	The process to recover land through channelization and levee construction of what was previously marsh land.
IRWMP	See integrated regional water management plan.
LADWP	Los Angeles Department of Water and Power
LAEDC	Los Angeles Economic Development Corporation
LAO	California Legislative Analyst's Office
legacy community	A rural community registered as a Historic District by either a State or federal entity. Delta legacy communities include Bethel Island, Clarksburg, Courtland, Freeport, Hood, Isleton, Knightsen, Rio Vista, Ryde, Locke, and Walnut Grove (Public Resources Code section 32301(f)).
legacy stressors	Stressors that result from past actions that cannot be undone, but whose impact can sometimes be reduced or mitigated (for example, mercury pollution from historical gold mining).
Legislature	California Legislature
levee-maintaining agencies	Local special districts, typically reclamation districts, that are public agencies formed for the purpose of levee maintenance and improvement, among other duties, and are funded by local assessments.
levee standards	Standards designed to either establish minimum criteria that would make levees and the properties protected eligible for Federal Emergency Management Agency (FEMA) grants or U.S. Army Corps of Engineers (USACE) rehabilitation funds both in case of catastrophic emergency, or set minimum criteria that would allow development behind the levees. The four main applicable levee standards and guidance for the Delta are (1) FEMA Hazard Mitigation Plan Guidance, (2) USACE Public Law 84-99, (3) FEMA 100-year (Base Flood) Protection, and (4) DWR 200-year Urban Levee Protection.
LHC	Little Hoover Commission

Term	Definition
low salinity zone (LSZ)	Generally, the region in an estuary with salinity ranging from fresh water up to about 5 parts per thousand (ppt), about one-seventh the salinity of sea water. The part of the salinity gradient centered on 2 ppt is considered to be of particular importance because it is hypothesized to be an area where suspended particulate matter and organisms accumulate. The location in the Bay-Delta where the tidally averaged salinity at 1 meter from the bottom is 2 ppt is known as X2 (measured as distance in kilometers from the Golden Gate Bridge) and serves as a water quality objective regulating Delta outflow.
LPP	Suisun Marsh Local Protection Program
LSZ	See low salinity zone
LTMS	Delta Dredged Sediment Long-Term Management Strategy
µS/cm	microsiemens per centimeter
MAF	million acre-feet
managed wetland	Perched wetlands that receive human-induced seasonal flooding for marshland development.
MCL	maximum contaminant level
mg/L	milligram(s) per liter
MWD	Metropolitan Water District of Southern California
NAS	National Academy of Sciences
National Heritage Area (NHA)	Places designated by the United States Congress where natural, cultural, historic, and recreational resources combine to form a cohesive, nationally distinctive landscape arising from patterns of human activity shaped by geography. These areas tell important stories about the nation and are representative of the national experience through both the physical features that remain and the traditions that have evolved within them.
National Pollutant Discharge Elimination System (NPDES)	A permitting program required for all point sources discharging pollutants into waters of the United States. The purpose of the NPDES program is to protect human health and the environment (Clean Water Act of 1977, 33 United States Code section 1311).
Natural Community Conservation Plan (NCCP)	A conservation plan created to meet the requirements of the Natural Community Conservation Planning Act, which identifies and provides for the regional or areawide protection of plants, animals, and their habitats, while allowing compatible and appropriate economic activity. The primary objective of the NCCP program is to conserve natural communities at the ecosystem level while accommodating compatible land use (Fish and Game Code section 2800 et seq.).
NCCP	See Natural Community Conservation Plan
new water	Defined in part by California Department of Water Resources as water that is legally and empirically available for a beneficial use. New water can be developed through many strategies such as capturing surplus water, desalinating ocean water, and improving water efficiency.
NHA	See National Heritage Area
NMFS	National Marine Fisheries Service

Term	Definition
nonpoint source pollution	Diffused sources that do not have a single point of origin or are not introduced into a receiving stream from a specific outlet. The pollutants are generally carried off the land by stormwater runoff. Common categories of nonpoint sources are agriculture, forestry, mining, construction, land disposal, and salt intrusion.
NPDES	See National Pollutant Discharge Elimination System
NRC	National Research Council
NWR	National Wildlife Refuge
OP	organophosphorus
OPC	California Ocean Protection Council
Paterno v. State of California	In *Paterno v. State of California*, the appellate court found the State liable for flood-related damages caused by the failure of a Yuba River levee incorporated into the State system of flood control, even though the State did not design, build, or even directly maintain it (*Paterno v. State* [2003] 113 Cal. App.4th 998 [6 Cal.Rptr.3d 854]).
PCB	polychlorinated biphenyl
peak flow	Maximum instantaneous flow in a specified period.
pelagic fish	A fish species that spends most of its life swimming in the water column with little contact with or dependency on the bottom. Adult spawning usually occurs in open water, often near the surface.
pelagic organism decline (POD)	A steep decline leading to near-record low populations of four pelagic species in the San Francisco Estuary—delta smelt, young striped bass, longfin smelt, and threadfin shad—widely recognized as a serious issue by 2004.
performance measures	A quantitative or qualitative tool to assess progress toward an outcome or goal. The Delta Plan must include performance measurements that will enable the Delta Stewardship Council to track progress in meeting the objectives of the Plan. Performance measurements must include, but need not be limited to, quantitative or otherwise measurable assessments of the status and trends in all of the following: (1) The health of the Delta estuary and wetland ecosystem for supporting viable populations of aquatic and terrestrial species, habitats, and processes including viable populations of Delta fisheries and other aquatic organisms. (2) The reliability of California water supply imported from the Sacramento River or the San Joaquin River watershed.
PL 84-99	See Public Law 84-99
Plan	Delta Plan
POD	See pelagic organism decline

Term	Definition
point source	Any discernible, confined, and discrete conveyance including, but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel, or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigation agriculture or agricultural stormwater runoff (40 *Code of Federal Regulations* 122.2).
pollutant	Defined as "dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water" (Clean Water Act of 1977, 33 United States Code section 1362(6)).
pollution	Defined as the human-made or human-induced alteration of the chemical, physical, biological, and radiological integrity of water (Clean Water Act section 502(19); 33 United States Code section 1362(19)). Pollution is also defined in California law as an alternation of the quality of the waters of the state by waste to a degree that unreasonably affects either the waters for beneficial uses or the facilities that serve these beneficial uses (Water Code section 13050(k)(1)).
ppb	parts per billion
PPIC	Public Policy Institute of California
ppm	parts per million
ppt	parts per thousand
PRBO CalPIF	Point Reyes Bird Observatory California Partners in Flight
Public Law 84-99 (PL 84-99)	A federal levee standard developed by the U.S. Army Corps of Engineers (USACE). Meeting this standard allows the Delta island or tract to be eligible for USACE funding for levee rehabilitation, island restoration after levee failures, and island inundation, provided that the reclamation district applies for and is accepted into the USACE's Rehabilitation and Inspection Program.
Public Trust Doctrine	This doctrine protects the right of the public to use State sovereign lands and waters for commerce, navigation, hunting, fishing, bathing, swimming, boating, and general recreational purposes, and also protects trust lands and waters in their natural state, so that they may serve as ecological units for scientific study, as open space, and as environments that provide food and habitat for birds and marine life, and which favorably affect the scenery and climate of the area. There is also a separate branch of the Public Trust Doctrine that protects the fishery resources in all State waters, including those in nonnavigable waterways, as public trust resources in and of themselves.

Term	Definition
Reasonable and Beneficial Use Doctrine	This doctrine states that a water right does not include the right to waste water and mandates that the water resources of the state be put to beneficial use. “It is hereby declared that because of the conditions prevailing in this State the general welfare requires that the water resources of the State be put to beneficial use to the fullest extent of which they are capable, and that the waste or unreasonable use or unreasonable method of use of water be prevented, and that the conservation of such waters is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and for the public welfare. The right to water or to the use or flow of water in or from any natural stream or water course in this State is and shall be limited to such water as shall be reasonably required for the beneficial use to be served, and such right does not and shall not extend to the waste or unreasonable use or unreasonable method of use or unreasonable method of diversion of water. Riparian rights in a stream or water course attach to, but to no more than so much of the flow thereof as may be required or used consistently with this section, for the purposes for which such lands are, or may be made adaptable, in view of such reasonable and beneficial uses; provided, however, that nothing herein contained shall be construed as depriving any riparian owner of the reasonable use of water of the stream to which the owner's land is riparian under reasonable methods of diversion and use, or as depriving any appropriator of water to which the appropriator is lawfully entitled. This section shall be self-executing, and the Legislature may also enact laws in the furtherance of the policy in this section contained” (California Constitution Article X section 2).
reasonable and prudent alternative	The regulations implementing Section 7 of the Endangered Species Act define reasonable and prudent alternatives as alternative actions, identified during formal consultation, that (1) can be implemented in a manner consistent with the intended purpose of the action, (2) can be implemented consistent with the scope of the action agency's legal authority, (3) are economically and technologically feasible, and (4) would, according to the National Marine Fisheries Service, avoid the likelihood of jeopardizing the continued existence of listed species and avert the destruction or adverse modification of critical habitat (Endangered Species Act of 1973, 16 United States Code section 1536).
Reclamation	Bureau of Reclamation
Recreation Proposal	*Recreation Proposal for the Sacramento-San Joaquin Delta and Suisun Marsh*
regional self-reliance	The degree to which a region implements water management options so that it can provide for all of its needs for water from within its own borders.
regional water supplies	Water supplies that are found or developed within a region to be used within its own borders.
reservoir reoperation	Changes to existing operations and management procedures for existing reservoirs and conveyance facilities to increase water-related benefits from these facilities.
resource management strategy	A project, program, or policy that helps federal, State, or local agencies manage water and related resources. Resource management strategies in the California Water Plan are grouped by intended outcomes: reduce water demand, improve operational efficiency and transfers, increase water supply, improve water quality, practice resource stewardship, and improve flood management. Although most of the resource management strategies have multiple potential benefits, any individual site-specific project or program within a resource management strategy may contribute only one, or a few, of the benefits.
riparian area	The land adjacent to a natural watercourse such as a river or a stream. Riparian areas support vegetation that provides important wildlife habitat and important fish habitat when shading the watercourse bank.

Term	Definition
RWCF	Stockton Regional Wastewater Control Facility
RWQCB	Regional Water Quality Control Board
SACOG	Sacramento Area Council of Governments
Sacramento-San Joaquin Delta Reform Act of 2009 (Delta Reform Act or Act)	Included in Senate Bill X71, established a new governance approach for the Sacramento-San Joaquin Delta that is focused on achieving the coequal goals and is fundamentally different from past approaches. The Delta Reform Act created the Delta Stewardship Council and gave it the direction and authority to serve two primary governance roles: (1) set a comprehensive, legally enforceable direction for how the State manages important water and environmental resources in the Delta through the adoption of a Delta Plan, and (2) ensure coherent and integrated implementation of that direction through coordination and oversight of State and local agencies proposing to fund, carry out, and approve Delta-related activities.
Safe Harbor Agreement	A voluntary agreement made between wildlife agencies and landowners in order to recover a listed species.
SAV	submerged aquatic vegetation
SB	Senate Bill
SBX7 1	Senate Bill X7 1
SBX7 7	Senate Bill X7 7
SDWSC	Stockton Deep Water Ship Channel
sea level rise	A change in average global sea level caused by a change in ocean volume. Often discussed in relation to climate change.
seepage	Percolation of water through the soil from unlined canals, ditches, laterals, watercourses, or water storage facilities.
SEMS	See Standardized Emergency Management System
sensitive species	Species not yet officially listed but undergoing status review for listing on the U.S. Fish and Wildlife Service's official threatened and endangered list; species whose populations are small and widely dispersed or restricted to a few localities; and species whose numbers are declining so rapidly that official listing may be necessary.
SFD	San Felipe Division
SHP	State Historic Park
SMPP	BCDC's *Suisun Marsh Protection Plan*
SOI	sphere of influence

Term	Definition
special-status species	Any species that is listed, or proposed for listing, as threatened or endangered by the U.S. Fish and Wildlife Service or National Marine Fisheries Service under the provisions of the Endangered Species Act; any species designated by the U.S. Fish and Wildlife Service as a “listed,” “candidate,” “sensitive,” or “species of concern”; and any species listed by the State in a category implying potential danger of extinction.
SP	State Park
SPFC	State Plan of Flood Control
SRA	State Recreation Area
Standardized Emergency Management System (SEMS)	Established throughout California to manage and coordinate any emergency response involving more than one agency or jurisdiction. It is the cornerstone of the emergency response system and the fundamental structure for the response phase of emergency management. SEMS is authorized under the California Emergency Services Act for managing multiagency and multijurisdictional responses to emergencies in California.
State	State of California
stormwater capture system	A facility operated by a public agency and designed to capture and retain stormwater flowing upon the public right-of-way, or through a public stormwater management system or a public stormwater drainage system, for subsequent use.
stressors (ecosystem)	Actions or factors, whether human or natural, that cause negative impacts on desirable ecosystem elements, processes, and functions. *See also: globally determined stressor, legacy stressors, current stressors, and anticipated future stressors.*
stressor fees	A companion principle to user fee, stressor fees are paid by persons who have been identified as stressing Delta natural systems. The fees fund regulatory and restoration programs.
subsidence	Sinking of the land surface due to a number of factors, including groundwater extraction, agricultural activities, or oil or gas extraction. In the Delta, land subsidence is mainly caused by oxidation of peat soils, but also from wind erosion. Drainage and cultivation dries the saturated peat, reducing its volume by approximately 50 percent.
subsidence reversal	The exposure of bare peat soils to air causes oxidation and decomposition, which results in subsidence, or a loss of soil elevation, on Delta islands. Flooding these lands and managing them as wetlands reduces exposure to oxygen, resulting in less decomposition of organic matter, which stabilizes land elevations. Wetland vegetation cycles lead to biomass accumulation, which sequesters carbon and helps stop and reverse subsidence. As subsidence is reversed, land elevations increase and accommodation space (the space in the Delta that lies below sea level and is filled with neither sediment nor water) on individual islands is reduced. A reduction in accommodation space decreases the potential for water quality impacts from salinity intrusion in the event of one or more levee breaks on deeply subsided Delta islands.

Term	Definition
subventions	Payments made by the State in the form of matching funds for the purpose of maintaining and improving Delta levees. The Delta Levees Maintenance Subventions Program is a cost share program providing technical and financial assistance to local levee-maintaining agencies in the Sacramento–San Joaquin Delta for the maintenance and rehabilitation of nonproject and eligible project levees. The subventions program is authorized by Water Code sections 12980 through 12995 and is managed by the California Department of Water Resources.
surface storage	Reservoirs used to collect and hold water for future release and use.
surface water	Water naturally open to the atmosphere including rivers, lakes, reservoirs, ponds, streams, impoundments, seas, and estuaries.
sustainable communities strategy	Regional transportation agencies are required to develop a sustainable communities strategy. The strategy is intended to demonstrate how the region will meet its greenhouse gas reduction target through integrated land use, housing, and transportation planning.
SWP	State Water Project
SWRCB	State Water Resources Control Board
threatened species	As defined by the California Endangered Species Act, a threatened species is a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that, although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of the special protection and management efforts required by the act. Any animal determined to be rare on or before January 1, 1985, is a threatened species (Fish and Game Code section 2067).
THM	trihalomethanes
tiered fee structures	Refers to a block-type fee structure where the unit price of a quantified benefit or impact, such as the amount of water used or the volume of contaminants discharged, increases with each additional block of benefit or impact.
TMDL	See total maximum daily load
total maximum daily load (TMDL)	A calculation of the maximum amount of a pollutant that a water body can receive and still safely meet water quality standards.
total water use	In the Delta Plan, refers to 60 to 65 million acre-feet of water in California that goes to urban, agricultural, and Central Valley environmental water uses such as instream flow requirements and non-CVP managed wetlands.
tributary	A river or stream that flows into a larger river or stream. Usually, a number of smaller tributaries merge to form a river.
unimpaired flow	The natural water production of a river basin, unaltered by upstream diversions, storage, or by export or import of water to or from other watersheds.
urbanization	The expansion of residential, commercial, and industrial development into rural areas or areas that may have previously been used for agricultural or ecosystem habitat.
urban water use	The use of potable and nonpotable water for urban purposes including, but not limited to, residential, commercial, industrial, recreation, energy production, military, and institutional purposes.

Term	Definition
urban water use efficiency	Water management measures that are implemented in residential, commercial, industrial, and institutional settings that reduce water and per capita water use and result in the most effective use of water to prevent its waste, unreasonable use, or unreasonable method of use.
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
user fees	Fees proposed to fund programs identified in the Delta Plan that are paid by the users or beneficiaries of those programs. Fees may be volume-based or impact-based.
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UWMP	See urban water management plan
vector-borne disease	Disease that results from an infection transmitted to humans and other animals by blood-feeding anthropods, including mosquitoes, ticks, and fleas. Examples of vector-borne diseases include Dengue fever, viral encephalitis, Lyme disease, and malaria.
waste discharge requirement (WDR)	An order adopted by a regional water board that regulates and permits specified discharges of waste to surface water and discharges of waste to land.
water balance	An analysis of the total developed/dedicated supplies, uses, and operational characteristics of water in a region. The analysis is intended to determine if actual water use equals supply.
water demand	An economic principle that describes consumer desire and willingness to pay a price for a specific amount of water. Holding all other factors constant, the price of a good or service increases as its demand increases and vice versa.
water export	The amount of water that a hydrologic region transfers to another hydrologic region. *See also: Delta exports.*
water import	The amount of water brought in from another hydrologic region or regions.
water quality criteria	Numeric limitations or levels (for example, concentrations) or narrative statements established to protect uses of a water body under the authority of the Clean Water Act. This term has two separate meanings: (1) Water quality criteria promulgated by the U.S. Environmental Protection Agency under Clean Water Act section 303(c) are enforceable components of water quality standards. (2) Recommended water quality criteria published under Clean Water Act section 304(a) are advisory and may be used by states and tribes to develop their own water quality standards or to implement narrative criteria in water quality standards.
water quality objectives	Numeric limitations or levels (concentrations or narrative statements) that are established for the reasonable protection of the beneficial uses of a water body. Determination of what is reasonable may include factors that are not required in federal development of a water quality criterion. Water quality objectives are included in water quality control plans adopted by regional water boards.

Term	Definition
water quality standards	Pursuant to the federal Clean Water Act, water quality standards are provisions of State or federal law that define the water quality goals of a water body, or portion thereof, by establishing (a) designated uses of water to be protected, and (b) water quality criteria to protect those uses. Water quality standards are enforceable in the bodies of water for which they have been promulgated.
water recycling	(1) The treatment of wastewater to remove solids and certain impurities to meet a beneficial use or a controlled use that would not otherwise occur, thus supplanting or augmenting a potable, or potentially potable, supply. (2) The treatment of municipal, industrial, or agricultural wastewater for reuse.
watershed	The land area that drains into a stream. The watershed for a major river may encompass a number of smaller watersheds.
water shortage contingency element	The Urban Water Management Planning Act requires water suppliers to include a water supply reliability and water shortage contingency element in urban water management plans, recognizing that suppliers need to prepare for extended droughts or the potential catastrophic interruption of water deliveries due to earthquakes or other events.
water supply reliability	See sidebar in Chapter 3, "What Does It Mean to Achieve the Goal of Providing a More Reliable Water Supply for California?"
water supply reliability element	Required components of urban water management plans (Water Code section 10631(c)), agricultural water management plans (Water Code section 10826 (b)(7)), and integrated regional water management plans (Water Code section 10540(c)(1)).
water transfer	A temporary or long-term change in the point of diversion, place of use, or purpose of use due to a transfer or exchange of water or water rights. Many transfers, including transfers among contractors of the State Water Project or Central Valley Project, do not fit this definition. A more general definition of a water transfer is a voluntary change in the way water is normally distributed among water users in response to water scarcity. Compared to water exchanges, which are typically water delivered by one water user to another water user, the receiving water user will return the water at a specified time or when the conditions of the agreement are met (Water Code section 1735).
water year	A compilation of hydrologic records collected over a 12-month period.
water year-type classifications	California Department of Water Resources uses five water year-type classifications for planning and water management purposes: wet, above normal, below normal, dry, and critically dry.
WDR	See waste discharge requirement
Wild and Scenic River	A State- and federal-designated river system that includes 17 California rivers and their many forks and tributaries. Approximately 1,900 miles of river are designated wild, scenic, or recreational under the National Wild and Scenic Rivers Act (1968) and the California Wild and Scenic Rivers Act of 1972.
X2	The location in the Bay-Delta where the tidally averaged salinity is 2 parts per thousand.

References

Poff, N. L., and J. V. Ward. 1989. Implications of streamflow variability and predictability for lotic community structure: a regional analysis of streamflow patterns. *Canadian Journal of Fisheries and Aquatic Sciences*. 46:1805-1818.

Richter, B. D., J. V. Baumgartner, J. Powell, and D. P. Braun. 1996. A method for assessing hydrologic alteration within ecosystems. *Conservation Biology* 10(4), 1163-1174.

Walker, B. 1995. Conserving biological diversity through ecosystem resilience. *Conservation Biology* 9(4), 747-752.

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Exhibit C

to Comments on the Department of Water Resources Draft Environmental Impact Report for the Water Supply Contract Extension Project

SAN FRANCISCO BAY:

THE FRESHWATER-STARVED ESTUARY

HOW WATER FLOWING TO THE OCEAN SUSTAINS CALIFORNIA'S GREATEST AQUATIC ECOSYSTEM

The Bay Institute

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PREPARED FOR:

SAN FRANCISCO ESTUARY PARTNERSHIP

BY:

The Bay Institute

SEPTEMBER 2016

The Bay Institute

bay.org

The Bay Institute is the research, policy and advocacy arm of bay.org, a nonprofit organization dedicated to protecting, restoring and inspiring conservation of San Francisco Bay and its watershed, from the Sierra to the sea. Since 1981, the Bay Institute's scientists and policy experts have worked to secure stronger protections for endangered species, water quality, and estuarine habitats; reform how California manages its water resources; and design and promote comprehensive ecological restoration projects and programs in San Francisco Bay, the Sacramento-San Joaquin Delta, the Central Valley watershed, and the Gulf of the Farallones.

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SAN FRANCISCO BAY:

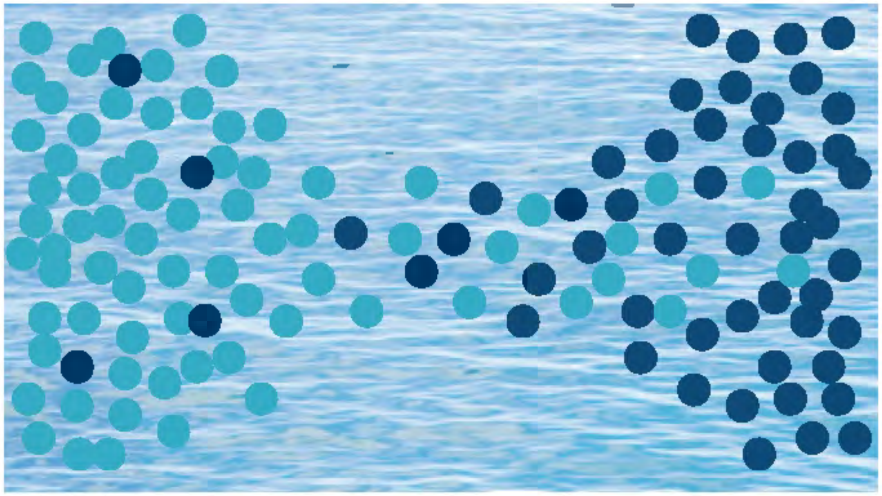
THE FRESHWATER-STARVED ESTUARY

The Bay Institute

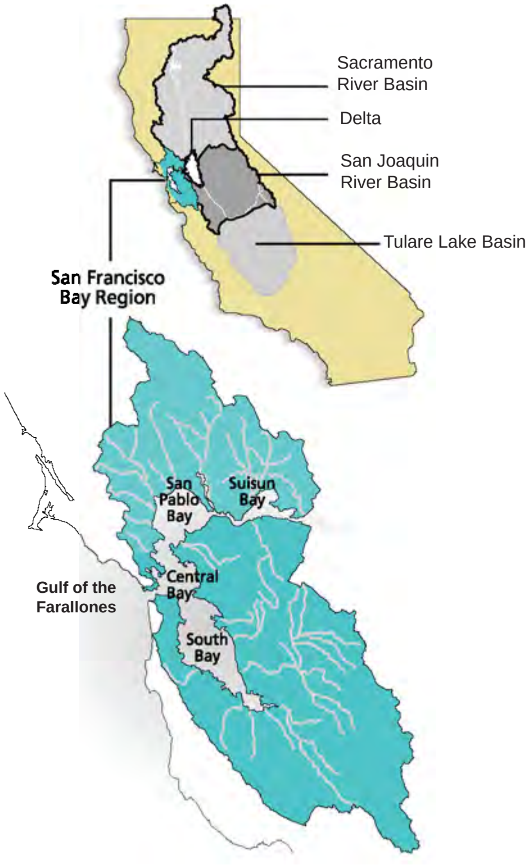
EXECUTIVE SUMMARY

INTRODUCTION

THE INFLOW OF FRESH WATER DRIVES THE HEALTH OF THE SAN FRANCISCO BAY ESTUARY AND ITS WATERSHED, FROM MOUNTAIN RIVERS TO THE PACIFIC OCEAN OUTSIDE THE GOLDEN GATE



San Francisco Bay is an estuary, where salt water and fresh water mix to form a rich and unique ecosystem that benefits fish, wildlife and people. Fresh water sustains the Bay ecosystem. Drastic changes to Bay inflow place the ecosystem, and the services it provides to all of us, at risk.



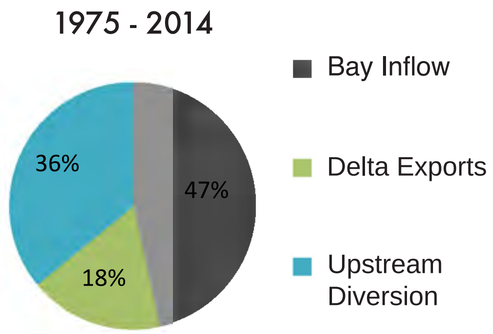
WHERE HAS ALL THE FRESH WATER GONE?

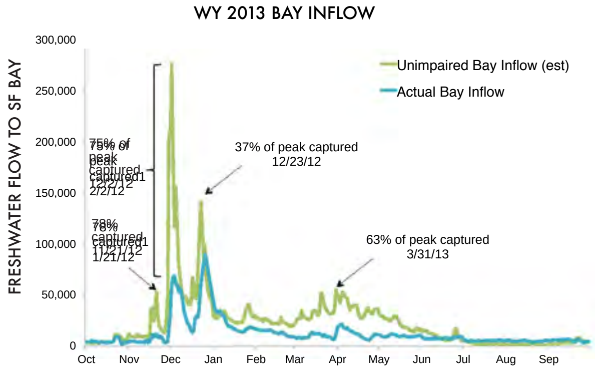
FRESH WATER NATURALLY FLOWED TO THE BAY – UNTIL WE STARTED CAPTURING AND REDIRECTING MOST OF IT, ESPECIALLY DURING ECOLOGICALLY CRITICAL PERIODS

Historically, most Bay *inflow* came from winter rains and spring snowmelt, which kept the upper estuary fresh most of the year and created increasingly brackish and saline habitats moving downstream to the Golden Gate. The Bay's fish and wildlife *evolved to take advantage* of these patterns of flow and habitat.

But, after building thousands of dams, over 600 large reservoirs, and 1,300 miles of diversion canals throughout the Bay's watershed, the flow that now reaches San Francisco Bay is **on average less than 50%, and in some years less than 35%**, of what it would be without those impairments. Ecologically critical winter and spring flows have been cut even more, with **about a third** of the seasonal unimpaired runoff and, just **one-fourth** of the runoff from some storms reaching the Bay.

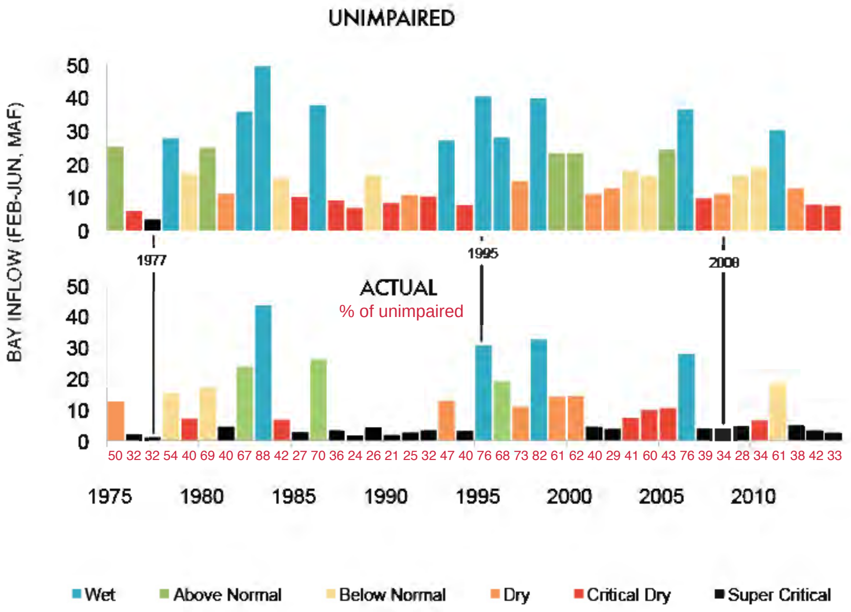
California's *water wars* – the fight over how much water cities, agriculture and the environment will get – are fought *upstream*, in the Bay's watershed and in areas that take water out of it. But *downstream*, in the Bay estuary and nearby coastal waters, is where the *outcomes of radically altering and reducing flows* can be seen most clearly. These outcomes include fish and wildlife species at serious risk of extinction, degraded water quality, shrinking beaches and marshes, and so much more.





THE CHANGE IS SO EXTREME THAT THE SAN FRANCISCO BAY ECOSYSTEM NOW EXPERIENCES A DEVASTATING, PERMANENT DROUGHT

Between 1975 and 2014, the unimpaired runoff in the watershed was only low enough to create a “supercritically dry’” year **once**, in 1977. But upstream diversions captured so much runoff during those four decades that the Bay experienced “supercritically dry” conditions – the amount of inflow typical in extreme drought – in **19 years** instead of only one. The resulting collapse of the Bay’s ecosystem is no surprise.



STARVING THE BAY

EXTREME FLOW REDUCTIONS DAMAGE THE BAY’S ECOSYSTEM

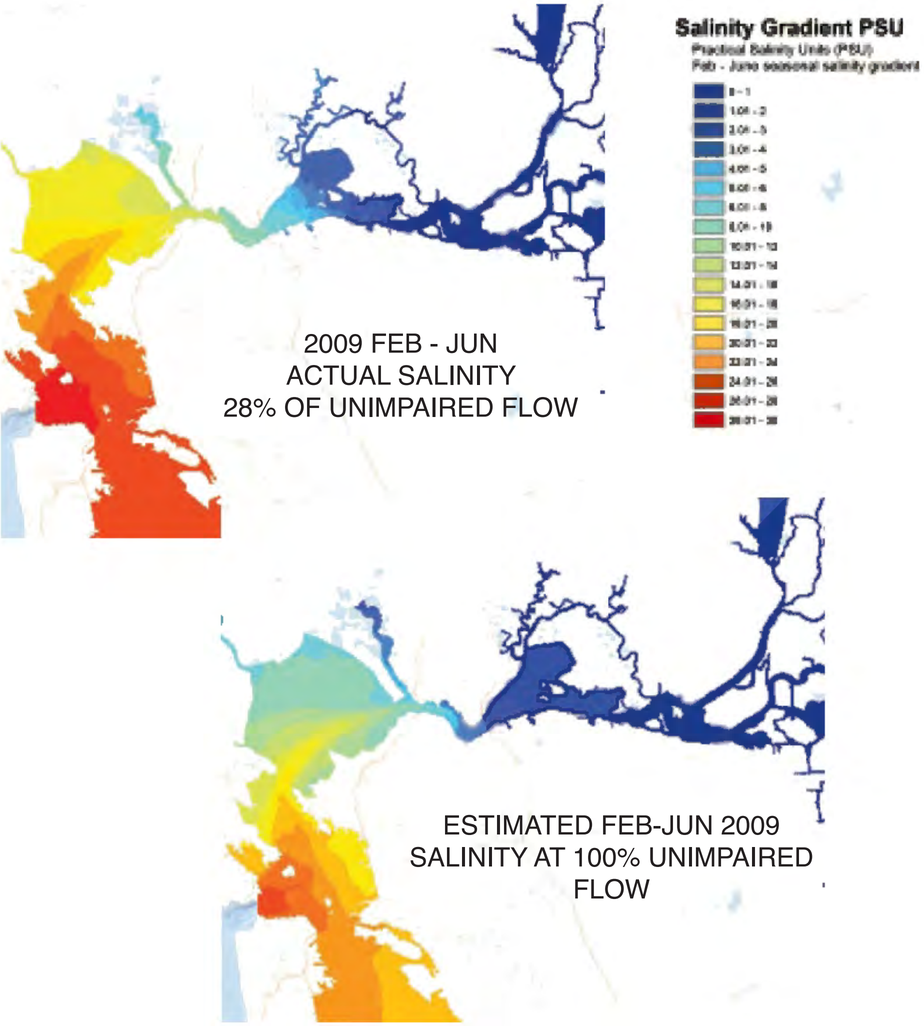
How much fresh water makes it to the estuary, *when*, and for *how long*, shapes the Bay’s ecosystem. Reducing Bay inflows so dramatically shifts the size and location of the ecologically important *salinity mixing zone*, reduces the inflow of *nutrients, food*, and *sediment* from the watershed that are vital components of fish and wildlife habitat; allows *pollutants* to accumulate; and facilitates *invasions* by undesirable non-native species.

SALINITY

The transition from fresh water to the ocean forms a gradient of increasingly saline habitats that are critically important for the estuary’s fish and wildlife. The amount and timing of inflow determines *where* and *how extensive* these productive low salinity habitats are. Winter and spring inflows move the critically important low salinity zone downstream in the upper reaches of San Francisco Bay. The *abundance* and *distribution* of many estuarine fish and invertebrate populations are *strongly* and *persistently associated* with the location of this zone; when it moves downstream, native species numbers increase.

Periods when the **average salinity was as high as in the past half-century previously occurred only three times in the last 1,600 years** – during recent droughts, January – July salinity was the highest it has been in 400 years. Reducing Bay inflow this drastically forces the low salinity zone to **move upstream**, exposing larval and juvenile fish to **poor water quality and habitat conditions** in the Delta, facilitating the **spread of**

invasive non-native species, and driving population **declines** of native species. Shifting the salinity field upstream also **brings salty water to fresh and brackish water marshes,** reducing the productivity of wetland habitats and number of plant and animal species in them, and slowing the formation of new soil.



2009 FEB - JUN
ACTUAL SALINITY
28% OF UNIMPAIRED FLOW

ESTIMATED FEB-JUN 2009
SALINITY AT 100% UNIMPAIRED
FLOW

Photo Credit: David Sanger

Further downstream, **persistent increased salinities** from reduced inflow displace the native invertebrate community in the Central Bay, **allowing non-native sea squirts to dominate** the subtidal zone. In the South Bay, freshwater inflows riding on the surface over a deeper, saltier layer support *the base of the food web* with *large plankton blooms;* the effect is dampened when flows are reduced. Similarly, outside the Golden Gate, a *plume of brackish water* that forms when winter and spring flows to the Bay ride on the surface, *stimulates plankton growth* and facilitates the movement of *nutrient-rich bottom water* into the Bay. Because so much fresh water is captured upstream, salinity at the estuary's downstream boundary has increased and the brackish water plume has diminished. In combination with warming seas, reduced flows from the Bay to nearshore waters are likely to **lower productivity** and increase the risk of **starvation and reproductive failure** in seabirds, fish, and marine mammals.

SEDIMENT

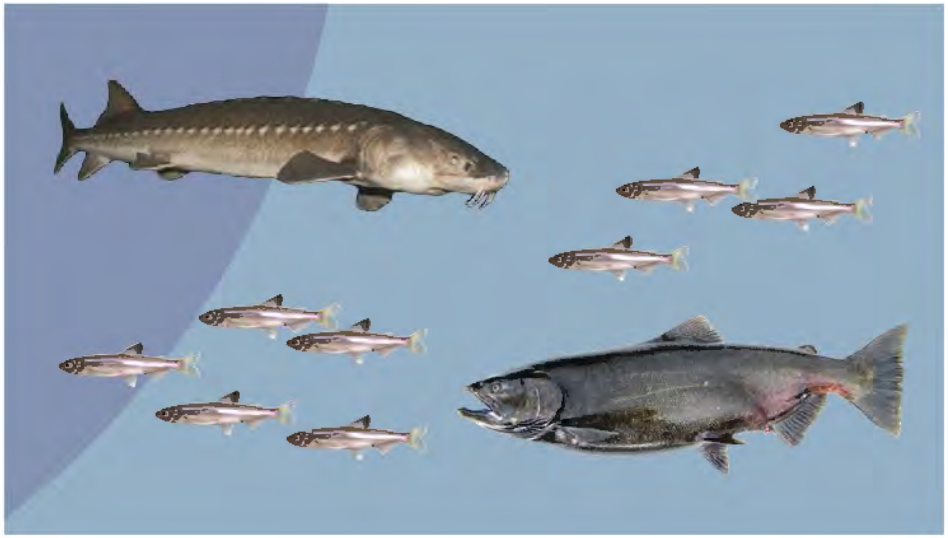
Higher Bay inflows carry more sediment (gravel, silt, and other particles), which helps *form and maintain wetlands and beaches*, and make the estuary's waters *more turbid*, or cloudy, protecting fish and invertebrates from predators. But dams and diversions capture sediment and reduce sediment-carrying flows. Sand makes up 70% of the Sacramento River's sediment load when flows are high; reducing flows helped **cut the sediment load in half** between 1957 and 2001. Flow reduction combined with other factors facilitated the shrinking of sandy beaches in the Bay by **two-thirds**, a **50%** increase in coastal erosion, and a decline of up to **40%** in turbidity in the upper estuary.

POLLUTION

When Bay inflows are low, concentrations of chemical and biological contaminants build up, sometimes to toxic levels, and increase the amount of time these pollutants spend in the estuary. Heavy metals and synthetic compounds like **copper, mercury, PCBs** and **silver** are more readily incorporated by aquatic organisms, at lower flows. The trace element **selenium**, which causes **birth defects** and **reproductive mortality** in many species, accumulates more rapidly in clams, and the fish and birds that prey on them, when flows are at the low levels seen in recent years. Low flows also encourage **toxic algae blooms,** which produce **neurotoxins** that build up in the environment and can kill animals and sicken people. These blooms are becoming **more frequent** in the upper estuary, and their toxins are detectable throughout the Bay.

FOOD WEB PRODUCTIVITY

San Francisco Bay is a *highly productive nursery* for fish, birds, mammals, and invertebrates like crabs and shrimp. Freshwater inflow stimulates the Bay estuary's food web by *increasing production of fish and large planktonic animals* that thrive in the muddy waters and wetlands that are created and sustained by sediment-laden peak flows. Flows also *transport* some of these organisms to other parts of the estuary, where they become prey for other species. **Altering flows alters the food web.** As flows decline, the **biomass of important invertebrate prey populations like Bay shrimp declines** correspondingly; water clarity increases, increasing the **rate of predation** on food prey species; and **non-native species colonize the estuary**, competing with or preying on native species. If the amount and timing of Bay inflows are allowed to more closely approximate natural patterns, these effects can be reversed.



WHO SUFFERS FROM THE BAY'S FRESH WATER STARVATION DIET?

The Bay ecosystem supports more than *750 plant and animal species*, including four unique runs of *Chinook salmon*, and millions of *waterbirds*. Seven million residents and more than twice as many visitors enjoy *seafood* produced locally in this estuary, *recreate* along its shores or in its waters, and draw satisfaction from its *wetlands* and *wildlife*. Reducing Bay inflows puts all of these values at risk.

VIABLE FISH AND WILDLIFE POPULATIONS NEED FRESH WATER

Conditions in the flow-starved estuary are very different from those in which native plants and animals evolved. As a result, some of the **most common species**, like Delta smelt, Chinook salmon, and sturgeon, are now among the **rarest**. What these and many other species – organisms that vary in their life histories, role in the food web, and location in the estuary – have in common is the *strong relationship between flow and healthy populations*.

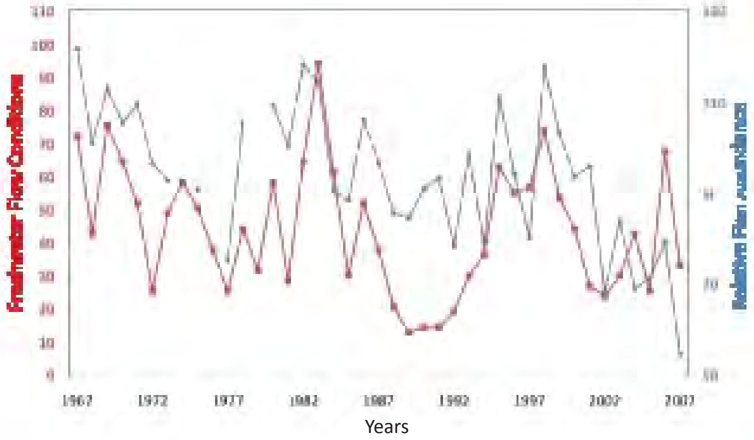
To be viable, the Bay's plants and animal populations need to be:

- abundant (higher populations ensure long-term survival through a range of different conditions)
- diverse (increased variation among individuals increases the odds that some will respond successfully to changing environmental stresses)
- productive (faster population growth rates allow species to exploit good conditions in a variable environment); and
- spatially distributed (exists in a large enough area reduces the risks posed by local catastrophes)

ABUNDANCE

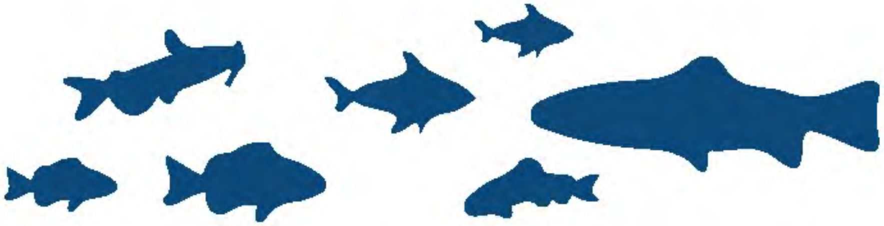
Reproduction, growth, and migration of many species, from invertebrates to forage fish to migrating salmon, are timed to occur during the critical winter and spring months when flows are higher. The *number of individuals* in these populations is strongly influenced by *how much Bay inflow* occurs during this period – this is one of the best-documented facts known about the Bay estuary. The dramatic decline in abundance of many populations closely tracks the dramatic decline in winter – spring Bay inflows; that is, **less flow has resulted in less fish** – for some species, populations are at **record or near record low levels.** In contrast, the abundance of many non-native species is inversely proportional to flow, increasing under low flow conditions. Flows in the fall also create brackish water habitat for Delta smelt and help returning adult salmon find their home spawning grounds.

MORE FRESHWATER = MORE FISH



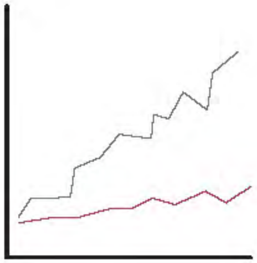
DIVERSITY

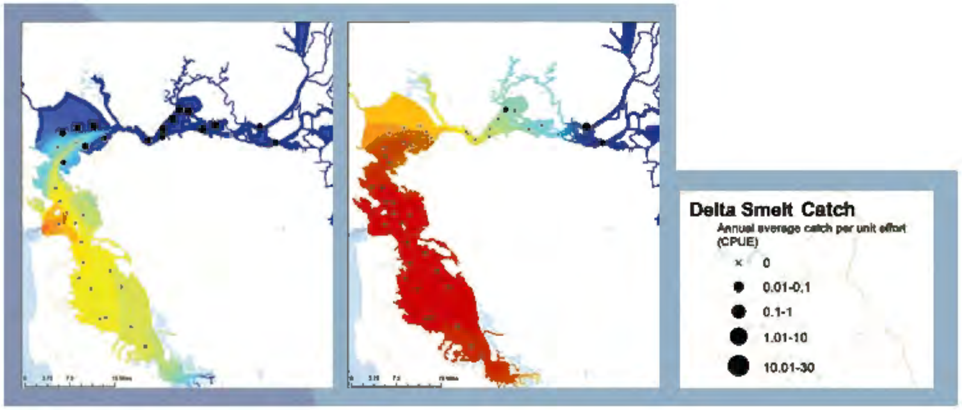
A population with more diverse individuals is *less vulnerable to extinction* because it has a *portfolio* of possible behavioral and ecological responses to changing or variable conditions. Restricting the amount and timing of flows year after year favors the survival of a **small subset of individuals** that are only able to prosper under a limited set of conditions. For instance, nearly **eliminating peak Bay inflows from the San Joaquin River and replacing them with small artificial pulses that occur during just one month** narrows the migration window for Chinook salmon, in essence gambling that these fish will reach the ocean exactly when food supplies and other conditions are good. The **collapse of California's salmon fisheries** shows that this gamble has not paid off.



PRODUCTIVITY

Fish and wildlife populations that can *grow quickly* can *rebound quickly* following times when conditions are poor. The Bay estuary's species evolved to rebound in wetter years after periods of drought. But the Bay's "permanent drought" means that wet years are infrequent and much less wet, and drier years are extremely dry and nearly continuous. As a result, the **higher flows that would allow populations to rebound rarely occur**, and the growth rate is limited or even negative.





SPATIAL DISTRIBUTION

When all individuals in a population are concentrated in a small area, the population is **more vulnerable to extinction** due to localized catastrophes. Lower Bay inflows significantly **reduce the size of the low salinity habitat** that many species depend on. Low inflows also shift this habitat– and the populations using it – upstream, exposing imperiled fish to the giant Delta pumps, where on average **9 million fish** are screened out of the exported water each year - **most do not survive** from the experience. In addition, to creating important habitat types, freshwater inflows to the Bay also help transport organisms between essential habitats. By **degrading water quality, eliminating signals that fish and wildlife use to orient themselves**, and **even drying up sections of rivers**, low Bay inflows can prevent populations from spreading out or migrating.

Photo Credit: Richard Eskite

DRIVING RECREATIONAL AND COMMERCIAL FISHERIES TO THE EDGE?

The flow and habitat conditions that once prevailed in San Francisco Bay made the area a *hub of commercial and recreational fishing activity on the West Coast*, with important fisheries for salmon, sturgeon, smelt, striped bass, and other species. The long-term trend of reducing Bay inflows has been a major factor in the **loss of thousands of fishing jobs** over the past few decades and the **historic closure of the ocean salmon fishery** in 2008-2010. While deteriorating ocean conditions, upstream habitat degradation, and poor hatchery management also played a role, scientists studying the closure have identified **better flow conditions as one of the few actions that can be taken to restore** the salmon fishery. **Starry flounder, sturgeon, and splittail** are other commercially valuable fisheries that depend on adequate flows and that are **also at risk.**

FLOW (AND FORAGE FISH) IS FOR THE BIRDS...

Forage fish (small fish and large invertebrates) that are *food items* for many larger fish, bird and mammal species perform a *crucial function* in the estuary's food web. For instance, fish-eating birds, such as pelicans, terns, and cormorants, rely on the existence of sufficient forage fish populations to feed them. Populations of many once common native forage fish species, like smelt, salmon, and shrimp, have **declined dramatically** in response to extreme reductions in Bay inflows and are now well below the levels needed to maintain viable populations of **other fish, pelagic seabirds and marine mammals,** so these other populations **are at risk of collapsing** too. Also, as reduced inflows reduce the area of brackish and freshwater wetlands or convert them to salt marsh, their **habitat value** for many bird populations is likely to **diminish.**

...AND THE WHALES

Marine mammals like seals and whales are a great tourist attraction in the Bay Area and the Northern California coast. By diminishing productivity and constricting the estuary's food web, reduced Bay inflows produce cascading effects that eventually create problems for these species. For example, **Orca whales** outside the Golden Gate prey on Chinook salmon, which were historically abundant and high in fat content; **dwindling salmon runs threaten** the local whale population.

… AND THE PEOPLE

Bay Area residents and tourists don’t just benefit from Bay inflows by catching fish, buying local seafood, or going whale watching. They also *wade, swim, sail and kayak* its waters and play on its *beaches* and in its *wetlands*. But low flows **degrade water quality** in general and are now beginning to cause periodic **harmful algae blooms,** in particular. Some cyanobacteria blooms produce **neurotoxins powerful enough to make humans sick** and kill small mammals; although the blooms occur in the upper estuary, neurotoxins produced upstream have been detected in the Central Bay. Low Bay inflows also **threaten the continued existence** of beaches and wetlands throughout the region. As rising sea levels and other forces erode these popular areas, water diversions **limit the peak flows** that would normally resupply them with sediment.

WARNING
BEACH CLOSED
THE WATER TEMPORARILY DOES NOT MEET CURRENT HEALTH AND SAFETY STANDARDS FOR HUMAN CONTACT OR FISHING.
CITY OF PACIFICA

Photo Credit: David Ferris

A Bay Area where it’s hard to catch salmon, see pelicans or Orca whales, find today’s local catch at the restaurant, hang out at the beach, or even be in contact with the water? This is a **high price to pay for ignoring the effect** of the radical alteration of Bay inflows on the many ecosystem services and economic benefits that the San Francisco Bay estuary provides.

TURNING THE FLOW BACK ON

Fortunately, there are actions that Californians can take to avoid that increasingly likely scenario.

ADOPT STRONGER WATER QUALITY STANDARDS FOR THE BAY ESTUARY NOW

Overwhelming evidence demonstrates that today’s **21-year old Bay-Delta water quality standards do not require nearly enough flow** to protect the beneficial uses of the San Francisco Bay Estuary’s waters as mandated by the Clean Water Act. That finding has been confirmed time and again by policy makers, regulatory agencies, and independent science review panels. Yet California is still years away from completing the update of its standards begun in 2009, despite the federal requirement to review standards every three years. It’s **time to end the delays and adopt new standards** that require enough flow to restore estuarine productivity and viable fish and wildlife populations, discourage the establishment and spread of invasive non-native species, and use indicators of biological and ecosystem health to measure progress and increase effectiveness.

REQUIRE ALL WATER DIVERTERS TO CONTRIBUTE THEIR FAIR SHARE

The primary responsibility for meeting Bay estuary water quality standards falls on a small subset of water districts that get water from the federal and state water projects. These agencies represent **a quarter or less of total water use** in the Bay’s watershed. Requiring all water users, including those with senior water rights, to contribute a **fair share** would spread the burden more equitably and generate **millions of acre-feet of additional water to restore the estuary.** It’s also time to more broadly overhaul California’s antiquated water rights system, which favors older water claims over the needs and public benefits generated by different water uses; this system has also awarded the right to use **five times more water in California than occurs naturally**, on average.

REDUCE RELIANCE ON THE DELTA AS A SOURCE OF WATER SUPPLY

In 2009, California adopted a landmark policy to reduce reliance on water supplies from the Delta region of the upper estuary and increase local self-reliance in areas that take water out of the Delta. California has only begun to tap the potential for local self-reliance; using water more efficiently, reusing and recycling water, cleaning up degraded water, capturing and reusing stormwater runoff, and storing water underground in aquifers **could save up to 14 million acre-feet of water** – over half the total amount of water used for human use throughout the Bay's watershed each year – each year. Implementing the new policy could also significantly **reduce California's carbon footprint;** for instance, transporting water via the State Water Project represents about 3% of the state's total energy consumption. Setting **targets for conserving water in the agricultural sector** – which uses about 80% of the state's developed water supplies – would generate additional water to restore a healthy Bay estuary and establish greater parity between agriculture and the urban sector, which is required to achieve a per-person conservation target of 20% by 2020.

Photo Credit:
Fernand Ivaldi
Getty Images

INTEGRATE FLOW AND HABITAT RESTORATION TO BATTLE CLIMATE CHANGE

Wetlands and beaches not only provide important habitat for fish and wildlife; they also act as natural flood barriers to protect shoreline communities in the Bay Area and Northern California. Loss of sediment supply and rising sea levels threaten to erode these benefits by literally eroding wetlands and beaches to nothing. **Freshwater flow regimes that help maintain wetlands and beaches** should be a part of efforts to design, evaluate, and permit restoration of these critical areas.

WE MUST ACT NOW

The science overwhelmingly indicates that more freshwater flow, following a more natural pattern, must reach the San Francisco Bay estuary to restore its fish, wildlife, water quality, food web, marshes, beaches, coastal fisheries, and other public benefits. The only barriers to action are the general lack of understanding about the severely degraded condition of this freshwater flow-starved estuary and the lack of political will to change the unsustainable way California manages its water resources. Can Californians be made aware of the pending collapse of the Bay estuary ecosystem – and the loss of all that ecosystem provides us – and motivated to demand action now? Can decision-makers at every level – federal, state, and local – be prevailed upon to take the steps necessary to prevent the destruction of California's greatest aquatic ecosystems before it is too late? The window of opportunity to protect this treasure is closing rapidly.

Butter Lupine Photo Credit: David Sanger

INTRODUCTION

THE FLOW OF FRESH WATER DRIVES THE HEALTH OF THE BAY AND ITS WATERSHED, FROM MOUNTAIN RIVERS TO THE PACIFIC OCEAN OUTSIDE THE GOLDEN GATE

The San Francisco Bay estuary is one of the world's great ecosystems – a natural treasure comparable in scale and importance to the Everglades, Chesapeake Bay or the Great Lakes. Like these other large ecosystems, the health of San Francisco Bay is at risk from many environmental insults. Contaminated agricultural runoff and legacy pollutants poison aquatic food webs. Invasive plants and animals compete with native species for food and habitat. Only a small fraction of its original wetlands remain. But perhaps the most serious and seemingly intractable threat comes from the large-scale and unsustainable diversion of the fresh water that should flow to the Bay from its vast watershed in California's Central Valley ("Bay inflow"). The radical alteration of Bay inflow is intimately connected to every other problem that threatens the Bay estuary's ecosystems. The inescapable facts are that the Bay estuary is being starved of the freshwater flow that makes it California's greatest aquatic ecosystem – and that people don't understand that fresh water flowing to the ocean is what keeps the Bay alive.

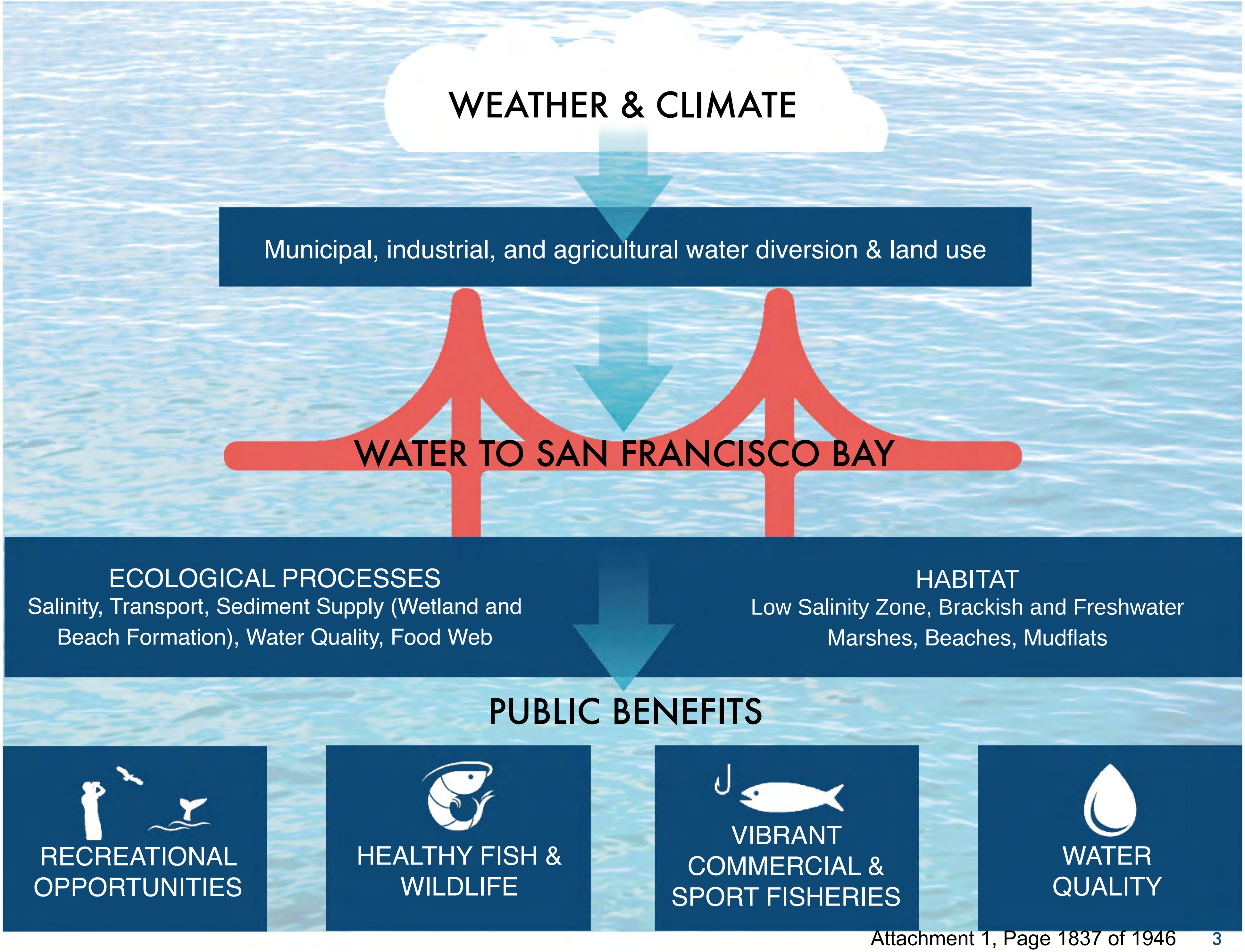
Freshwater flows define the San Francisco Bay estuary. As the place where fresh water and saltwater mix, the estuary provides a unique brackish water ecosystem for hundreds of plant and animal species – many found nowhere else on Earth. San Francisco Bay is the most famous and recognizable part of this estuary, an ecosystem formed by the mixture of fresh water from the rivers and streams of California's Central Valley and salt water from the ocean. When freshwater inflow to an estuary is drastically altered, as in it has been for San Francisco Bay, the very nature of the ecosystem is changed, with dramatic consequences for the fish and wildlife that depend on the estuary's unique habitats. Ultimately, people who enjoy the many benefits this ecosystem offers – from its fishable and swimmable waters to its beaches and rich wetland habitats – lose out when we deny the estuary the freshwater flow it needs.

THE BAY IS A MAJOR BUT UNAPPRECIATED CASUALTY IN CALIFORNIA'S "WATER WARS"

The long-standing conflicts over how much water should be diverted from the estuary and its watershed to provide water for irrigation, industry, and drinking water supplies are often depicted as occurring far upstream from San Francisco Bay. News stories describe battles over how much water should be held back in the thousands of reservoirs in the Bay's watershed, or diverted from Central Valley rivers, or exported by the giant pumps in the Sacramento-San Joaquin Delta, in order to be delivered to cities and farms. Government agencies and water districts fight over appropriate limits on water extractions in order to safeguard water quality, fish, and wildlife. People debate whether agribusiness should grow thirsty crops that depend on government subsidies and water from overdrafted groundwater basins and distant watersheds, and whether agricultural water use should be metered in our semi-arid environment.

What is rarely mentioned is that the outcomes of all battles in these water wars affect the Bay and the coastal ocean outside the Golden Gate. Most of the freshwater flow that shaped these environments historically is captured today in a massive system of reservoirs, siphons and pumps. The loss of freshwater flow is harming the Bay and the nearshore marine ecosystems, the fish and wildlife that depend on them, and the humans that benefit from and enjoy them (Figure 1).

Figure 1: The amount and timing of critical freshwater inputs to the estuary are a function of what nature provides and the amount of water humans divert and store upstream. Unsustainable water diversions lead to altered ecological processes and degraded habitats which produce cascading effects on many beneficial uses that people gain from a functioning estuary ecosystem. The amount of fresh water reaching San Francisco Bay generates myriad public benefits, including healthy fish and wildlife populations, improved water quality, viable commercial and recreational fisheries, and ample recreational opportunities such as enjoying beaches or viewing wildlife.



WEATHER & CLIMATE

Municipal, industrial, and agricultural water diversion & land use

WATER TO SAN FRANCISCO BAY

ECOLOGICAL PROCESSES
Salinity, Transport, Sediment Supply (Wetland and Beach Formation), Water Quality, Food Web

HABITAT
Low Salinity Zone, Brackish and Freshwater Marshes, Beaches, Mudflats

PUBLIC BENEFITS

- RECREATIONAL OPPORTUNITIES
- HEALTHY FISH & WILDLIFE
- VIBRANT COMMERCIAL & SPORT FISHERIES
- WATER QUALITY

CALIFORNIA'S PAST INVESTMENTS IN THE BAY ARE AT RISK

Californians have invested a half-century of effort and billions of dollars to control water pollution, restore wetlands and prevent exotic species from being introduced to the Bay estuary. But that enormous financial and social investment is at risk unless we let a larger share of the watershed's runoff flow downhill to the Bay. Californians can protect their investment in the Bay by changing the water use and water management practices that prevent us from protecting the freshwater flows that support this majestic ecosystem and the jobs that rely on its health.

This report describes how:

- The Bay's natural freshwater flow regime has been altered by the world's largest system for capturing and moving water;

- The estuary's vital ecological processes, including salinity distribution, transport of sediments, nutrients, and food, pollution control, habitat availability, and food web dynamics, are damaged by these alterations to the natural runoff pattern; and,

- The living beings that depend on the health of the Bay, from simple aquatic plants, to forage fish, to migrating salmon, to marine mammals, to humans, are at serious risk from the loss of services the Bay ecosystem provides.

Photo Credit: The Bay Institute

WHERE HAS ALL THE FRESH WATER GONE?

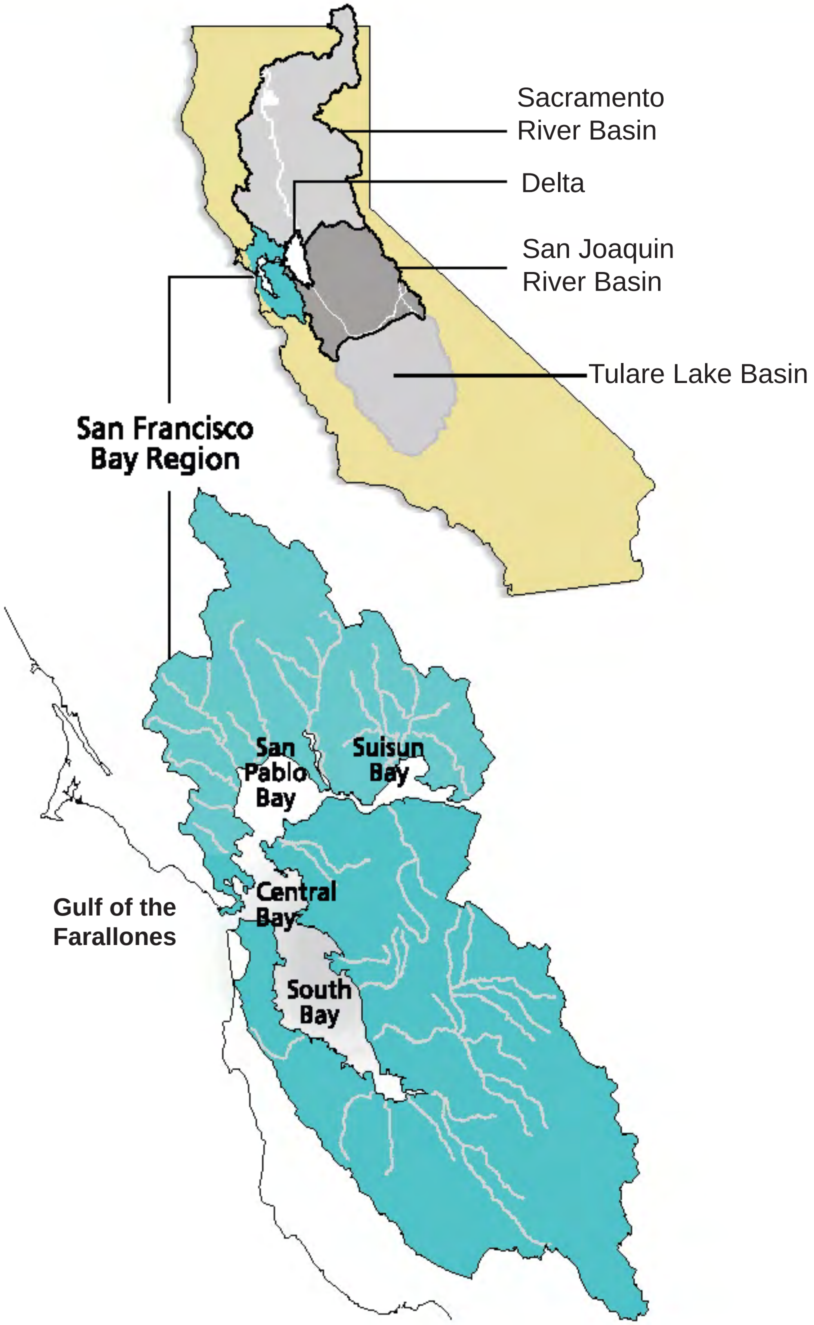
PATTERNS OF NATURAL AND ALTERED FLOW TO SAN FRANCISCO BAY

San Francisco Bay is part of the largest estuary on the west coast of the Americas. The estuary extends from the inland Delta where the Sacramento and San Joaquin Rivers of California's Central Valley converge, out to the nearshore coastal waters of the Gulf of the Farallones. The Bay itself encompasses four major embayments – Suisun Bay, San Pablo Bay, Central Bay, and the South Bay (Figure 2).

THE SAN FRANCISCO BAY ESTUARY AND ITS WATERSHED

Figure 2: From the peaks of the mountain ranges surrounding the Central Valley to the Golden Gate, the San Francisco Bay watershed historically drained up to 40% of California's land area. Most of the Bay's inflow comes from rivers and streams that flow into the Sacramento and San Joaquin Rivers and then is funneled through the Delta to the Bay. Locally important creeks and rivers that discharge directly into the Bay contribute about 10% of the Bay's freshwater inflow. The once vast Tulare Lake periodically overflowed into the San Joaquin River, but now the basin of this dry lakebed contributes water to the Bay only in the wettest years.

Sacramento - San Joaquin Delta
Photo Credit: David Sanger



Freshwater flow drives everything that happens here. The Bay's vast watershed now drains about a third of the land area of California, collecting surface and ground water from the Sacramento and San Joaquin River watersheds, and in exceptionally wet years, from the Tulare Lake Basin, south of Fresno (which contributed water to the Bay more frequently before the construction of the current water supply system). Smaller rivers and creeks that flow directly into the Bay such as the Napa River, Guadalupe River, Sonoma Creek, Coyote Creek, Alameda Creek, San Francisquito Creek and Walnut Creek contribute less than 10% of inflow[1].

FRESH WATER NATURALLY FLOWED TO THE BAY....

The natural pattern of freshwater inflow to the Bay is shaped by California's Mediterranean climate. About 80% of the annual precipitation in the Bay's watershed occurs from November through March[2]. Winter storms can deposit large amounts of rain or snow in a matter of days, increasing runoff dramatically for short periods and periodically freshening the Bay. As temperatures warm in the spring, accumulated water held in the mountain snowpack – the state's largest "reservoir" – melts and flows into the Bay, with high runoff that freshens the Bay for a much longer period than the peak flows that follow winter rainstorms. The high volume of the spring flow establishes an ecologically important salinity gradient in the estuary, which creates freshwater habitats in the Delta and parts of northern San Francisco Bay and increasingly brackish water habitats closer to the Golden Gate. As freshwater flows to the Bay decline in late summer and early fall, the zone of brackish water moves upstream as far as the western part of the Delta. Except under drought conditions, the Delta remains a freshwater ecosystem throughout the year[3].

As discussed later in this report, the estuary's native species have adapted to this naturally variable pattern of inflow to the Bay. The first pulses of runoff from winter storms trigger the migratory journeys of juvenile salmon and cue fish that live in the Delta and northern San Francisco Bay to begin to move to spawning areas. The large winter floods and spring snowmelt shape habitat availability in the estuary and drive numerous essential ecological processes downstream.

High year-to year variability in precipitation and runoff is characteristic of a Mediterranean climate. Multi-year wet periods and dry periods (droughts) also are typical. Since the mid-1970s, the Bay's watershed has experienced three very dry periods (1976-1977, 1987-1992, and 2012-2015) and two extended wet periods (1978-1986; 1995-2000). Within the last millennium, the watershed has experienced even longer (decade- to century-long) droughts and wet periods[4]. The high variability between seasons and across years and the resulting shifts in the estuary's salinity were probably essential in limiting the establishment of invasive non-native species prior to the 20th century.

... UNTIL WE DISRUPTED THE PATTERN – AND RADICALLY REDUCED FLOWS TO THE BAY

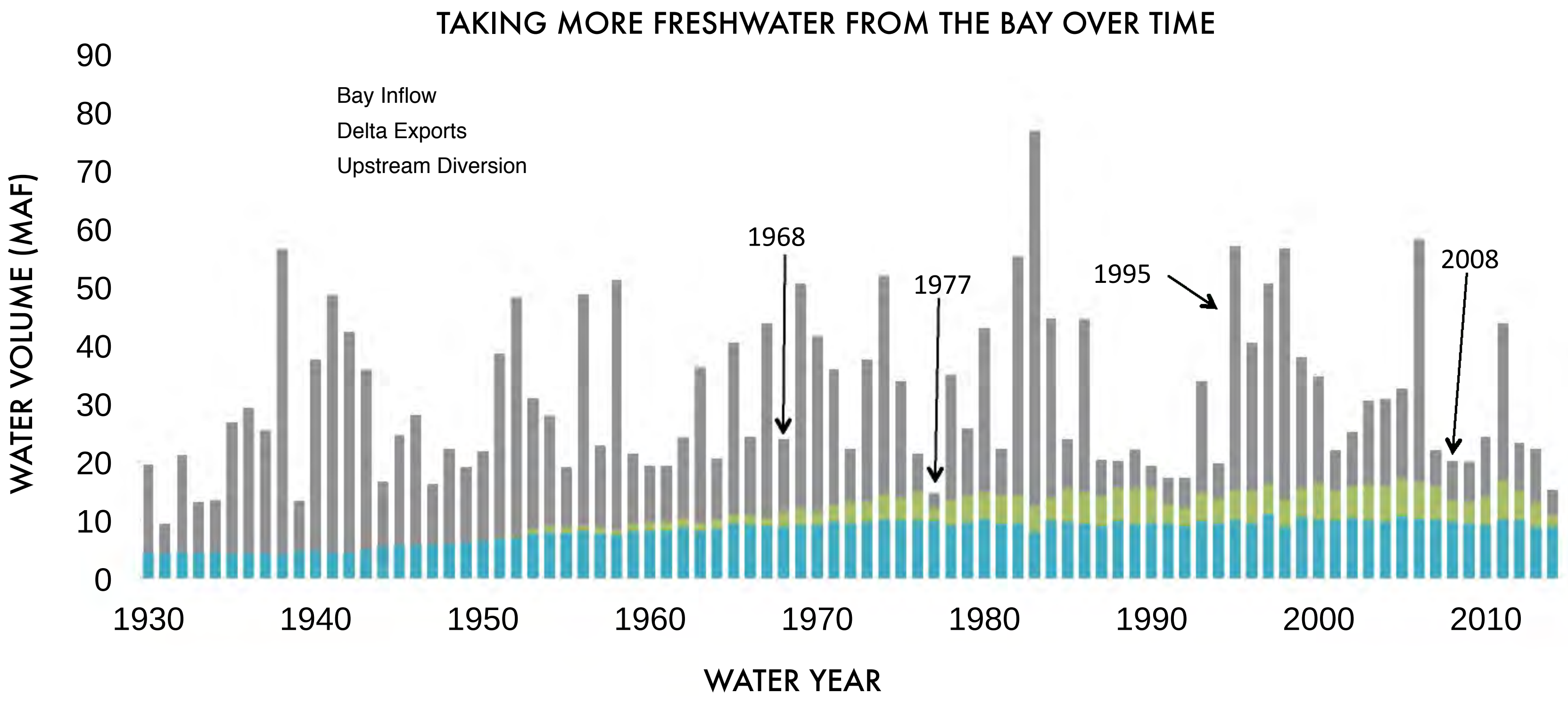
By draining and filling wetlands and floodplains for conversion to agriculture and denuding hillsides for mining and logging, Californians began to change the pattern of runoff from the Bay's watershed in the latter half of the 19th century. These actions reduced the watershed's capacity to absorb snowmelt and storm runoff and increased the sediment load in rivers and streams. Agricultural diversions upstream of the estuary also increasingly reduced the total amount of fresh water that made it to the estuary. The impact on Bay inflows throughout the watershed became more pronounced in the 1920s and 1930s as flood control projects were built in the Sacramento Valley, the construction of dams and use of motorized pumps for wells drove the tremendous expansion of irrigated agriculture, and growing Bay Area cities started importing water from rivers that drained to the Bay. Urban landscapes, with their impermeable surfaces, further decreased the watershed's ability to retain or slow runoff from periodic storms. Much larger inflow changes resulted from the construction and operation of the massive federal Central Valley Project (CVP) – including Shasta Dam on the Sacramento River, Friant Dam on the San Joaquin River, and the Tracy Pumping Plant in the Delta – in the 1940s and 1950s.

The final component in the radical alteration of the Bay's hydrology came in the 1960s and 1970s when the State Water Project (SWP) began operating the Banks Pumping Plant in the Delta that exports water to cities in the southern Bay Area and Southern California and agriculture in the San Joaquin Valley. Together, the state and federal Delta pumping facilities are part of the world's largest water storage and conveyance system; they have become the single largest extractor of the Bay watershed's fresh water. Since 1985 the combined CVP/SWP exports from the Delta have averaged over 5 million acre-feet per year, and over 6 million acre-feet per year in the period from 2000 to 2007 (Figure 3).

Since the SWP began exporting water from the Delta, a variety of state, federal, and local water agencies have constructed many more large dams and canals throughout the Sierra Nevada and Central Valley to capture, store and transport watershed runoff. Thousands of dams, over 600 large reservoirs, and 1300 miles of aqueducts now store and re-distribute over 30 million acre-feet of water, roughly equivalent to the surface water runoff from the entire watershed in an average year[5].

This massive transformation of the watershed has dramatically altered every component of the natural Bay inflow pattern, including the magnitude and timing of flows, the frequency and duration of high flow events, and the variability between high and low flows. The magnitude of the reduction in freshwater flow inputs is revealed by comparing the amount of water that actually reaches the Bay to the amount that would have reached the Bay if there were no dams, diversions, or exports of water ("unimpaired flow" or "unimpaired runoff"). The percentage of annual unimpaired flow that actually reached the Bay prior to the completion of Shasta Dam (1945) was much greater than it has been since the SWP began withdrawing major amounts of flow from the Bay's watershed, in 1968. Since 1975, total annual flow is on average less than 50% of what it would be without storage in dams, diversions, and direct exports from the Delta (Figure 3). In some years, it is less than 35% (Figure 5, left panel). Worse yet, even greater reductions in flow during the ecologically important winter and spring seasons occur frequently.

TAKING MORE FRESHWATER FROM THE BAY OVER TIME



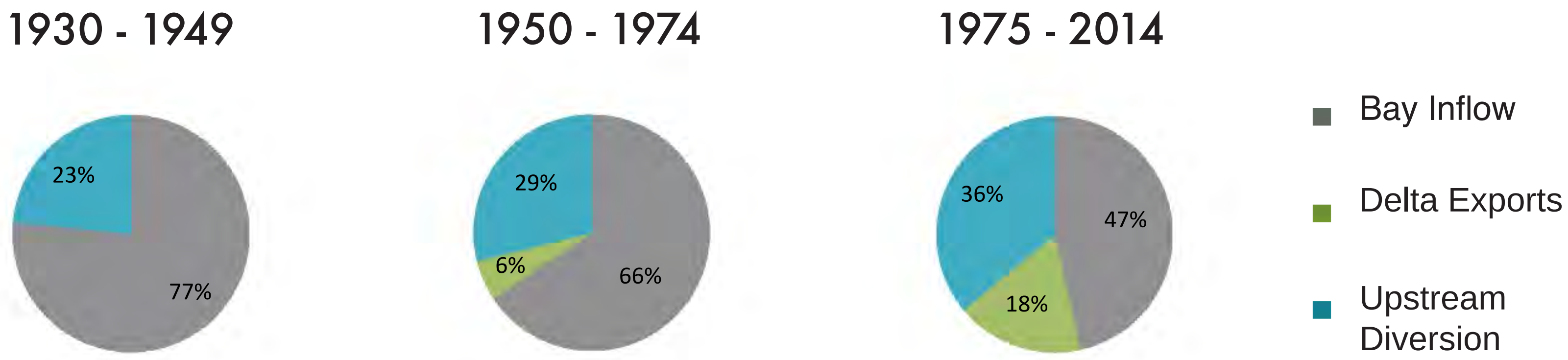


Figure 3: The amount of fresh water that would flow to San Francisco Bay from California's Central Valley (bars, top panel) varies tremendously from one year to the next. By contrast, the amount of available Central Valley runoff that is diverted or stored upstream (aqua bars) or exported from the estuary (green bars) for agricultural, industrial and municipal uses has increased steadily over the last half century. As a result, the proportion of water diverted or exported from the estuary has also dramatically increased over the same time period (pie charts, bottom panel), leaving less water to flow into the Bay (grey). Recently, diversions and exports of water have averaged approximately half of the amount available – in dry years, much less than half the runoff reaches the Bay. Important years identified in the figure, include 1968, when the State Water Project began exporting water from the Delta; 1977, a record drought year; 1995, when water quality standards for the estuary were last updated; and 2008, when new federal protections for imperiled Delta smelt, Chinook salmon, steelhead, and green sturgeon were issued.

About 80% of the water diverted from the Bay's watershed is used for agricultural irrigation. Photo credit: Fernand Ivaldi, Getty Images

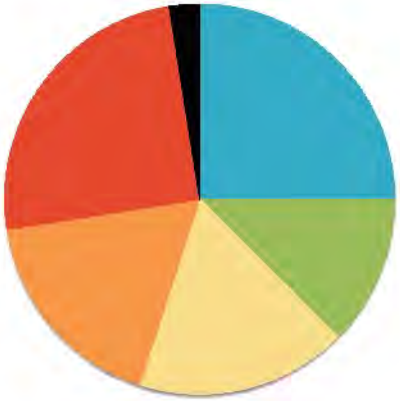
SAN FRANCISCO BAY'S DEVASTATING, PERMANENT DROUGHT

Because Bay inflows have been drastically reduced and flow patterns radically altered, the estuary has experienced extreme drought conditions for much of the past four decades. The amount of runoff associated with the very driest years was once the exception. It is now the new normal. The overall change in Bay inflows from human water use has been so severe that the Bay ecosystem is experiencing a nearly permanent drought (Figure 4). The driest winter – spring period in the last 95 years occurred in 1977. But because so much runoff is now captured (especially during the winter and spring months), the estuary experienced 1977-like, "super-critically dry" conditions in 19 years, or almost half the years between 1975 and 2014. In contrast, wet year conditions (in which native species have the best chance to recover from persistently low Bay inflows) occurred in the Bay's watershed in 25% of the past 40 years. But actual flows to the Bay resembled those of wet years in just four years during the 1975-2014 period. During six of the past 10 years less than 40% of the unimpaired runoff available in the winter and spring made it to the estuary.

PERMANENT DROUGHT: HOW MUCH OF THE WATER IN THE

UNIMPAIRED

WINTER-SPRING RUNOFF CONDITIONS IN THE BAY'S CENTRAL VALLEY WATERSHED 1975-2014



ACTUAL

WINTER-SPRING INFLOW CONDITIONS IN THE BAY 1975-2014

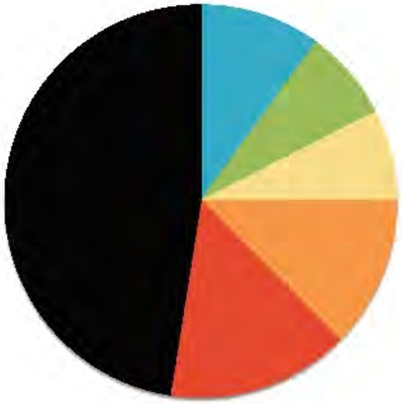
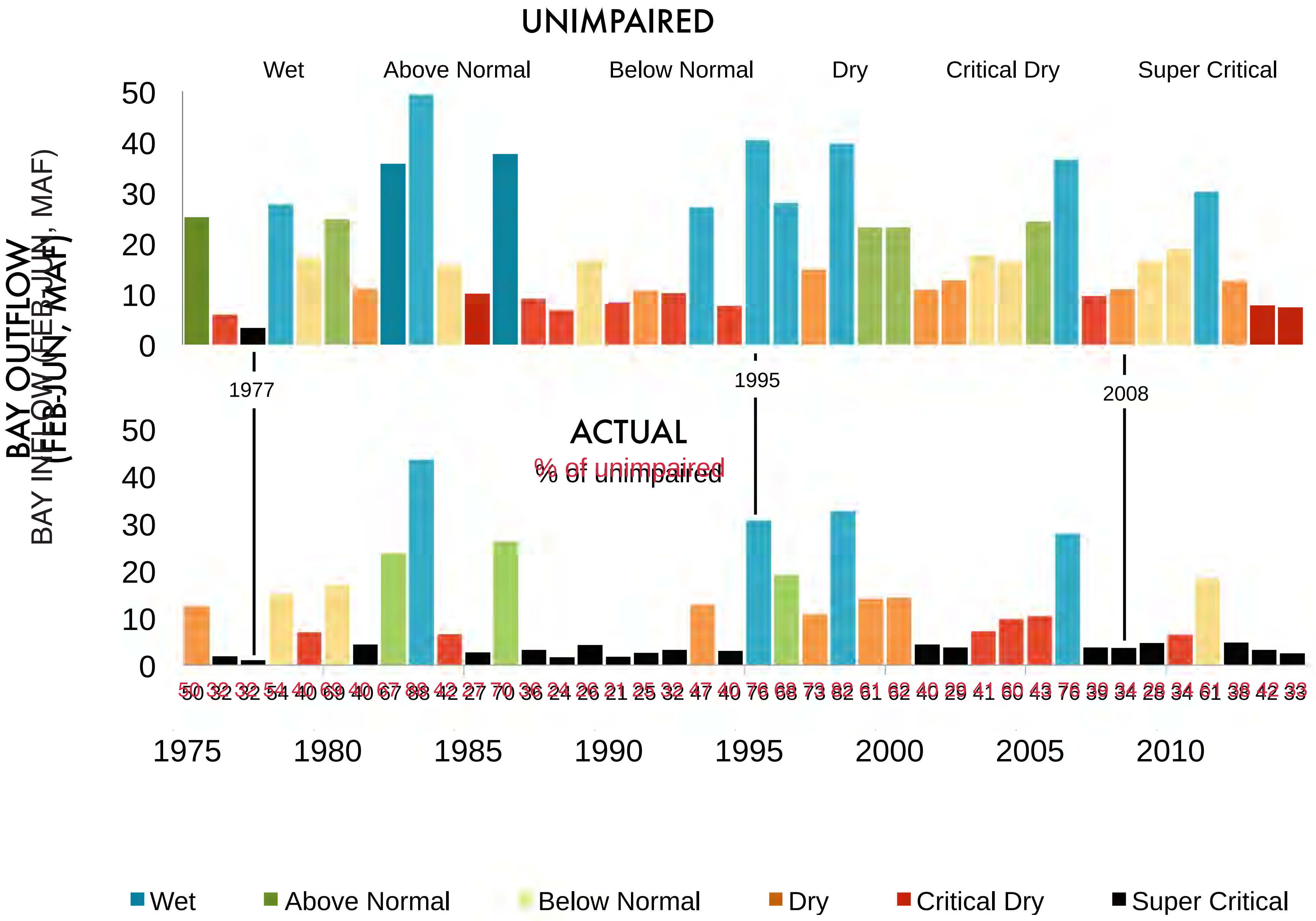


Figure 4: The Bay's vast watershed receives massive volumes of snow and rain in some years and very little in other years. Most of this water becomes runoff during the winter and spring months and many native species have evolved to capitalize on this pulse of water. The percentage of available runoff that reaches the Bay decreases as the combined total of watershed diversions and Delta exports increase. By dividing winter-spring runoff conditions into categories, the bar charts to the right show when Wet (blue), Normal (green), Below Normal (yellow), Dry (orange), Critically Dry (red), and Super Critically Dry (black) years occurred in the Bay's watershed (upper bar graph; "unimpaired") and the corresponding conditions that actually occurred in the Bay (lower bar graph, "actual"). Each of these categories represent one-fifth of the years as measured by their unimpaired runoff, except for the Super Critically Dry category, which represents the driest single year (~2.5%) of the 40 years represented here.

The pie charts show the relative frequency of these different hydrological conditions as they occurred in the Bay's watershed (upper pie chart, "unimpaired") and what the Bay's ecosystem actually experienced (lower pie chart, "actual"). As a result of intensive water diversion and exports, the estuary and its unique and valuable fish and wildlife species have experienced extremely dry conditions throughout most of the past four decades. For example, Super Critically Dry conditions, which occurred naturally only in 1977, are by far the most common conditions experienced in the estuary these days. Wet conditions occurred in the Bay less than half as frequently as they did in the watershed that feeds it. Years 1995 and 2008, marked on the bar graphs, correspond to state and federal actions that reserved relatively minor amounts of water for fish, and have failed to modify or mitigate the trend of intensive and growing diversion of Bay inflows.

BAY'S WATERSHED ACTUALLY REACHES THE BAY?



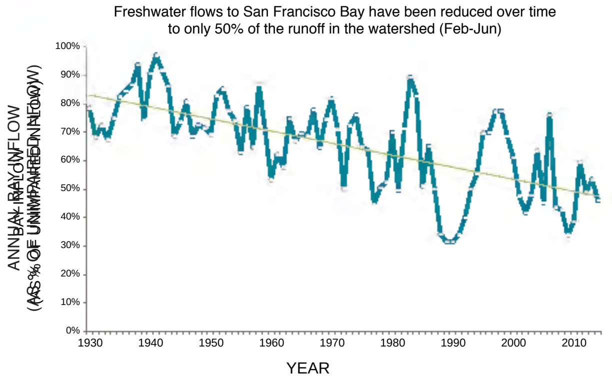
DRYING UP ECOLOGICALLY CRITICAL PERIODS

The change in total annual flow to the estuary is only one indicator of the massive changes in inflow to the Bay as a result of how California uses its limited water supply. The natural seasonal timing of flow has been modified as well (Figure 5, middle panel). For example, although over three quarters of the Bay's unimpaired inflow arrives as winter storms and spring snowmelt, the percentage of available runoff that actually made it to the Bay between February and June reached as low of 28% in 2009. During the last decade, only an average of 35% of unimpaired runoff made it to the Bay during May, making this the most impaired month of the year. In contrast, state water quality regulators report that 75% of unimpaired Bay inflow during the winter-spring period is necessary to fully protect the estuary ecosystem[6]; and in fact, scientific studies from around the world indicate that ecosystem function is severely impaired if less than 80% of freshwater flows remain in rivers[7]. When instead just one-third or less of these ecologically vital flows are allowed to make it to the Bay, there is absolutely no reason to expect any other outcome except ecological collapse.

Even seasonal and monthly averages don't reveal the full impact of the change to Bay inflows – short-duration peak flows have been severely reduced, and nearly eliminated in many cases (Figure 5, right panel). In all but the wettest years, the brief pulses of flow that follow rainstorms and snowmelt events – and which are so important to migrating fish like salmon – have been virtually eliminated, as reservoirs, river diversions, and exports from the Delta capture these critical flow spikes. The biggest winter floods have been severely curtailed[8]. For example, in late November and December of 2013, 75-78% of the peak flows were captured in reservoirs, diverted upstream, or exported directly from the Delta. The precious runoff that does still make it to the Bay—from below dams and the few remaining undammed watersheds—could be further curtailed if one or more new and expanded dam and diversion projects, most of which would be very expensive, produce low yields, and be partly subsidized by taxpayer funding, are built and operated.

Upstream dams and diversions capture the majority of runoff in the Bay's watershed. Photo Credit: California Department of Water Resources

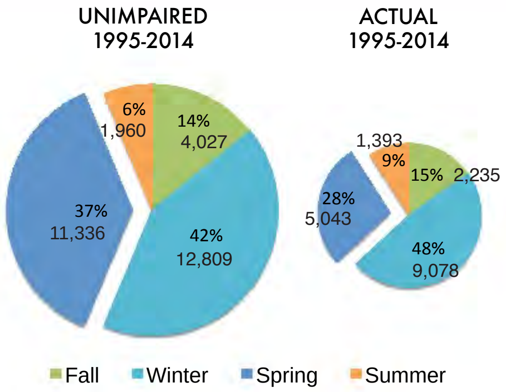
A BAY CHANGED: ALTERATIONS TO FRESHWATER FLOW



ANNUAL

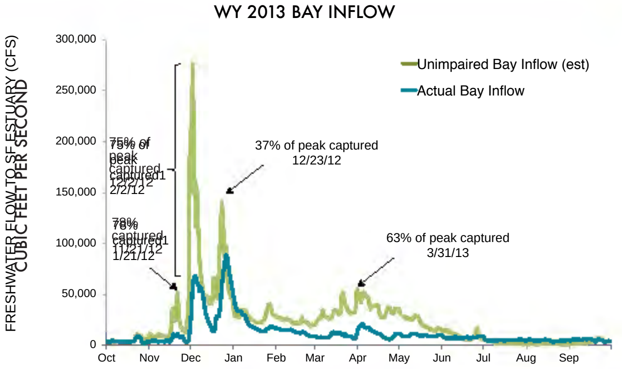
Compared to the amount of runoff in the Bay's Central Valley watershed each year, the amount of water that actually reaches the Bay has been declining steadily over time. A greater proportion of available runoff (the "percentage of unimpaired flow") reaches the estuary in wetter years; during dry years the Bay receives proportionately less of the water available. This occurs because the total amount of water that humans divert and store in reservoirs does not vary much in response to annual hydrology.

Data source: CDEC and DWR Dayflow



SEASONAL

The fraction of water that would arrive in the estuary during different seasons without storage and diversions (unimpaired conditions; left pie chart) and what actually arrives after the effect of human water management (right chart, numbers are volume in thousands of acre feet). Not only is the volume of freshwater flow reduced, but the distribution of this flow across seasons is altered as well. For example, under unimpaired conditions, 37% of the Central Valley's runoff would flow to the estuary during the spring, but only 28% of the (much smaller) volume that actually makes it downstream arrives during the spring. This disproportionate reduction in fresh water flowing into the estuary during the spring occurs during the very season when native fish and wildlife population are most responsive to freshwater flow.



PEAK FLOWS

Estimated flow to San Francisco Bay during a year in the absence of storage or diversions (green line) compared with the estimated flow that actually reached the estuary (blue line). The difference between unimpaired and actual inflow on key dates shows that natural early season peaks in flow are largely eliminated by storage and diversion operations. Native species rely on pulses of water (which result from periodic rainfall and snowmelt events) to orient during migration and to cue important life cycle transitions. California's water management practices eliminate this important natural signal. The loss of short duration peak flows puts native species at a disadvantage and facilitates invasion by non-native species.

Figure 5: Water storage, diversion, and export changes the natural pattern of freshwater flow in multiple ways. The total amount of water diverted from the estuary and its watershed for human use increased steadily over time, resulting in less and less fresh water making it downstream annually (left panel). The timing of the freshwater flow that remains is also radically altered by human water management practices. For example, the seasonal timing of flow has been changed such that proportionately less water arrives during the ecologically critical spring months (center panel). Also, diversions have a disproportionate effect on short-term peak flows, which native species rely on to orient their migrations or to spawn (right panel).

American avocet Photo Credit: Judy Irving

STARVING THE BAY

HOW FLOW REDUCTIONS DAMAGE KEY COMPONENTS OF THE BAY'S ECOSYSTEM

As rivers approach the sea, salty and fresh water mix to form an estuary. In addition to diluting what would otherwise be seawater, the freshwater flowing into an estuary creates unique and productive ecosystems. Estuaries contain special fresh water and brackish (low salinity) habitats that shift position dynamically in response to the tides and seasonal or annual variations in fresh water flow. The balance between fresh and salt water determines the size and shape of these estuarine environments and their capacity to support the fish and wildlife species that have evolved to specialize in them.

How much freshwater flow makes it as far as the estuary, when it arrives during the year, and the extent to which the amount and timing of arriving flow change from year to year, all determine what kind of benefits fish, wildlife, and humans receive from the estuarine environment. When the flow of fresh water is reduced dramatically for a prolonged period of time, the transport of nutrients, food (from simple photosynthetic organisms to fish), and sediment from the watershed into the estuarine environment is reduced as well. In the absence of periodic flushing, pollutants accumulate in the system. In addition, reduced freshwater flow facilitates invasion by undesirable, non-native species and proliferation of harmful organisms that generate toxic water pollution. Alone and in combination, the effects of reduced freshwater flow into the Bay estuary undermine its water quality, its ability to support fish and wildlife populations, and the formation and maintenance of surrounding beach and wetland habitats.

This chapter describes how changing freshwater inflows to the Bay directly affects many fundamental ecological processes, including salinity distribution, transport of sediment and biological materials, pollution control, habitat formation and maintenance, and food web dynamics. In many cases the specific mechanisms through which freshwater flow into the Bay acts on these processes and habitats are understood incompletely. Flow acts as a master variable, and its interactions with different ecosystem elements are complex and difficult, if not impossible, to untangle. Yet the size and diversity of freshwater flow's effects on the Bay's ecosystem are clear. The next chapter will explain how all these flow-related changes to the Bay impact the fish, wildlife, and people who rely on it for many critical services.

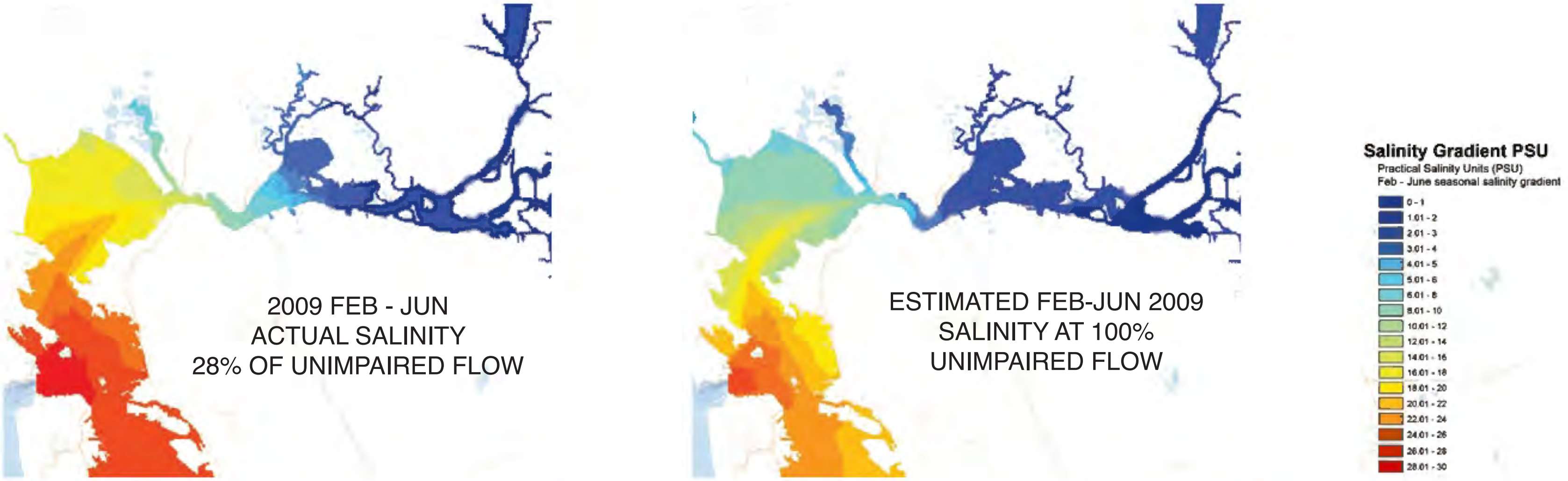
SALINITY

The transition from fresh water to salt water in the estuary is a dynamic gradient that moves daily, seasonally and annually. Where this transition occurs is influenced in large part by how much fresh water flows into the estuary. The amount of water at different salinity levels determines the quantity and quality of habitat for plants and animals that live in the estuary. Habitat condition and location can be altered by salinity in many ways, including:

- Extent – how much habitat is there?
- Distribution – where in the estuary is the habitat available?
- Quality – how suitable is the habitat for the species that use it?
- Connectivity – can species access and move among habitats?
- Timing – is the habitat available during key life stages for species?
- Persistence – is the habitat available for multiple generations?

Reductions in freshwater flow to the Bay shift the timing and location and restrict the extent of the salinity gradient, altering estuarine habitats in ways that can translate to population level effects on species that utilize those habitats. Periods when the average salinity was as high as in the past half-century previously occurred only three times in the last 1,600 years – during recent droughts, January – July salinity was the highest it has been in 400 years. The timing of peak inflow has been changed from May to February, changing the position of the estuary's salinity field throughout the spring and summer months[9] (Figure 6). How the salinity field is affected depends on what part of the estuary is being considered.

THE EFFECT OF WATER DIVERSION ON SALINITY IN THE BAY



In 2009, a Dry year in the Bay's watershed, only 28% of available runoff from the Central Valley made it to the Bay; the rest was diverted, stored, or exported. Because there was so little fresh water, Central Bay, San Pablo Bay, and even parts of Suisun Bay became very salty.

Had no water been stored, diverted, or exported, the salinity distribution in 2009 would have looked more like this (the actual salinity distribution in 1980). Fish and wildlife that use freshwater and brackish habitats would have been able to use all of Suisun Bay and most of San Pablo Bay.

Figure 6: Water diversions and exports affect the distribution of salinity throughout the Bay. Most aquatic organisms are sensitive to the salinity of their habitat; thus, changes in salinity distribution reflect changes in habitat availability for many of the Bay's species. These maps show the actual distribution of salinity in one Dry year (2009; left panel) and what the salinity distribution would have looked like without diversion or export of fresh water (right panel).

Data sources: U.S. Environmental Protection Agency. Salinity Gradient - Coarse-grid version of UnTRIM San Francisco Bay-Delta Model, Delta Modeling Associates.
Basemap - ESRI, DeLorme, BEBCO, NAANGDC, & other contributors

GROUND ZERO: THE SALINITY TRANSFORMATION OF NORTHERN SAN FRANCISCO BAY AND THE DELTA

Bay fish and their prey benefit from lower salinities at critical times: A unique and ecologically critical area known as the low salinity zone (LSZ) occurs in the upper, northern part of the estuary. This zone is especially important for juvenile fish and invertebrates[10]. Historically, as freshwater flows naturally increased in the winter and spring, the LSZ was located in the broad, shallow reaches of Suisun and San Pablo Bays, and shifted gradually upstream in the summer and fall. Numerous scientific studies over many decades have documented the powerful and persistent correlations between the abundance of many of the Bay's fish populations, including longfin smelt, starry flounder, and striped bass, with the position of the LSZ in the ecologically sensitive winter and spring period[11]. That is, the number of fish of many estuarine populations increases as the LSZ moves downstream in response to increasing flows. How fish and invertebrate populations are distributed is also correlated with the location of the LSZ, with benefits decreasing as the zone shifts upstream with less inflow. For example, the position of the LSZ during the winter and spring affects the exposure of larval and juvenile fish to diversion into the large export pumps in the southern Delta[12]. The abundance and distribution of Delta smelt are also correlated with the location of the LSZ in the fall[13].

Several types of zooplankton (small invertebrate animals) are also strongly affected by the position of the LSZ, including mysid shrimp, Bay shrimp, and seasonal populations of other small zooplankton[14]. These organisms are essential food for the Bay's fish and wildlife populations. The historic zooplankton community in the LSZ has been devastated over the past three decades by a combination of reduced freshwater inflows to the Bay, increased water exports from the Delta, and the introduction of non-native invasive species[15]. Allowing more of the Central Valley's natural flow of fresh water to reach the estuary during the spring is one of the few tools available to improve the distribution and increase the abundance of important zooplankton species in the open waters of San Francisco Bay.

Exotic species invade when salinities are less variable: Reducing inflows not only constrains the downstream movement of the LSZ but also generally keeps the salinity field more uniform and less dynamic from season to season and year to year in the upper reaches of the estuary. This reduced salinity variation is a primary factor in the establishment and success of undesirable non-native plant and animal species. For example, establishment of nuisance species such as the overbite clam appears to have reduced phytoplankton abundance in the upper estuary[16]. There is evidence that exotic zooplankton invasions are facilitated by consistently low inflow to San Francisco Bay[17]. Some introduced species, like inland silverside – a voracious predator – increase in abundance during periods when flows are low[18]. Once established, these invaders contribute to deteriorating habitat conditions for native species by competing for food, space and other important habitat needs.

Wetlands change as salinity changes: The freshwater and tidal marshes and riparian areas that occur on the margins of the upper estuary buffer the land from tides and storm surges and support over 500 fish and wildlife species, including a large number of rare species such as Suisun song sparrow, San Francisco common yellowthroat, California black rail, and giant garter snake[19]. Restoring wetland habitat is a high priority for current management efforts; currently, less than one tenth of historic wetland remains around the Bay and only 4% in the Delta[20].

Pollen records indicate that extended periods with higher than average salinity have previously occurred only three times in the last 1,600 years[21]. Since 1950, primarily as a result of flow reductions and flow pattern alterations throughout the Bay's watershed, we are now experiencing the fourth such period[22]. Tidal marshes with higher salinity have lower numbers of plant species and are less productive[23]. Even short-term changes in freshwater inflows can convert freshwater marsh to brackish marsh, and brackish marsh to salt marsh; as temperatures, atmospheric CO2, and salinities all rise, the longer-term impact of wetland conversion could have large consequences on ecosystem function[24].

Ridgway's Rail (formerly, Clapper Rail) is one of many species native to the San Francisco Bay area that are endangered. These secretive birds, which rarely fly, forage in tidal mudflats and make their homes in the upper vegetated zone of the marshes that once dominated the Bay's margin. Photo Credit: David Sanger

Small shifts in salinities can affect how seeds germinate, grow, and are distributed; which species occur; and how much food the marsh provides for fish and wildlife[25]. For instance, during the short but severe 1976-77 drought, a marsh at the east end of the Carquinez Strait became much more saline and plant composition shifted, with bulrush decreasing and salt-tolerant pickleweed invading. These changes can be long lasting; according to one study, when salts accumulate in tidal marsh soils, "larger pulses of fresh water of greater duration will be required to reduce soil salinities in the marsh and promote germination and recruitment"[26].

Marsh formation is critical as a tool for adapting to climate change. Salinity plays a key role in the rate at which marshes can rise in response to changing sea levels. Organic matter accumulates faster in freshwater marshes, and the rate of soil formation decreases with increasing salinity[27]. Absent sufficient freshwater inflow, sea level rise will push the salinity field further inland, reducing the area available for brackish and freshwater habitats in the upper reaches of the estuary. The resulting conversion of brackish and freshwater wetlands to salt marsh will reduce the amount of marsh area that can buffer the impact of rising seas. As marshes erode, so too do the benefits of flood regulation and water quality control that they provide to communities along the estuary's shores. Also, reductions in the area of less saline marsh habitat will affect species like black rails that depend on vegetation not found in salt marshes.

LOOKING DOWNSTREAM: SALINITY CHANGES IN CENTRAL AND SOUTH SAN FRANCISCO BAY ARE ALSO A PROBLEM

Farther downstream, the saltier Central and South Bays also experience major salinity changes when freshwater runoff into the Bay is high. In the winter and spring— the time of year when human activity alters flows the most – reducing Bay inflow can change salinity distribution in the Central and South Bay even more than in the upper estuary[28]. During the 1987-1992 drought, for example, when inland water diversions and exports reached (then) record high levels, the winter – spring salinity at Fort Point, under the Golden Gate Bridge, was the highest experienced in 400 years[29].

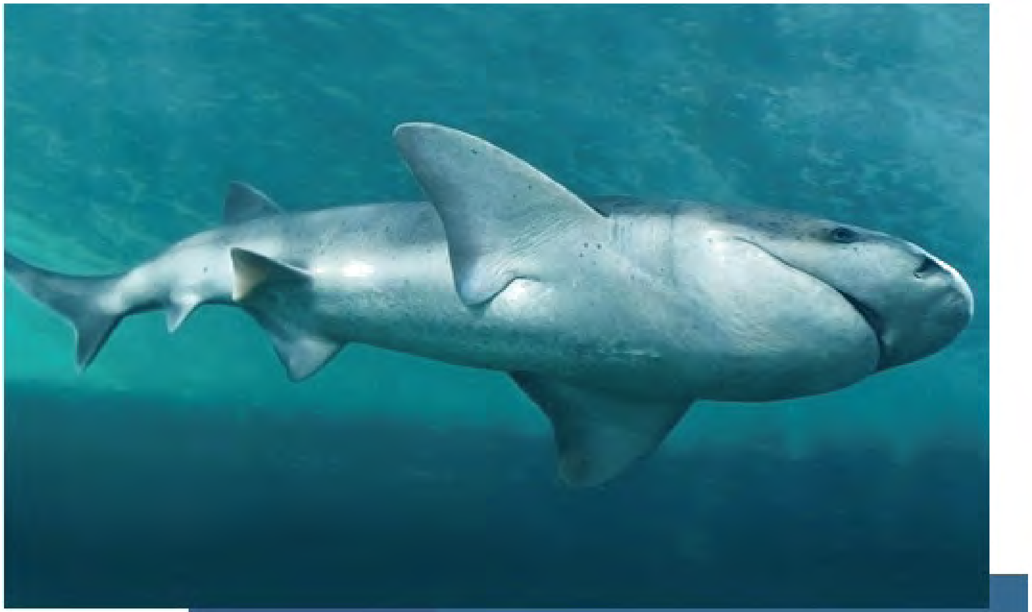
Species in Central Bay shift in response to flow-related salinity changes: What kinds of species are present in the Bay near San Francisco, and how they interact, are influenced by freshwater inflow and the salinity field. For instance, rates of growth, reproduction and migration for invertebrates in the Bay like oysters, barnacles, and sea squirts (sessile marine invertebrates) are highly affected by freshwater inflows. When winter inflows are reduced, large non-native sea squirt species dominate the invertebrate community, competing for space and limiting populations of other species, such as oysters. Although prolonged exposure to fresh water during very high flood flows may kill oysters, new oyster populations readily establish at lower salinities, probably in response to the limiting effects of higher flows on their invasive competitors[30].

Seasonal salinity stratification dominates the South Bay: During the summer and fall, the lagoon-like South Bay is about as salty as the ocean, with circulation driven by the tides and winds. But, in winter, high freshwater inflow from the upper estuary can cause strong density-driven currents to form, with fresher water on top and saltier water on the bottom—a phenomenon known as stratification. As Bay inflow diminishes through the spring, and as more saline water outside the Golden Gate is drawn into the Bay by tides, the Central Bay becomes saltier and a density-driven current of more saline water flows into the South Bay along the bottom. The South Bay is usually stratified in the spring, and unstratified in summer and fall. This seasonal pattern causes a spring peak in phytoplankton productivity[31], and many fish species respond positively to the changes in South Bay salinity associated with the variation in Bay inflow[32].

BEYOND THE BAY: FLOW EFFECTS ARE FELT IN THE GULF OF THE FARALLONES

Salinity changes in the saltiest part of the estuary – the Gulf of the Farallones, just west of the Golden Gate – are also most influenced by the seasonality and magnitude of freshwater flows. During winter and spring, outflows from the Bay create a plume of brackish water (as low as 20 parts per thousand [ppt] salinity and up to 5 meters deep), stimulating phytoplankton growth and contributing to overall foodweb productivity in the Gulf of the Farallones, a protected marine sanctuary[33]. At times, this plume briefly extends as far offshore as the Farallon Islands and Cordell Bank. The plume tends to turn to the north in winter, extending as far as Ft. Bragg, CA. During the summer when flows are lower, the plume is smaller but still extends outside the Golden Gate, turning to the south[34].

Plankton and larger organisms such as salmon, sharks, and marine mammals all converge at the plume front. Birds that nest on the Farallon Islands also feed at the plume front. But this highly productive, flow-driven habitat is being diminished. Bay inflow accounts for 86% of the variability in salinity at the Golden Gate[35]. Salinity at the ocean boundary has increased by 12 parts per million per year since 1920[36], showing that the brackish water plume has become substantially reduced over time[37].



Sevengill shark Credit: Aquarium of the Bay

The Bay – ocean connection is a two way street: Increased inflow to the Bay and subsequent outflow to the ocean during the spring increases the exchange of water, nutrients, and organisms in both directions. Wind-driven coastal upwelling brings denser, cooler, nutrient-rich, saltwater closer to the ocean surface. As this marine water flows into the Bay, it benefits bottom-feeding organisms[38]. When spring inflows to and outflows from the Bay are reduced, not only are the ecological benefits of the brackish water plume at the surface affected, but the importation of saltier water along the bottom is also cut back, reducing nutrient inputs to the Bay's benthic habitats[39].

These two phenomena – upwelling of nutrient-rich water and the brackish plume – interact to form the rich marine ecosystem of the Gulf of the Farallones. Reducing inflows to the Bay not only limits the benefits the Bay receives from both of these ecologically important processes, but may also affect the productivity of coastal environments. Indeed, the state of our scientific understanding indicates that freshwater flows into the estuary have multiple effects that reach far downstream into marine environments. According to a recent study:

> “The effects of [freshwater flow from the watershed] propagated further down the estuary salinity gradient than [effects from the Pacific Ocean] that propagated up the estuary salinity gradient, exemplifying the role of variable freshwater outflow as an important driver of biotic communities in river-dominated estuaries.”[40]

In plain English, freshwater flow impacts downstream areas more than the more saline habitats downstream impact the fresher upstream areas. As the effects of climate change become more acute, the benefits of freshwater flow for coastal waters will become even more critical. Warming ocean conditions, weaker upwelling, and shifts in the Pacific Decadal and North Pacific Gyre Oscillation are reducing marine productivity along the California coast with cascading effects on the food web[41]. As productivity declines, birds, fish and marine mammals are more likely to starve and less likely to reproduce successfully. For these creatures, improving freshwater flows would help grow the food items, such as juvenile salmon, that are an important part of the offshore food web, and would also restore seasonal brackish surface water habitats in the Gulf of the Farallones, supplying fuel for the marine ecosystem outside the Golden Gate and potentially helping to offset oceanic climate change effects.

SEDIMENT

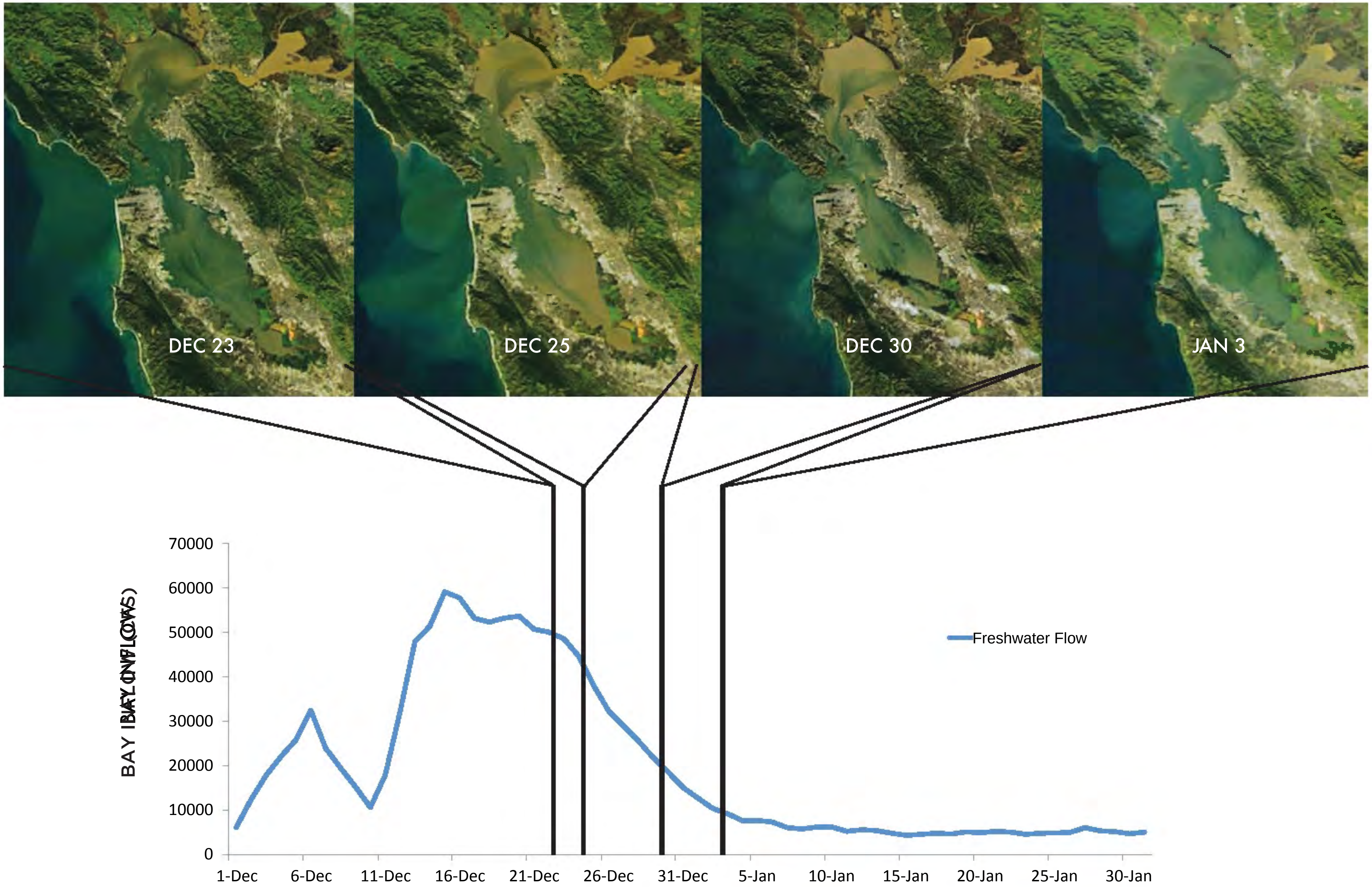
Moving water transports particles of varying sizes, from large gravel to silt to tiny bits of organic matter, collectively termed “sediment.” In the Bay, the transport of sediment plays a vital role in the formation of habitats like marshes and beaches. In addition sediment-laden high flows contribute to the occurrence of cloudy, “turbid” water in the estuary’s upper reaches, an important habitat attribute for many fish.

Water moves more sediment when it flows faster. In the Bay’s watershed, most sediment is transported during high flow periods (Figure 7). Eventually the water slows down as it reaches the tidal parts of the estuary, with the heaviest particles settling out first. Sediment is deposited on the bottom of the Bay and in marshes along its edges. Sediment passing out the Golden Gate may remain suspended, settle to the ocean floor, or be deposited on nearby beaches.

LESS SEDIMENT REACHES THE BAY TODAY

Over time, humans have dramatically altered the amount of sediment delivered to the estuary, with significant ecological and human costs. In the 19th century, the amount of sediment reaching the Bay actually increased because of erosion from ranching, farming and hydraulic mining in the Sierra Nevada[42]. In recent times, however, far less sediment has flowed downstream – with major consequences for the Bay. Thousands of dams constructed over the past century and a half throughout the watershed now trap the flow of gravel, clay, sand and silt. Meanwhile, hundreds of miles of stream bank were engineered to limit erosion in the watershed. Submerged islands trap sediment in the Delta[43] and dredging of navigation channels removes sediment directly from the system[44].

FRESHWATER FLOW MOVES SEDIMENT INTO AND THROUGH THE BAY



Images from NASA

Figure 7: Peak flows of fresh water into the estuary carry sediment through San Francisco Bay and beyond. The graph above shows flow during a brief pulse of freshwater flow in the days following a December 2014 storm. When Bay inflows increase, a plume of suspended sediment is transported downstream, as seen in the satellite photos of San Francisco Bay from December 23, 2014 to January 3, 2015. Sediment suspended in the Bay's waters from these infrequent, but critically important, peak flow events is important for restoring tidal marshes and maintaining habitat for native fishes. Sediment supplies to the Bay and nearshore ocean have been limited by physical changes to the landscape (e.g., they are trapped behind dams and removed by dredging) and by elimination of the higher peak flows that could mobilize the sediments that remain. New projects to store or divert large amounts of water upstream of the Bay could siphon off more of the declining suspended sediment supply and further truncate the peak flows that carry that sediment downstream.

IT'S CLEAR – AND THAT'S THE PROBLEM

Capturing more water upstream and regulating downstream releases traps large volumes of sediment in reservoirs, limits erosion and overbank flooding along Central Valley rivers and tributaries, and reduces the frequency of flood events that would otherwise allow more sediment to reach the Bay[45]. Peak flows that can mobilize significant amounts of sediment occur much less often, and when they do, they carry much less sediment than previously[46]. Sediment input from the largest source in the Bay's watershed, the Sacramento River, declined by half between 1957 and 2001[47].

Many estuarine fish species respond to water turbidity – reduced visibility due to suspended sediments – in order to evade predators, find food, and move between habitat areas. Because the amount of sediments available for resuspension in the Bay has declined, turbidity has been dramatically decreased – by 36% in 1999[48] and by as much as 40% in the Delta[49]. The occurrence of clearer water is believed to expose highly endangered fish species like salmon and Delta smelt, and other organisms to increased risk from predators[50] and lost feeding opportunities[51].

FEEDING HUNGRY MARSHES AND BEACHES

A healthy sediment supply is crucial to the persistence of marsh and beach habitats throughout the estuary. As they become saltier due to reduced inflows, the brackish and freshwater marshes of the upper estuary require even larger amounts of sediment to maintain their physical form and elevation[52]. The problem is magnified by accelerating sea level rise, which will drown the Bay's existing wetlands unless they gain elevation. Maintaining low Bay inflows – or further reducing them – at the same time that sea levels rise, will ensure continued loss of this unique estuarine habitat. Reducing sediment inputs to wetlands undermines California's large-scale investment of time, money and energy to restore them.[53]. These and all types of wetlands are not just habitats for fish and wildlife; they also function as barriers against the effects of sea level rise on at-risk human communities and valuable infrastructure around the Bay; insufficient sediment inputs will make it more difficult to provide and maintain these barriers[54].

Bay inflows also transport sediments that feed and maintain local beaches, and these areas shrink or are lost as sediment inputs decrease. Twenty-three miles of sandy beaches in the Bay have been reduced to 7 miles, and most of the remaining beaches are in different locations than historical beaches[55]. Outside the Golden Gate, the coastline is the most rapidly eroding section in the state, with erosion accelerating 50% since the 1980s[56].

Baker Beach, Photo Credit: Christian Mehlführer

Although Bay inflow reductions aren't the only cause, they are an important contributor to the beach erosion problem. High Bay inflows can carry a lot of sand: at low flows, sand is a small percentage of the total sediment load in the Sacramento River, but it represents up to 70% of the total at high flows[57]. The loss of high flows into the Bay cuts off sand resupply to chronically eroding beaches throughout the Bay Area and along the open coast south to Pacifica (where most sediments have a Sierran origin, transported on flows from the Bay's watershed)[58]. Beach erosion in these areas removes habitat for many bird and invertebrate species, such as breeding populations of snowy plovers that require undisturbed beach area for nesting[59]. And, of course, people enjoy beaches too.

POLLUTION

Preventing pollution before it happens by eliminating or reducing toxic inputs to air, land, and water is always the best policy. In conjunction with that approach, maintaining adequate freshwater flow into the Bay helps to dilute the concentration of chemical and biological contaminants before they reach levels that are toxic and decreases the amount of time these substances spend in the Bay where the dilution factor is much lower than in ocean waters. Conversely, when freshwater flows are reduced for long periods, both naturally occurring and synthetic contaminants can increase to toxic levels.

TOXIC POLLUTANTS DO MORE HARM WHEN FLOWS ARE LOW

The amount of Bay inflow is known to significantly affect how readily available some heavy metals are to aquatic organisms like shellfish[60]. Silver and copper concentrations in benthic organisms in the South Bay typically decrease after winter inflows lower salinities, especially in years with higher flows. Reducing Bay inflows from the Central Valley could also reduce the effectiveness of processes that assimilate and neutralize waste in the South Bay[61].

Significant amounts of “legacy” contaminants from past mining and industrial practices are embedded in the Bay’s sediments, where they can be taken up by benthic organisms and then bioaccumulate in the foodweb. Over the past 20 years, for instance, mercury and PCB (Polychlorinated Biphenyl) concentrations in fish have persisted at high levels, limiting consumption of popular fish species[62], even long after being phased out from human use. Low flows can exacerbate the transfer of contaminants from the sediment to the food web; in Suisun Bay, for instance, the concentration of mercury in suspended sediment is higher at low Bay inflows (because waves resuspend bottom sediment) and lower at higher inflows[63].

Selenium is a naturally occurring element, essential, in trace amounts, for animal cell function. But it is highly toxic at even slightly higher doses, causing birth defects, reproductive failure, or death. The primary sources of selenium in the Bay’s watershed include discharges into the Bay from oil refineries and irrigation runoff from selenium-laden soils on the west side of the San Joaquin Valley.

Low flows promote uptake and integration of selenium into the food web[64]. Low flows are specifically correlated with higher selenium concentrations in clams[65]. As a result, diving ducks, sturgeon, and Sacramento splittail, which eat clams, can develop deformities and reproductive problems because of the elevated selenium levels associated with low flows[66]. Selenium concentrations in clams rise to a level of concern when Bay inflows are less than 7,000 cfs[67]; these extremely low Bay inflow levels occurred in 2014 and 2015 when the State of California relaxed minimum water quality and flow requirements in order to increase deliveries for agricultural irrigation in the Central Valley.

TOXIC ALGAL BLOOMS – CAN REDUCING FLOWS GENERATE NEUROTOXINS?

When freshwater flows are reduced to low levels, the estuary can become a good environment for harmful organisms that generate dangerous toxins.

Cyanobacteria (also known as “blue green algae”) are ancient photosynthetic ancestors of modern plants and algae. Some of the chemicals produced by cyanobacteria are extremely toxic to humans and wildlife. Periodic proliferation of certain cyanobacteria (such as Microcystis aeruginosa) are called “harmful algal blooms” or HABs. These blooms produce neurotoxins that can kill fish, aquatic mammals, waterfowl, and even dogs[68]. When these toxins get into drinking water supplies they are a real risk to human health.

Blooms of toxic cyanobacteria are occurring with increasing frequency in the upper estuary[69]. Toxins produced by HABs have been detected in invertebrates and fish throughout the entire estuary[70]. Organisms that are not killed outright by these toxins can transfer the poisons to their predators; the toxins become more concentrated as they move up the food chain (in a process known as “biomagnification”).

A recent review prepared for the California Environmental Protection Agency concluded that HABs in the Bay estuary are more frequent when water moves more slowly (increased residence time) and water clarity is high[71]; both of these conditions occur when inflows are low. The fact is that low flows not only fail to dilute or flush pollutants but also actually provide the very conditions that support the growth of organisms that generate powerful toxins. In this case, maintaining adequate inflows is a crucial element in preventing the creation of powerful toxins that threaten people and the environment.

Cyanobacteria bloom, Photo Credit: US Geological Survey

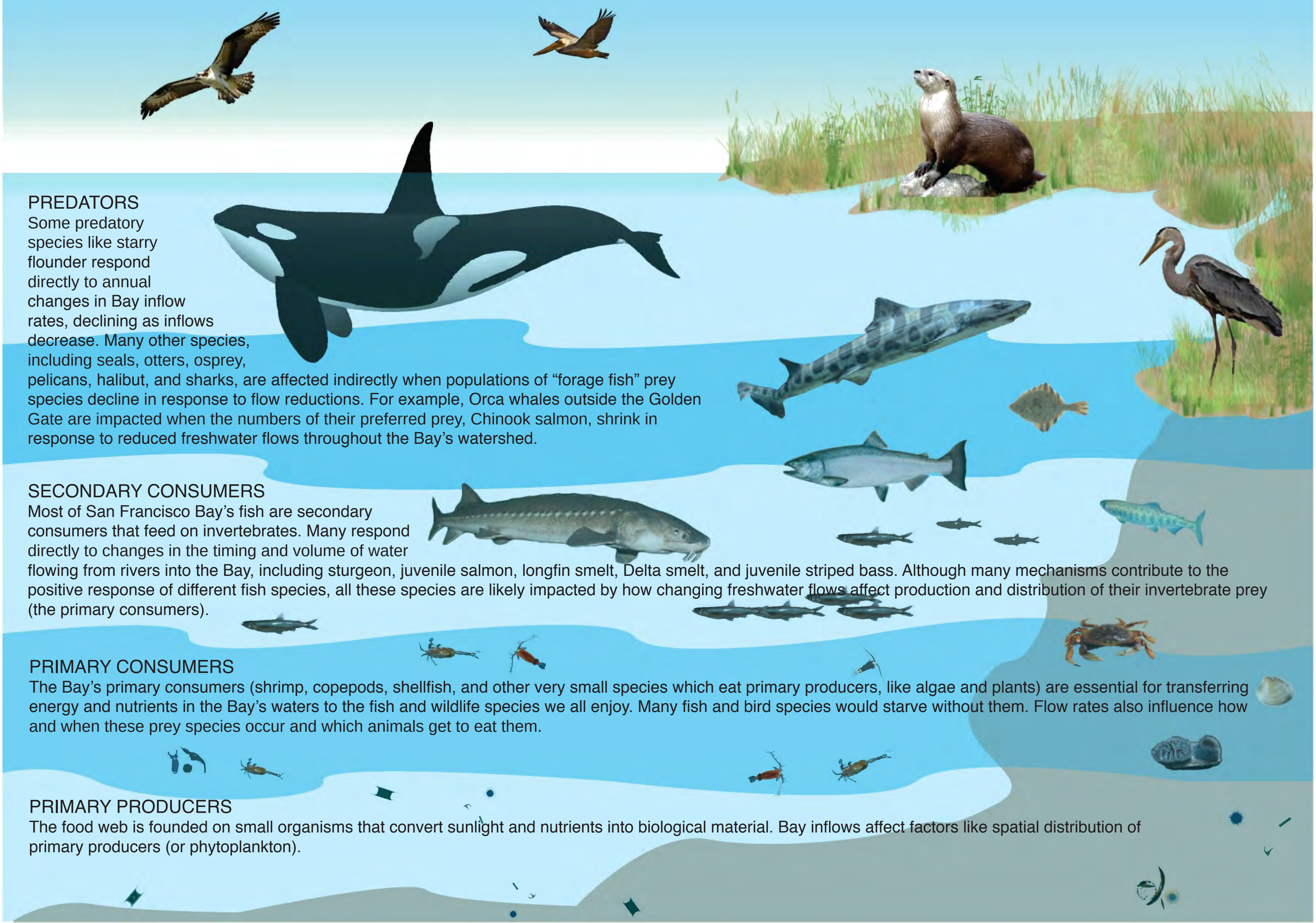
FOOD WEB PRODUCTIVITY

Estuaries are highly productive nursery habitats for fish, birds, mammals, and invertebrates like crabs and shrimp. The San Francisco Bay estuary is no exception. Beginning in the 19th century, San Francisco was the center of major commercial and recreational fisheries for salmon, sturgeon, herring, smelt, rockfish, halibut, flounder, and crab. The Bay’s bounty played a large role in feeding the growing population of central and northern California and even Oregon.

Not surprisingly, this natural productivity depends on the many environmental processes that are driven or influenced by how much fresh water makes it to the estuary. As river flows reach the upper estuary, they slow down and spread out into a mosaic of shallow waters, mudflats and brackish and freshwater marshes; all of the critical inputs of nutrients, sediments and food the flow brings supports the growth of phytoplankton (tiny aquatic plants) and zooplankton (very small invertebrate animals), and a host of larger creatures that feed on them, in the water column and along the wetland margins. These freshwater and brackish habitats are more productive than the saltier ones downstream[72] and a large number of rare species are only found there[73]. Even though there are many factors that affect productivity, the science is clear that productivity of the food web in estuaries is closely tied to freshwater inflow[74], and that flow's stimulation of the food web has an important impact on survival and growth rates of many species[75].

One way to focus on how the estuary's food web works is to take a closer look at the production of juvenile Chinook salmon from the Bay's Central Valley watershed. Production of juvenile salmon emigrating from the Central Valley's rivers is strongly correlated with the amount and timing of freshwater flow[76]. River flows carry these young fish downstream to the estuary, along with the nutrients, sediments, and food that stimulate productivity. The estuary's muddy waters and wetlands (a result of sediments transported from upstream) provide cover and abundant food that allow the young salmon to survive and grow, along with other small fish and invertebrates. Some of the young salmon become prey for larger species, including birds and mammals. The survivors migrate on currents driven by inflows and the tides, and some become food in distant parts of the estuary, even outside the Golden Gate. The juvenile Chinook salmon produced in the Bay's watershed eventually become one of the primary food items in the diet of the Orca whales that reside in the Gulf of the Farallones[77]. This means that even creatures that rarely enter the Bay rely on the productivity of the food web driven by the amount and seasonal timing of Bay inflow (Figure 8).

FRESHWATER FLOWS AFFECT FOOD WEBS IN THE BAY AND BEYOND



PREDATORS

Some predatory species like starry flounder respond directly to annual changes in Bay inflow rates, declining as inflows decrease. Many other species, including seals, otters, osprey, pelicans, halibut, and sharks, are affected indirectly when populations of “forage fish” prey species decline in response to flow reductions. For example, Orca whales outside the Golden Gate are impacted when the numbers of their preferred prey, Chinook salmon, shrink in response to reduced freshwater flows throughout the Bay’s watershed.

SECONDARY CONSUMERS

Most of San Francisco Bay’s fish are secondary consumers that feed on invertebrates. Many respond directly to changes in the timing and volume of water flowing from rivers into the Bay, including sturgeon, juvenile salmon, longfin smelt, Delta smelt, and juvenile striped bass. Although many mechanisms contribute to the positive response of different fish species, all these species are likely impacted by how changing freshwater flows affect production and distribution of their invertebrate prey (the primary consumers).

PRIMARY CONSUMERS

The Bay’s primary consumers (shrimp, copepods, shellfish, and other very small species which eat primary producers, like algae and plants) are essential for transferring energy and nutrients in the Bay’s waters to the fish and wildlife species we all enjoy. Many fish and bird species would starve without them. Flow rates also influence how and when these prey species occur and which animals get to eat them.

PRIMARY PRODUCERS

The food web is founded on small organisms that convert sunlight and nutrients into biological material. Bay inflows affect factors like spatial distribution of primary producers (or phytoplankton).

HARD TIMES FOR THE UPPER ESTUARY FOOD WEB

Freshwater flows into the estuary are an extremely powerful driver of productivity in northern San Francisco Bay and the Delta. Over many decades, scientists have documented strong and persistent statistical relationships between winter – spring inflows and the abundance of major invertebrate prey populations like Bay shrimp[78]. In years with low inflows, Bay shrimp biomass correspondingly declines[79]. Under natural runoff patterns, inflows are high enough in most years to support a productive ecosystem. The human-made "permanent drought" experienced in the Bay, however, in combination with other factors, has had catastrophic effects on the food web. Primary production in the Delta declined 43% between 1975 and 1995[80]. One flow-related factor is the long-term decline in suspended solids entering the estuary on peak inflows, and the resulting increase in water clarity, which increases predation risk for many species. Another factor driving the decline in food web productivity is the almost complete loss of fresh water inflow from the San Joaquin River basin portion of the Bay's watershed[81] (most of which is either diverted upstream or exported by the giant Delta pumps).

Figure 8: San Francisco Bay and the nearshore ocean support an incredible array of fish, bird, mammal, and invertebrate species that are linked together in a complex food web. Freshwater flows into the estuary have direct effects on the productivity of this food web – major decreases in fresh water flows and/or changes in the timing of that flow lead to smaller populations of many key organisms. The creatures that feed on these "flow-dependent" species, including birds and mammals that live in the nearshore ocean, are indirectly impacted by declines in their food supply. Human water diversions in the Bay's watershed have had measurable (and often dramatic) negative effects on the food web of San Francisco Bay and the nearshore ocean.

Overbite clam

Photo Credit: Luis A. Solórzano

An additional alteration to the Bay's food web is invasion by exotic (non-native) species, which can displace native fish and wildlife populations[82]. Reduced inflows favor the spread of invasive species[83], probably because flow reductions undermine the ability of native species to dominate their historical habitats. The extent of change varies by location, with the biggest changes in the historically fresh and brackish portions of the upper estuary, which are increasingly dominated by invasive species over time[84]. The most dramatic example of food web alteration by an exotic species is the colonization of this region in the 1980s by the overbite clam; this one species filters large amounts of phytoplankton from the water column, leaving less energy available for all the other species that feed on plankton or its consumers. The overbite clam invasion coincided with a dry period when reservoir operations and water diversions prevented more than three-quarters of the Central Valley's winter-spring unimpaired runoff from reaching the Bay[85]. The conjunction of these stressors has been implicated in multiple changes in the structure and functions of the upper estuary's low salinity zone[86].

Despite these major changes, many fish and zooplankton of the upper estuary continue to respond positively when estuary inflows increase because the flow-related mechanisms that drive their productivity have not changed[87]. In addition, the effect of the overbite clam may be ameliorated at higher flow levels as their abundance fluctuates in response to salinity changes[88], with the population responding to shifts in the extent and location of the low salinity zone[89]. Indeed, increases in freshwater flow may help control a wide range of nuisance species in the estuary, such as Brazilian waterweed (*Egeria densa*), toxic algae, jellyfish, clams, and inland silverside[90].

To make matters even worse in the post-invasion world, declining inflows in recent years have facilitated the occurrence of harmful algal blooms of cyanobacteria in the Delta and upper estuary. When such blooms occur, they can change phytoplankton community composition and toxin levels[91]. The new fact on the ground is that the loss of inflows has not only been undermining the ability of the food web to support native species in the upper estuary, but now it is actually helping create a new food web that is toxic to fish, wildlife and humans.

THE FAR SIDE: PLANKTON IN THE SOUTH BAY AND OUTSIDE THE GOLDEN GATE

Because fresh water is less dense than saltier water, freshwater inflow from the upper estuary rides on the surface of the water column as it enters the South Bay in the spring. This sets up strong density-driven currents in the South Bay[92], which in turn provide the right conditions for a spring plankton bloom[93]. When South Bay waters become stratified during and after these spring inflows, sun penetrates the fresher surface waters allowing algal cells to grow[94], unchecked by the large population of grazing organisms that live on the bottom of the Bay[95]. How large these plankton blooms are "is directly related to the intensity and duration of river-driven density stratification"[96], and when Bay inflows are very high exceptionally large blooms occur as a result[97].

As mentioned earlier, the surface plume of brackish water that flows out the Golden Gate in winter and spring creates a highly productive environment that makes an important contribution to the richness of the marine ecosystem in the Gulf of the Farallones National Marine Sanctuary[98]. The plume front creates a food-rich habitat where invertebrates, fish, birds, and marine mammals all converge to eat and be eaten. Flows into the Bay and then onward to coastal waters also directly facilitate the transport of nutrients and organisms and cue stages in the outmigration of juvenile Chinook salmon and other fish which are important food sources for marine mammals like Orca whales.

Orcas near Golden Gate Bridge
Photo Credit: Jennifer Hagerty

Chinook salmon Photo Credit: Bay.org

Photo Credit: Judy Irving

WHO SUFFERS FROM THE BAY'S STARVATION DIET?

HOW FISH, WILDLIFE, AND PEOPLE ARE HARMED BY A FRESHWATER-STARVED BAY

Every day, the seven million of us who live in the Bay Area can enjoy San Francisco Bay by walking along its shores, gazing at it from our cars, homes, or offices, or by swimming in or boating on its waters. Each year, more than twice that many people visit the region to enjoy this spectacular estuary, its waters, and its natural bounty. The benefits that people derive from vibrant fish and wildlife populations, good water quality, and diverse natural settings are all tied to making sure enough fresh water makes it into the Bay. In other words, Bay inflow isn't just good for the Bay ecosystem but is one of the foundations for the quality of life and the strength of the economy in the Bay Area.

The San Francisco Bay estuary supports some 750 species of plants and animals, and many more are found throughout its vast watershed. Nowhere else on Earth do so many distinct types of Chinook salmon use one place as a migratory corridor and juvenile rearing area. The Bay's wetlands are home to over a million waterbirds, including many unique native species, and an important food source and resting place for millions of migrating birds. These species all evolved in response to predictable natural patterns of inflow to the Bay.

Cold freshwater flows in rivers throughout the Bay's watershed provide excellent conditions for spawning of a wide range of fish species, like Chinook salmon, Sacramento splittail, green and white sturgeon, and steelhead. The emerging year-class of juvenile fish then migrate into the Bay where they join a complex food web of resident and migratory species living in the open waters, wetlands, and nearby terrestrial habitats. Most species in the Bay are affected in some way by the freshwater pulses that flow through it and mix with its more saline marine waters (Figure 9). As explained in the previous chapter, all the critical processes that make the Bay estuary a productive place for fish and wildlife – from the transport of fish, food, nutrients and sediments in Bay inflow to the formation of low salinity zones, wetlands and beaches – are shaped by how much freshwater flow arrives, when it arrives, how frequently it occurs, and how long it lasts. There are many examples, unfortunately, of what happens when the flow is no longer big enough, doesn't last long enough, isn't frequent enough, or doesn't occur at the right time.

WHAT DO THESE SPECIES HAVE IN COMMON?

SPECIES	NATIVE?	LIFE SPAN (YEARS)	RESIDENT/ MIGRATORY/ NURSERY REARING	REPRODUCES WHERE?	ABUNDANCE CORRELATED WITH FLOW?
Chinook Salmon	Yes	3-5	Anadromous	River	**YES**
Striped Bass	No	4-10	Anadromous	River	**YES**
Green Sturgeon	Yes	Decades	Anadromous	River	**YES**
Delta Smelt	Yes	1	Resident	Delta	**YES**
Longfin Smelt	Yes	1-3	Resident/ Migratory	Delta/ Suisun	**YES**
Starry Flounder	Yes	7-8	Nursery Rearing	Ocean	**YES**
Sacramento Splittail	Yes	5-7	Resident	Shallow Freshwater	**YES**
American Shad	No	5-7	Migratory	River	**YES**
Staghorn Sculpin	Yes	1-3	Resident	Ocean/ Estuary	**YES**
Leopard Shark	Yes	Decades	Nursery Rearing	Ocean/ Bay/ Estuary	**YES**
Bay Shrimp	Yes	1.5-2.5	Nursery Rearing	Ocean	**YES**

Figure 9: The relationships between freshwater flow and species abundance are widespread. The specific mechanisms by which flow affects abundance, and the relative importance of mechanisms are likely to vary for different species (Kimmerer 2002b); however, the strong, significant correlations that persist across decades of monitoring provide powerful evidence of the benefits of freshwater flow to San Francisco Bay's fish and wildlife populations.

VIABLE POPULATIONS OF FISH AND WILDLIFE NEED FRESH WATER

The massive transformation of the Bay's watershed by tens of thousands of dams, canals, pumps, and wells has changed the patterns of flow to the Bay so much that the current conditions bear little resemblance to those in which the Bay's native fish and wildlife evolved. The result is a system where native species are in decline – some very close to extinction – while nuisance non-native species increasingly take advantage of the altered ecosystem.

Populations of many aquatic organisms at different levels of the food web have sharply declined, and six native fish species - Delta smelt, longfin smelt, steelhead, green sturgeon, and the winter and spring runs of Chinook salmon – that used to be among the most common in the estuary are now listed as in danger of extinction by the federal government and/or the State of California (Figure 10). To have viable populations, these species need to be:

- *abundant* (have enough individuals to ensure long-term survival through a range of different conditions)

- *diverse* (have enough variation among individuals to ensure that some will respond successfully to changing environmental stresses)

- *productive* (able to grow the population fast enough to exploit good conditions in a variable environment); and

- *spatially distributed* (exist in a large enough area to avoid catastrophic localized pressures).

American shad   Photo Credit: Brian Currier

COLLAPSE OF SPECIES ACROSS MULTIPLE TROPHIC LEVELS

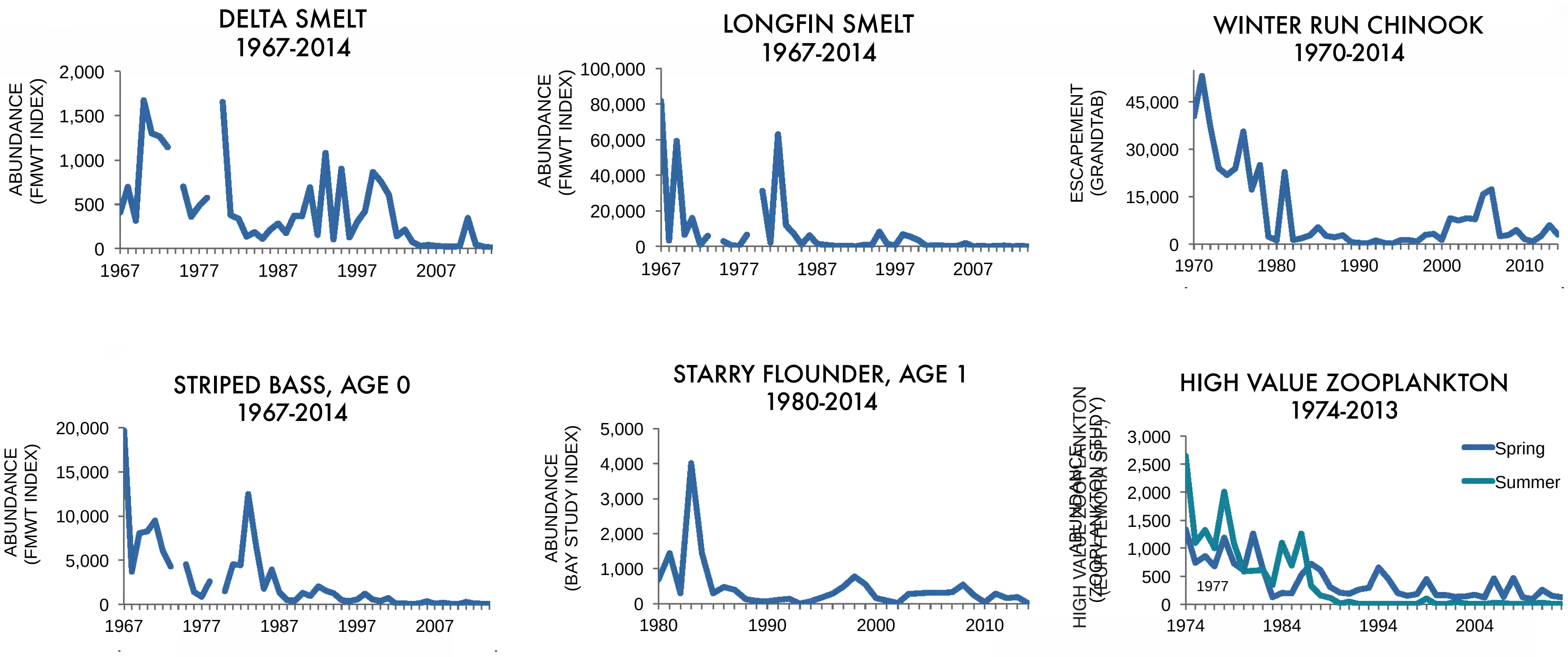


Figure 10: Abundance trends of several populations that serve as key indicators for the health of the San Francisco Bay estuary and its watershed. Data sets and length of data time series differ across species.

Many populations that use the San Francisco Bay estuary as a nursery or migration pathway are in severe decline. These declines pre-date, but have been exacerbated by, water management actions during the current drought.

Data provided by: California Department of Fish and Wildlife's Bay Study, Fall Midwater Trawl, Zooplankton Study, Anadromous Resources Assessment and the Interagency Ecological Program for the San Francisco Estuary

The outlook for these populations is grim in large part because Bay inflows are no longer adequate to maintain the services the Bay ecosystem once provided to support abundant, diverse, productive and spatially distributed populations.

One of the best-documented facts about the estuary is the strong, persistent relationship between freshwater flow and healthy populations of key species. Over the past few decades many scientific studies have documented the critical role freshwater flows play in maintaining viable populations of native fish and wildlife, and the productive habitats and food webs that support them, in estuaries in general and the San Francisco Bay estuary in particular[99]. This overwhelming body of evidence has led federal and state regulators and resource managers, as well as numerous scientific review panels, to conclude that current freshwater inflows to the Bay estuary are no longer adequate to sustain native fish and wildlife populations[100].

ABUNDANCE: LESS FLOW, LESS FISH

Obviously, the more individuals of a particular plant or animal species there are, the less vulnerable that species is to extinction risks from natural or human disturbances like habitat destruction or toxic pollution. Native fish species such as Delta smelt, longfin smelt, and Chinook salmon were among the most abundant species in the Bay ecosystem until the second half of the 20th century, but are now among the most rare species, and altering and reducing flows has been the main reason for their decline.

How much Bay inflow there is during critical times in fish life cycles strongly affects abundance: Critical parts of the life cycle of many fish species in the Bay estuary – such as reproduction, growth, and migration – are timed to occur during the winter and spring months because the inflow from rainfall and snowmelt during this period was naturally higher, creating beneficial habitat conditions. The amount of timing and flow in any winter – spring period has a large effect on how populations of these species respond during the months and years following[101] (Figure 11).

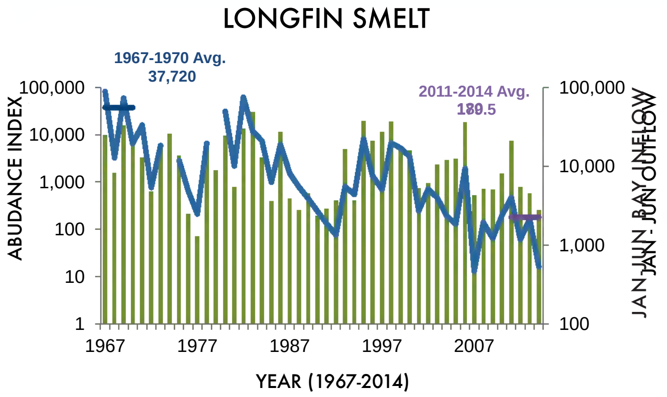
During the winter and spring, the migration of juveniles of fish species like Chinook salmon, steelhead, and sturgeon is cued by rising flow levels, and the young fish make their way along with the flow from their natal rivers through the estuary to the ocean. More Chinook salmon survive the journey when flows are higher[102].

At the same time, small forage fish like Delta smelt and longfin smelt, important parts of the estuary food web, respond to increasing flows by moving to spawning areas in the upper estuary and breeding. Longfin, once the most common native fish residing in the estuary and now one of the rarest, respond dramatically to flow changes – their abundance is tightly and positively correlated to winter – spring Bay inflows[103]. No other factors, including the impact of invasive species, appear to affect longfin population dynamics during the first few months of life[104].

During the spring months young starry flounder (another species caught by recreational and commercial fishermen) migrate into the Bay estuary from the ocean to mature[105]. The number of one-year-old starry flounder rearing in the estuary in a given year is strongly correlated to the amount of freshwater inflow in the previous spring[106].

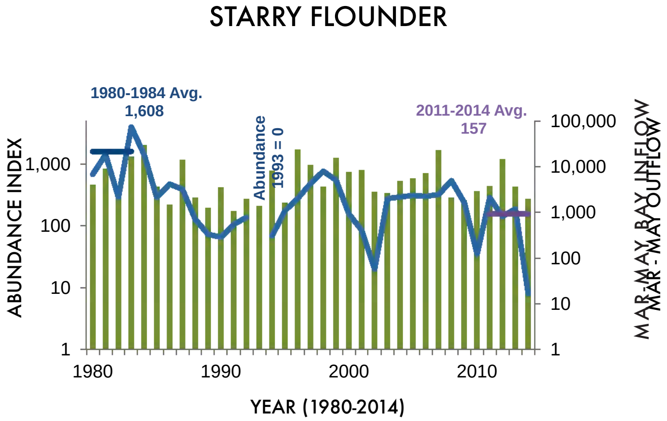
DECLINING BAY INFLOWS = DECLINING FISH POPULATIONS

Figure 11: Strong correlations between abundance (blue lines, left vertical axis; abundance indices from biological sampling programs) and winter-spring inflow into San Francisco Bay (green bars, right vertical axis; "Bay Inflow") have persisted for many decades for fish species and their invertebrate prey. Longfin smelt were once the estuary's most common resident fish and a key component of a commercial smelt fishery; this population has declined by orders of magnitude and is strongly and significantly correlated with freshwater flow rates. Starry flounder, a predatory fish, generally increase in years following those with high freshwater flows into the estuary. Bay shrimp are prey for smelt, flounder, and a host of other fish and bird species; their population tracks closely with springtime Bay inflows.

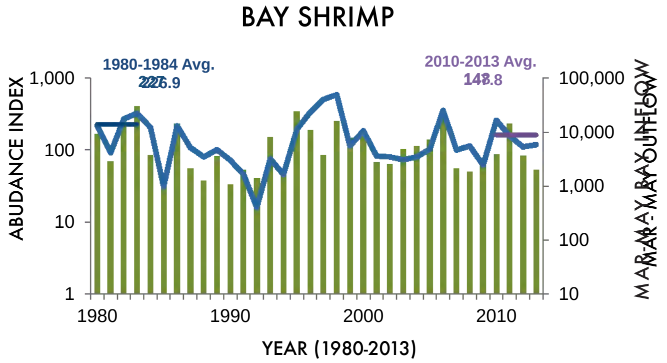


🟩 Bay Inflow
▬ Abundance Index

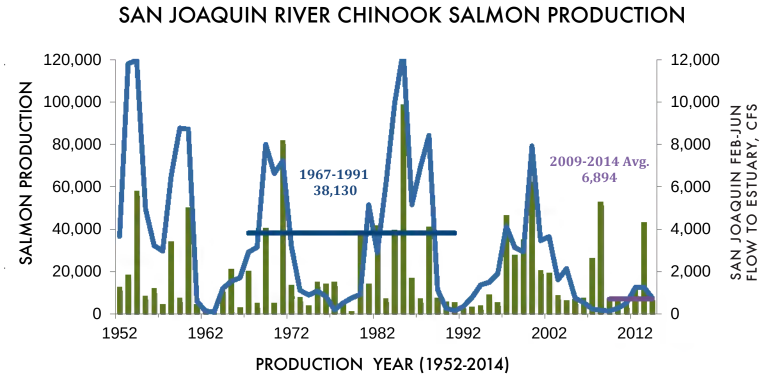
Longfin smelt - Recent average decline 99.5%



Starry flounder – Recent average decline 90%



Bay Shrimp - Recent average decline 35%



🟩 San Joaquin River Flow during juvenile migration

▬ San Joaquin River Chinook Production (measured in the ocean 2 years later)

Chinook salmon -
Recent average decline 89%

Chinook salmon production (the estimated number of fish from a given watershed that reach age-2 in the ocean) is highly correlated with freshwater flow rates that occurred when juvenile salmon migrated to the ocean, two years earlier. The figure matches production of naturally spawned Chinook salmon from the San Joaquin River with the river's flow to the estuary two years earlier, during outmigration of that same cohort of fish.

Many other species produce a significant and persistent population response to winter – spring inflows, from the smaller organisms and other zooplankton that fish feed on, such as shrimp[107] to the popular non-native sportfish like striped bass and American shad that once thrived alongside native species[108], and from the estuary's brackish upper reaches to as far away as the South Bay[109].

While the population effects of inflow to the estuary are most noticeable in the winter and spring, the effects are not limited to these seasons. The endangered Delta smelt, a small native fish found nowhere else in the world which used to be one of the most common fish in the estuary, benefits from increased area of brackish habitat that forms when fresh water reaches the upper estuary in September and October[110]. The adult Chinook salmon that successfully survived their journey to and through the ocean rely on the same fall inflows to provide adequate water quality conditions for their return migration[111] and help orient them towards their native spawning grounds[112].

Exporting Bay inflows (and fish) into giant pumps also cuts down on abundance: In the Delta region of the upper estuary, giant pumps operated by the federal Central Valley Project and State Water Project export water for use by irrigators in the San Joaquin Valley and cities in Central and Southern California. These pumps are so powerful that much of the Bay inflow is drawn toward the interior Delta, and along with it fish and invertebrates, and their eggs and larva. More than 9,000,000 fish on average are screened out of water to be exported by the pumps each year; though this process is called *"salvage,"* most of these fish will die before or shortly after they are released back into the Delta[113] (Figure 12). The real impact of salvage is actually much larger because larval fish are not counted and most small fish die (typically in the mouths of predators) before they reach the salvage facilities. In drier years, these export impacts can have a devastating impact on fish abundance, taking up to 40% of the annual population of Delta smelt (which live only one year) and up to 15% of outmigrating juvenile Chinook salmon[114].

Starry Flounder is one of many fish species that respond positively to increases in freshwater flow into San Francisco Bay. Dramatic reductions in Bay inflow jeopardize the recreational and commercial fisheries for this species.
Photo Credit: David Csepp, NMFS/AKFSC/ABL

How much Bay inflow there is can help or hinder the spread of non-native species: The Bay estuary is one of the most highly invaded estuaries in the world, and the radical alteration of Bay inflows is believed to be a primary factor in successful colonization by invasive non-natives. The abundance of many non-native species shifts in inverse proportion to flow. For example, an extended drought in the 1980s coinciding with then record high levels of water diversion facilitated the establishment and explosive spread of the overbite clam. When, in contrast, Bay inflows increase, invasive clams and fish such as the small but voracious inland silverside decreases in abundance[115].

NUMBER OF FISH SALVAGED AT THE STATE AND FEDERAL PUMPS IN THE DELTA 1993 – 2011

STATUS KEY

Endangered - Federal	🇺🇸
Endangered - California	🐻
Threatened - Federal	🛡
Threatened - California	◉

LEGEND

Native to CA	🌉
Recent decline	📉
Important Fishery	🐟
Commercial/Sport Fisheries Destroyed	🎣
Protection Removed (for political reasons; species has not recovered)	🚫

Figure 12 Fish were selected to encompass the wide range of species and life history types that are affected by water pumps.

"Average annual salvage" is mean yearly salvage from 1/1993 through 12/2011; "Maximum salvage" is the value for the calendar year with the highest salvage numbers (years differ amoung species).

These numbers underestimate the actual fish kills by not counting the fish that slipped through the bypass system and were killed by the pumps, and by not including indirect mortality. "Yearly Total" refers only to the 20 species listed.

SELECTED FISH SPECIES	1993-2011 Average	ANNUAL SALVAGE Maximum	STATUS
American shad	1,022,700	2,510,184	🐟 📉
Bluegill	127,133	394,952	
Channel catfish	45,799	131,484	
Chinook salmon (winter run)	51,955	183,890	🇺🇸 🐻 🌉 🎣 📉
Chinook salmon (spring run)			🛡 ◉ 🌉 🎣 📉
Chinook salmon (fall run)			🌉 🐟 📉
Chinook salmon (late-fall run)			🌉 🐟 📉
Delta smelt	29,918	154,820	🛡 🐻 🌉 📉
Green sturgeon	58	363	🛡 🌉 📉
Inland silverside	62,838	142,652	
Largemouth bass	54,180	234,198	🐟
Longfin	6,228	97,686	◉ 🌉 📉
Prickly sculpin	76,403	274,691	🌉
Steelhead (Rainbow trout)	5,278	18,580	🛡 🌉 🎣 📉
Redear sunfish	1,609	5,611	
Riffle sculpin	155	798	🌉
Sacramento sucker	3,443	27,362	🌉
Sacramento splittail	1,201,585	8,989,639	🛡 🌉 🐟 📉
Striped bass	1,773,079	13,451,203	🐟 📉
Threadfin shad	3,823,099	9,046,050	📉
White catfish	296,543	941,972	
White sturgeon	151	873	🌉 🐟 📉
Yellowfin goby	193,399	1,189,962	

AVERAGE YEARLY SALVAGE TOTAL: 9,237,444

DIVERSITY: IT'S ALL IN THE TIMING

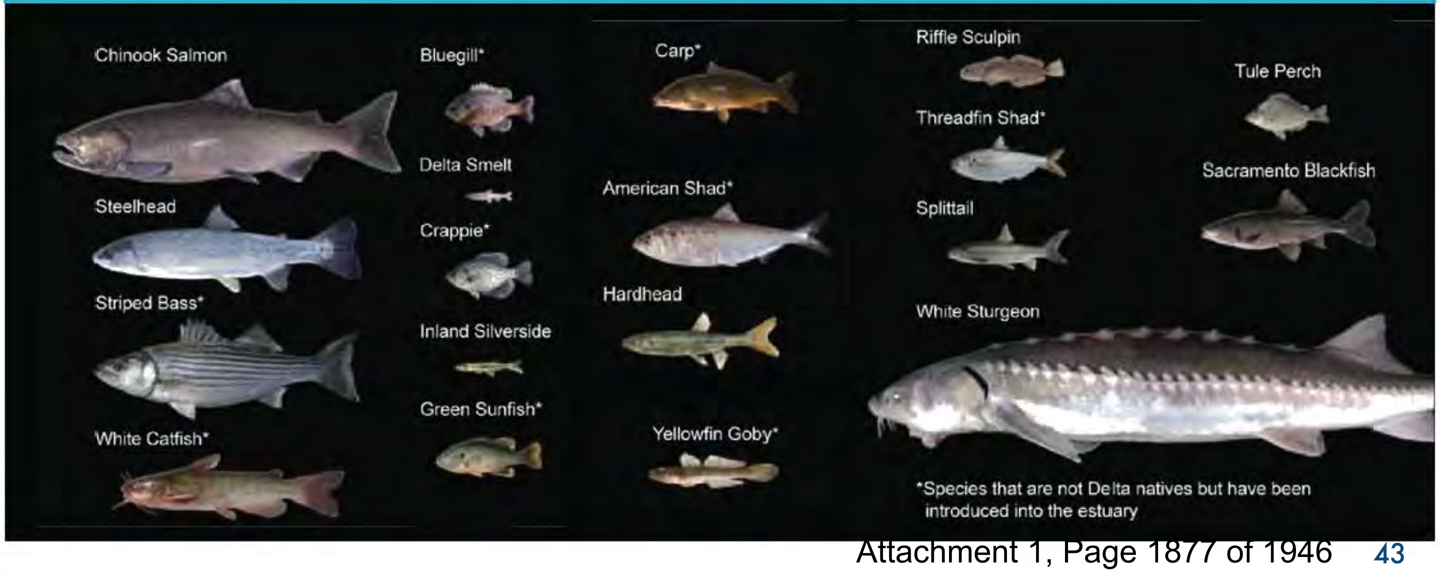
"Don't put all your eggs in one basket" is common advice for investors. Likewise, populations comprised of diverse individuals that exhibit a range of life history behaviors and genetic predispositions are more resilient to environmental disturbances of all kinds and less vulnerable to the risk of extinction. California's natural regime of extended winter rains and spring snowmelt and high year-to-year variability favors a wide variety of responses by the individuals within a population. Constraining the volume and timing of peak flows year after year selects for a small segment of behavioral and ecological responses that are able to utilize habitats during limited windows of availability (Figure 13). For instance, the dramatic decline of Bay inflows in the winter and spring limits the spawning period for Delta smelt, making the fish less able to capitalize on good conditions that may occur during the multi-month spawning and rearing seasons[116]. When the window of suitable spawning conditions for Delta smelt is reduced and limited to the same narrow timeframe year after year, some rare but valuable life-history strategies no longer pay off. The genetic variants that allow for these different strategies may decline or even disappear – meaning that the population's ability to grow is compromised, even when good conditions return[117].

Hedging your bets is the best way to plan a migration: Chinook salmon experience a similar dilemma. Historically, different juvenile migration strategies have succeeded under different conditions[118]. But, as shorter and less frequent peak flow periods and lower flow volumes occur with increasing regularity during their juvenile migrations, the salmon life history types that can survive such conditions are favored over other life-history types. The period when flows are provided to support the outmigration of juvenile fall-run Chinook salmon from the San Joaquin River (the state's second largest river) is limited to one month, and even that requirement was relaxed during the recent drought.

Restricting the migration window and limiting the flows that cue migration undermines the life-history diversity (in this case, the size and time at which juveniles migrate) that have allowed Chinook salmon to survive natural (and extreme) fluctuations in

SPECIES OF FISH COMMONLY COLLECTED AT THE STATE FISH SALVAGE FACILITY

PHOTO: CA DWR

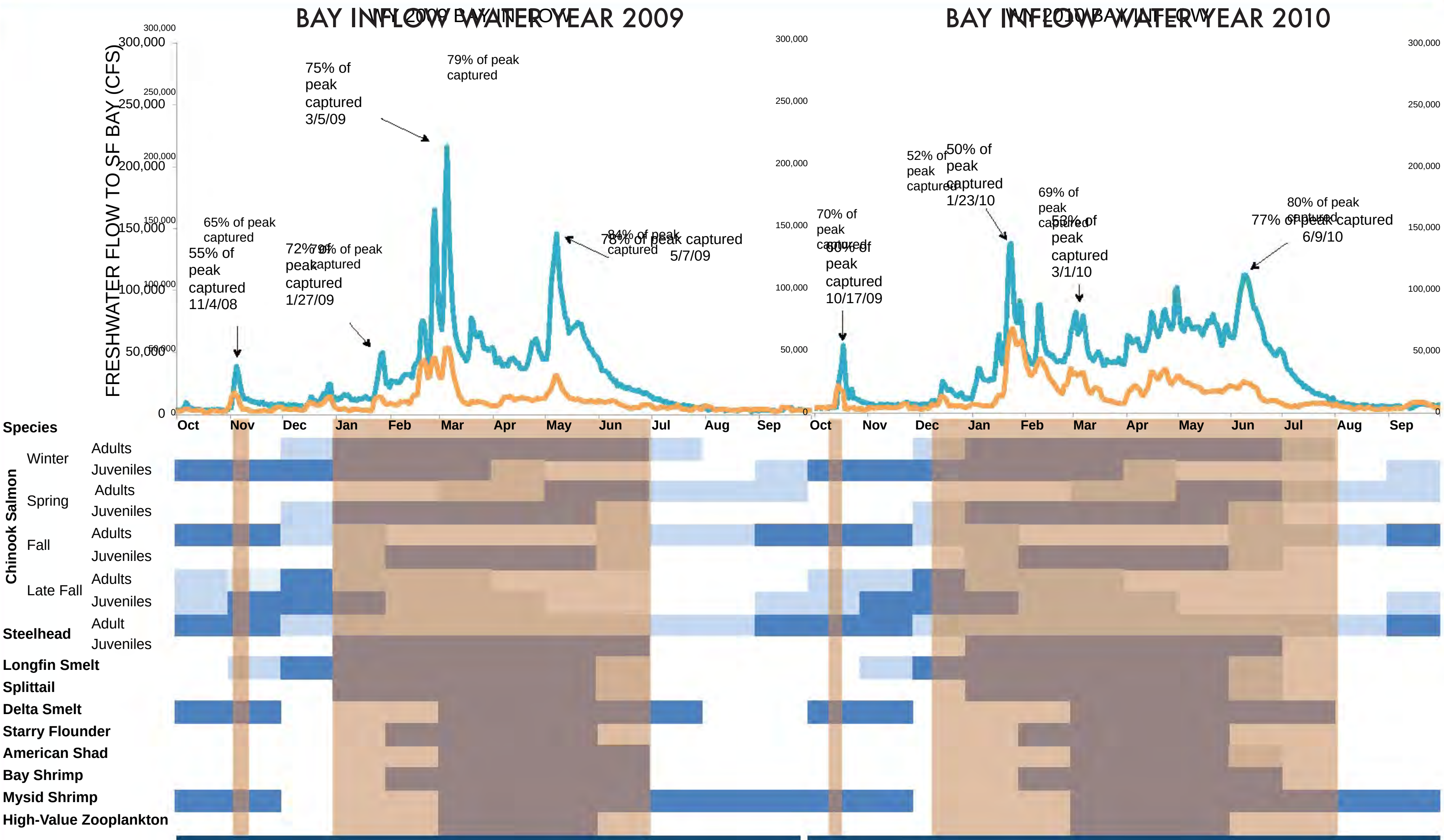


*Species that are not Delta natives but have been introduced into the estuary

IMPACTS TO FRESHWATER

DIFFERENCES BETWEEN ESTIMATED UNIMPAIRED AND ACTUAL FLOW PATTERNS

EXAMPLES OF FLOW DEPENDENT SPECIES AND LIFE STAGES LIVING IN THE BAY

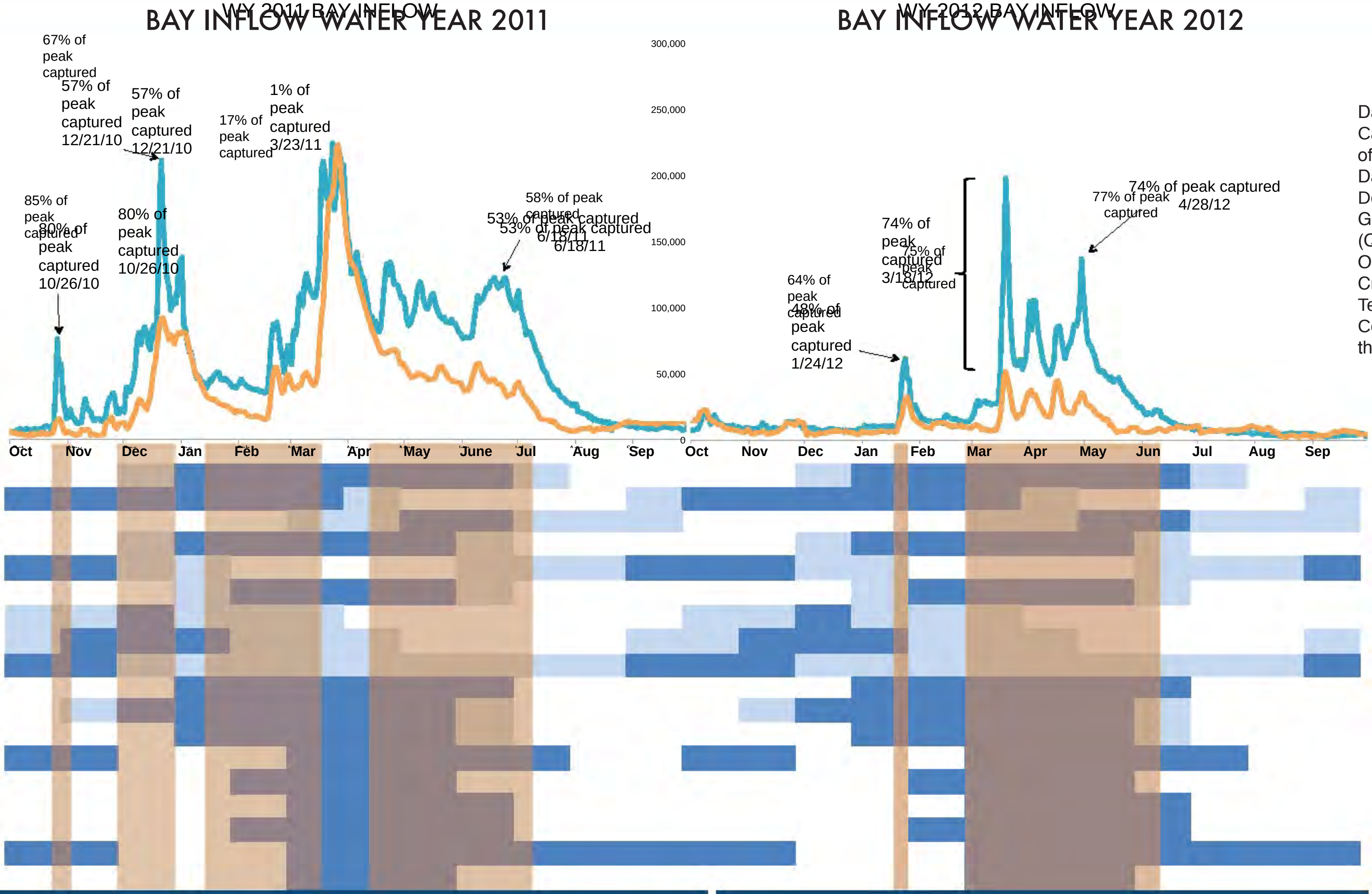


Only 28% of the Central Valley watershed's runoff made it to the Bay between February and June 2009, the lowest percentage of available flow since 1990. Peak flow events in January, February, March, and early May were virtually eliminated; this deprived juvenile salmon (all four distinct populations) and numerous other species of the ecological benefits associated with these short-term pulses of fresh water.

Sixty-five percent of Central Valley runoff was diverted during the winter-spring of 2010, and high percentages were diverted during peak flow periods that species like Chinook salmon rely on to find their way through the Delta to the Ocean.

Figure 13: Overlap in timing of freshwater flow and presence of different species life-stages in San Francisco Bay and the Delta. Top panels show, for years 2009-2012, the rate of freshwater flow into the Bay (Bay Inflow, orange line) in comparison to what would have flowed had there been no dams or diversions upstream of the estuary (unimpaired flow, blue line). Lower panels show the seasonal timing of several species that use the estuary to

FLOW AND SPECIES 2009-2012



Data sources:
California Department of Water Resources Dayflow and California Department of Fish and Game Report, 2010 (Quantifiable Biological Objectives and Flow Criteriafor Aquatic and Terrestrial Species of Concern Dependent on the Delta).

Even when wet conditions returned in 2011, most of the winter flows were captured until Central Valley reservoirs were filled in March. After that, runoff was allowed to reach the estuary. Fish and wildlife usually receive their share of life-giving flows only when humans run out of space to store extra water.

When dry conditions returned in 2012, most of the available fresh water runoff was diverted again. Only 38% of the critical winter-spring flows reached the estuary, plunging the Bay's ecosystem back into a severe, man-made drought. Again, species like salmon and splittail were deprived of the short-term peak flows upon which they rely.

complete their life cycle (light blue bars indicate when a life stage may be present; dark blue bars indicate the life stage is definitely present at that time). The overlap between species presence and periods when flow volume was significantly reduced by water diversions and exports in each year (red shading) reveals likely impacts of Central Valley water management on major fish and invertebrate populations in San Francisco Bay.

their environment for millennia. This loss of diversity in juvenile migration strategies likely led to the unprecedented closures of California's ocean fishery in 2008 and following years[119]. The net effect of reducing migration diversity is to gamble that a small subset of the fish that migrate during such short windows will reach the ocean exactly when food supplies, temperatures, and other conditions are adequate. Salmon thrived in the Bay estuary by hedging their bets about when to go to the ocean; restricting those opportunities eliminates large portions of the population that might capitalize on changing conditions, and makes the dwindling remnant much more susceptible to extreme population swings.

PRODUCTIVITY

In the context of what defines a viable population, productivity refers to a population's ability to grow; it is the balance between birth rate and death rate. Populations that have a high capacity for population growth can rebound quickly after periods with poor environmental conditions[120]. In estuaries, both river inputs and ocean conditions affect productivity of different species to different degrees. Scientific research in the Bay estuary suggests that freshwater inflows have greater ecological effects on this particular estuary than the effect of ocean waters moving inland into less saline environments[121] (Figure 14).

As with abundance, there is strong scientific evidence linking population growth in native fish species like longfin smelt and Chinook salmon to freshwater inflows to the estuary[122]. In the variable conditions that typify an estuary, many aquatic organisms evolved to rebound rapidly in wetter years following poor conditions in drier years. But these species must now contend with the Bay's human-made "permanent drought". In terms of the actual conditions experienced by the estuary's fish and wildlife, wet years are infrequent and much less wet, and drier years are extremely dry and nearly continuous. As a result, in most years the population's rate of growth is constrained, and the higher flows that would allow the population to rebound rarely occur.

Food web productivity also improves with increases in freshwater flow to the estuary. Productivity in this sense has been degraded by the direct and indirect effects of reducing inflows, as described in the previous chapter. One of those effects is the successful establishment of invasive species, whose growing numbers can displace native fish and wildlife populations by competing for food and habitat. The effects are not confined to the winter and spring months. For example, the prevailing theory about why anchovies are no longer abundant in the upper estuary in summer and fall is that the local population simply left the area when food web productivity was reduced[123]. This effect has been attributed to the effect of the overbite clam on production of anchovy prey; however, the clam's invasion itself appears to have been facilitated by the extreme reduction in inflow. Species such as Pacific herring feeding in the summertime may also be negatively affected by reduced food web productivity in the Bay[124].

Salmon   *Photo Credit: Bay.org*

GENERALIZED MODEL OF BAY FISH ABUNDANCE

	SPAWNING SUCCESS		JUVENILE AND ADULT SURVIVAL				
ECOLOGICAL FEATURE	FECUNDITY	SPAWNING HABITAT	PREY DENSITY	DISEASE	CONTAMINANTS	PREDATION	REARING HABITAT
IS THE PRODUCT OF...	Flow and ocean conditions affect prey abundance in the Bay which can affect female growth and body size	Suitable spawning substrate with appropriate temperature, salinity, and flow rate	Water temperature, nutrient and food transport, productivity of microscopic organisms, contaminants, disease	Water temperature, flow rates through the estuary (residence time), fish distribution	Toxin concentrations, frequency of harmful algal blooms	Turbidity, flow rate, and predator abundance	Prey abundance, flow rates, temperature, salinity, turbidity, contaminant loads
PRINCIPALLY MODIFIED BY...	☾ ≈	≈	☾ ≈	≈	≈	≈	☾ ≈
FLOW AFFECTS...	Prey abundance which can affect female size	Amount of spawning habitat available for species that spawn in the Bay watershed's rivers and in the estuary by modifying temperature, salinity, and other environmental conditions	Prey production and distribution throughout the Bay by influencing nutrient, and food transport, contaminant concentrations, and disease spread; ocean conditions affect abundance of certain prey species that enter the Bay	Residence time and fish distribution	Conditions that promote harmful algal blooms and dilutes concentrations of other contaminants	Transport of small fish and turbidity (cloudiness) of water, which hide small fish and reduce predation rates	Salinity, turbidity, flow rates, and prey availability that affect rearing success. Ocean conditions (such as upwelling) influence rearing success for some species in the lower Estuary

FRESHWATER FLOW DRIVES MULTIPLE MECHANISMS THAT AFFECT PRODUCTION OF FISH IN THE BAY

Figure 14: A generalized view of factors driving population fluctuations for many of the fish populations that depend on the Bay to complete their life cycle. The forces that produce each ecological feature and their impact on different fish species are too numerous to list; the key point is that freshwater flows into the estuary affect each of these drivers. The strength of the influence of freshwater flow or ocean impacts varies by species and by location of the life-history stage in question.

☾ Ocean Impacts

≈ Freshwater Impacts

SPATIAL DISTRIBUTION: THE ADVANTAGES OF SPREADING OUT IN THE LANDSCAPE

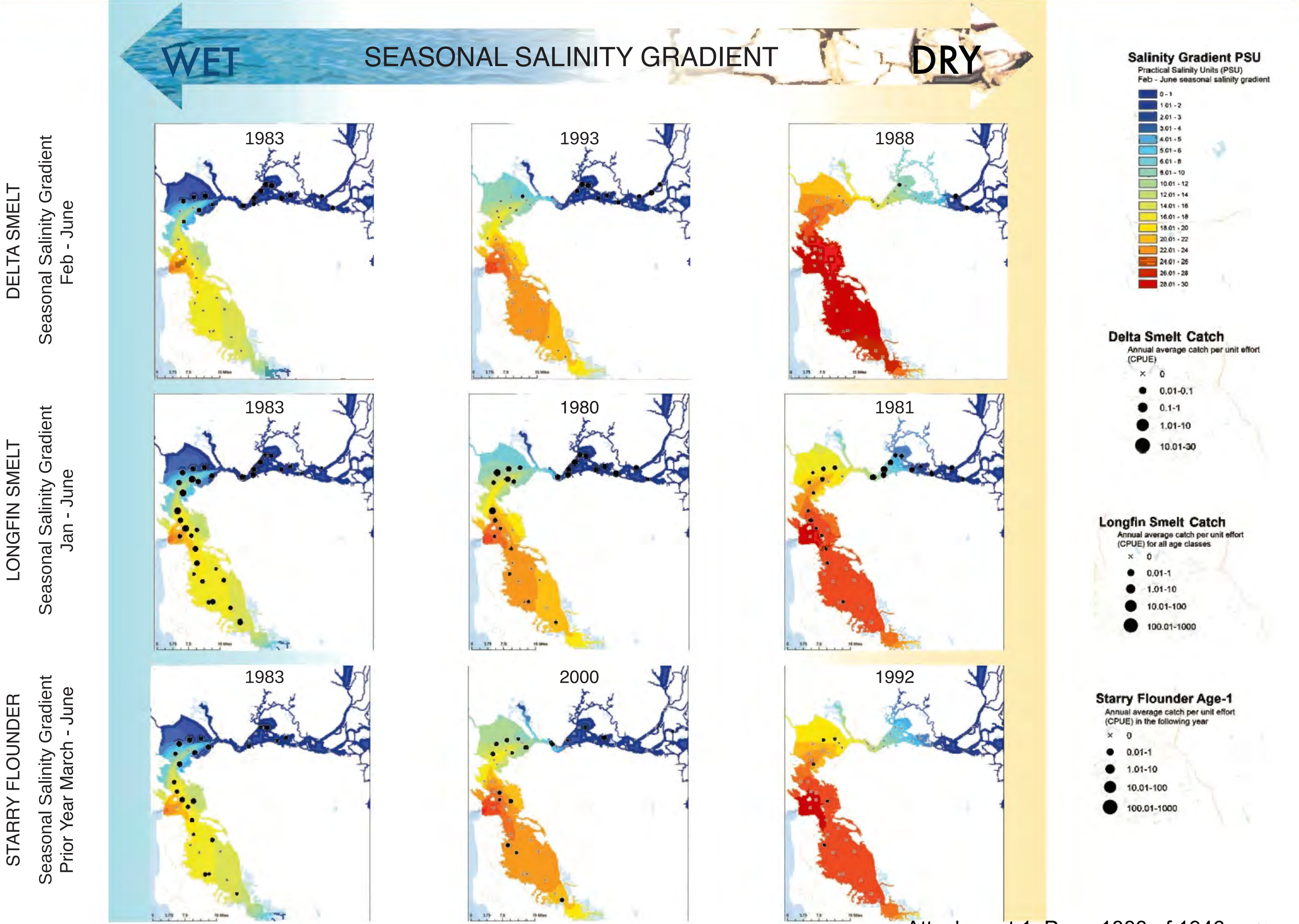
Populations are less vulnerable to extinction risk from both degraded local conditions and catastrophic events when they are more widely distributed in the landscape[125]. How much freshwater flow makes it downstream has a profound effect on how much habitat of different types is created and where it is located throughout the landscape of the estuary, in turn affecting where particular species can be found and how many individuals of that species can utilize a particular habitat (Figure 15). Because many native aquatic organisms in the Bay estuary have evolved to exploit its unique brackish water habitats, resident species such as Delta smelt and longfin smelt are typically associated with a narrow band of habitat in the Low Salinity Zone. When inflow to the estuary is reduced, the LSZ contracts in response, shrinking available habitat for the smelt and related species[126]. As the band of usable LSZ habitat contracts, it also moves upstream, shifting the distribution of longfin and Delta smelt upstream towards the Delta and increasing the number of fish that are lost to the giant south Delta pumps run by the federal Central Valley Project and State Water Project[127].

Adequate distribution isn't just a problem for resident fish. Flows can be so low in reaches of the southern Delta and the San Joaquin River basin that their use as migratory corridors by Chinook salmon and other species is impaired or eliminated[128], and water quality becomes so degraded that fish passage is blocked[129]. The inability to sustain the distribution of Chinook and other salmonids in the San Joaquin Valley portion of the Bay's watershed is highly problematic as a result of reduced freshwater flows[130]. In effect, this loss of spatial distribution makes all of the estuary's salmonid populations dependent on conditions in the Sacramento River valley; any problems there (e.g., a spill of toxic chemicals, disease outbreaks) could eliminate the Central Valley's production of salmonids.

Figure 15: The spatial distribution of many species changes in response to variation in freshwater inputs to the estuary. These maps show the distribution of three fish species across a range of Bay inflows and salinity gradients during the spring. For example, in an extremely wet year (like 1983) the distribution of Delta smelt (top row) extends throughout the upper estuary during the spring. In contrast, distribution of this native fish is limited to Suisun Bay and the Delta when the combined effect of drier conditions and high diversion levels makes Bay inflows extremely low, such as 1988. Starry flounder (bottom row) prefer habitats with intermediate salinities that are broadly available under high flow conditions, but less widespread when conditions are very dry. The wettest year (1983) is depicted for each species on the left hand side of the figure; drier years are shown to the right hand side. In the absence of water diversions or exports, salinity conditions similar to those depicted on the left would have occurred in 10 years between 1975-2014, but they actually occurred in only 4 of those years. By contrast, Super Critically Dry years only occurred naturally in one year (1977) during this four decade period, but similarly extreme conditions in the estuary actually occurred for 19 years – almost half the time.

Data sources: U.S. Environmental Protection Agency; California Department of Fish and Wildlife and the Interagency Ecological Program San Francisco Bay Study; Delta Modeling Associates (Salinity Gradient, Coarse-grid version of UnTRIM San Francisco Bay-Delta Model); and ESRI, DeLorme, BEBCO, NAANGDC, & other contributors (Basemap).

FISH DISTRIBUTION CHANGES IN RESPONSE TO THE SALINITY FIELD



FORAGE FISH – WHEN THE FOOD WEB IS THE SUM OF ITS PARTS

Collectively, small fish and large invertebrates that swim in open water are known as “forage fish.” They represent the prey base for larger fish, sea birds, and marine mammals, which often do not distinguish one kind of fish from another. Declines in forage fish populations are a known threat to populations of seabirds[131] and marine mammals[132]. Because of their crucial function in estuarine and marine food webs, global declines in forage fish have become a concern for scientists, ecosystem managers, and some fishing communities.

The populations of many forage fish species that were historically the most abundant in the estuary, such as longfin smelt, striped bass, American shad, Bay shrimp, and mysid shrimp, have declined dramatically in recent decades. Unlike many other areas of the world where they are overfished, forage fisheries are generally well managed in the Bay and nearshore coastal waters of California. Instead, these population declines are directly related to the long-term trend of reducing Bay inflow – indeed, a reliance on freshwater flow is the only thing some of these forage fish have in common (Figure 9). Forage fish have an ecological value much greater than their physical size. Without sufficient Bay inflow to provide the habitat conditions that allow forage fish populations to thrive, populations of other fish, birds, and marine mammals that rely on forage fish in the Bay and the Gulf of the Farallones are at risk of collapsing too.

Great Egret, one of many native bird species that relies on the fish and invertebrates produced by the San Francisco Bay foodweb. The effects of freshwater flow rates extend throughout the Bay ecosystem and beyond. Photo credit: David Sanger

FLOW IS FOR THE BIRDS, TOO

Fish, invertebrates, and other aquatic plants and animals aren’t the only creatures that benefit from Bay inflows, and suffer when they are reduced. The Bay estuary is also home to a diverse community of both resident and migratory birds. A critical part of the Pacific Flyway, the estuary provides crucial habitat for millions of migrating waterfowl and shorebirds, representing over 200 species. However, many bird populations that use the estuary are declining, and currently twenty-two bird species are listed as threatened, endangered, or species of special concern in this estuary[133].

It takes a fishery to support an aviary: Many factors are to blame for declines in bird populations, including urbanization, contaminants, and direct habitat loss. But long-term reductions in freshwater flows to the estuary likely contribute significantly to the pressure on the Bay's waterbird populations because of the resulting decline in the abundance of forage fish and the degradation of wetland habitat and water quality. Protecting fish-eating birds, such as pelicans, terns, and cormorants, requires production of a sufficient forage fish prey base. But populations of many fish species that depend on adequate inflows to the estuary have dropped well below the levels that are needed to maintain viable populations of pelagic seabirds[134].

Throughout the estuary many bird species are closely associated with wetland marshes[135], and large areas of the upper estuary, especially in Suisun Marsh, are managed to provide fresh and slightly brackish habitat for ducks. As reducing inflows makes the estuary more saline over time, the diversity and composition of wetland vegetation will change as well, affecting its habitat value for bird species. Salinity-induced wetland vegetation shifts in recent years have been as extreme as experienced in the most severe natural drought periods in California's history[136]. Changing salinities can limit the diversity of seeds stored in the soil and the productivity, diversity, and composition of wetlands[137]. Animal species that depend on these marshes are likely also impacted by salinity and vegetation changes resulting from reduced inflow[138]. Finally, impaired water quality that is exacerbated or caused by low inflows also harms the Bay's many bird populations.

DRIVING RECREATIONAL AND COMMERCIAL FISHERIES INTO THE ABYSS?

It would be a sadder and poorer world if Californians allow the San Francisco Bay estuary to become so impaired that its unique and wonderful aquatic life, and the birds and mammals that feed on it, disappears forever. But the consequences are not only ecological, or spiritual, or esthetic – there are extremely significant economic costs as well. The Bay Area has always been a major hub of the Pacific Coast's commercial fishing industry. Bay Area residents and tourists from across the globe come to San Francisco Bay in order to enjoy the pursuit of salmon, sturgeon, and many other game fish and, if they're lucky, to bring home a delicious dinner.

"Fish-friendly water management" is the only option: Today, Chinook salmon are one of the most recognizable and cherished fish on the Pacific Coast, and their production in the Bay's watershed supports a commercial and ocean recreational fishery that extends all the way from Monterey Bay to Oregon. But these valuable fisheries are extremely vulnerable to changes in Bay inflows. The long-term trend of flow alteration (combined with habitat degradation and poor hatchery management) in the watershed, and the associated declines in salmon production, has been a contributing factor to the loss of thousands of jobs and the beaching of hundreds of boats in the fishing industry[139]. When these long-term problems overlapped with poor ocean conditions, fishing for Chinook salmon off the California coast was closed completely in 2008 and 2009 (and through most of 2010). At the time, much attention was focused on the role of ocean conditions (and their relationship to global climate change); however, the most comprehensive scientific study of the unprecedented closure of the fishery noted that decades of poor habitat conditions in their freshwater nurseries

San Francisco Bay is home to both commercial and recreational fisheries such as Pacific herring pictured in this photo. Fisheries for many species like salmon and starry flounder depend on the health of the Bay ecosystem, including numerous ecological processes that are driven by freshwater flows to the estuary. Photo Credit: David Sanger had set the stage for this collapse and called for "…more fish-friendly water management…" as one of the few actions that might prevent the problem from recurring[140]. If California wants to preserve its salmon fisheries, the only effective antidote for poor ocean conditions is to improve flow conditions upstream of the Golden Gate.

It's not just salmon on the plate: The Bay supports many other important fisheries, including the nation's last major urban commercial fishery (for Pacific herring). For instance, there is a valuable sport and recreational fishery for starry flounder, a predatory fish, which once produced hundreds of metric tons in California[141]. The flounder population in the estuary grows or contracts depending on how much water flows into the Bay during the spring[142]. In addition, tourists and Bay Area residents pay substantial amounts of money (for tackle, licenses, and a boat ride) to try to catch white sturgeon in the Bay; the spawning success of these giant fish is directly related to flow from the watershed into the estuary[143]. Sacramento splittail, an endemic species that depends on periodic flooding to inundate its spawning habitats, are also a staple of recreational and subsistence fishing in the upstream portions of the estuary. Invertebrates, like oysters and Dungeness crab, are also much sought after, and again maintenance and restoration of their habitats and populations requires more careful management of freshwater flows to the Bay. Unless flow conditions are improved, these fisheries could all go the way of the once vibrant fisheries for Delta smelt and longfin, two species that were once ubiquitous in the estuary but are now so rare that they are listed as endangered. As these fisheries disappear, the fishing communities that depend on them – from small towns along the coast to families who rely on subsistence fishing in the Delta to the seafood-related businesses of Fisherman's Wharf – are at risk as well.

MARINE MAMMALS SUFFER WHEN REDUCING FLOWS REDUCES THEIR FOOD SUPPLY

There are few more amazing and thrilling experiences for Bay Area residents and visitors than to observe sea lions and seals hauling up onto local docks and piers, or to take a whale-watching trip to see the Orca whales (the "Southern Resident killer whale" population) that feed and migrate right outside the Golden Gate. These protected marine mammal species eat fish and other organisms that rely on the estuary and its Central Valley watershed as spawning and rearing grounds. By diminishing the estuary's productivity and changing its food web, reducing Bay inflows can produce cascading effects that eventually create problems for local marine mammal populations. For example, the local Southern Resident killer whale population specializes in eating Chinook salmon; the abundance, reproductive success, and mortality rates of resident Orcas are linked to prey limitation caused by recent Chinook salmon declines[144]. Orca whales have come to rely on Chinook salmon because they are large fish with a high fat content that were historically abundant throughout the year, so the decline of salmon stocks has had dire consequences for resident Orcas. Dwindling supplies of salmon are believed to restrict the recovery of the local population[145]. As a result of mismanaging flows in the estuary and its watershed, the future of these two iconic species in the Bay Area is uncertain.

CASCADING EFFECTS OF FRESHWATER FLOW IN THE SAN FRANCISCO BAY ESTUARY

	NEARSHORE OCEAN	SAN PABLO, CENTRAL, AND SOUTH BAYS	SUISUN BAY AND MARSH	DELTA
PROCESSES AFFECTED BY FRESHWATER FLOWS	• Sediment transport (turbidity) • Nutrient transport • Beach formation	• Sediment transport (turbidity) • Nutrient transport • Marsh accretion • Changes in the availability of habitats with different salinities • Water column stratification	• Sediment transport (turbidity) • Nutrient transport • Marsh accretion • Changes in the availability and location of habitats with different salinities • Residence time • Food web productivity • Gravitational circulation, fish and wildlife migrations	• Sediment transport (turbidity) • Nutrient transport • Marsh accretion • Residence time • Floodplain innundation • Fish and wildlife migrations • Contaminant loading • Toxic algal production • Keep brackish water “at bay”, maintains agricultural and drinking water quality
BIOLOGICAL EFFECTS ASSOCIATED WITH FRESHWATER FLOWS	• Increase food web productivity • Improve survival and fitness of resident Orca whales and other marine mammal populations • Create/maintain/improve beach habitats • Increase fishery productivity	• Control wetland plant species composition and distribution • Improve abundance and distribution of many native species including those that become food for other species • Increase fishery productivity • Create/maintain/improve brackish marsh habitat	• Improve abundance and distribution of many native species, including those that become food for other species • Increase fishery productivity • Create/maintain/improve brackish marsh habitat	• Prevent harmful algal blooms • Improve abundance and distribution of many native species • Increase fishery productivity • Control spread of invasive species • Reduce entrainment of endangered fish at Delta export pumps

Figure 16: Most fresh water comes to San Francisco Bay from rivers of the Central Valley’s watershed, via the Sacramento-San Joaquin Delta (upper right). The effects of flowing fresh water (including the transport of food, nutrients, sediments, and organisms produced upstream) can be felt throughout San Francisco Bay and into the nearshore Pacific Ocean. Along the journey from the rivers to the ocean, freshwater flows affect numerous processes and habitats, generating a variety of biological outcomes. Generally speaking, managing water diversions upstream of the Bay in a more sustainable manner will lead to higher flow rates, more natural variability in those flow rates, and increasing benefits for the larger San Francisco Bay ecosystem and the people who live in and visit the Bay Area.

PEOPLE ARE THE ULTIMATE LOSERS FROM LOW BAY INFLOWS

Clearly, people benefit from a healthy San Francisco Bay in many ways (Figure 16). When the Bay's fish and wildlife populations are thriving, they provide enormous commercial and recreational opportunities, from taking your family to discover the unique plants and animals of the Bay's wetlands and beaches to going whale watching or salmon fishing, and they feed millions of people each year. Collectively, the Bay's natural resources make San Francisco one of the most attractive places in the world to live and visit.

People don't just benefit from observing wildlife and eating seafood, but regularly enjoy direct contact with the Bay. Many "play in the Bay" when they wade, swim, sail, or kayak in its waters; these activities are only enjoyable when the Bay's waters are clean and there are wetlands and beaches to visit. When Bay inflows decline, water quality and the ability to resupply beaches and wetlands with sediment declines as well.

Don't go near the water without a hazmat suit: We now know that low inputs of Bay inflow not only degrade water quality but also are beginning to cause periodic harmful algae blooms in the estuary. These harmful "algae" (actually, cyanobacteria) produce neurotoxins powerful enough to make humans sick and even to kill dogs, otters, and other small mammals[146]. The Microcystis cyanobacteria blooms more frequently when low fresh water flows reduce flushing and decrease turbidity in the Delta[147]. Although this species blooms only in the fresh water of the upper estuary, its toxin can be transported downstream; in fact, the neurotoxin was recently detected in invertebrates in the saltier waters of the Central Bay[148]. Thus, the problem of low Bay inflow not only harms fish and wildlife but also threatens water quality and recreational opportunities for people throughout the larger Bay Area. This alarming development has the potential to reverse the positive effects of our decades old, multi-billion dollar investment in cleaning up the Bay's waters.

The reduction of Bay inflows also poses a threat to the continued existence of the beaches and wetlands that surround the Bay and the coastal areas nearby the Golden Gate, popular recreational sites that attract both residents and tourists throughout the year. These special environments rely on a continuous supply of sediments to maintain themselves in the face of ongoing erosion from storm runoff and waves. Delivery of sediments to the Bay and coastal environments, and our ability to maintain these important features, is controlled in part by how much freshwater inflow we allow to reach the estuary. As Bay inflows are constricted by human water diversions, they mobilize less sediment; many of the Bay Area's beaches and wetlands are rapidly eroding for lack of sediment resupply. As sea levels rise, the resupply problem will become even more critical.

> A Bay Area where it's hard to catch salmon, see pelicans or Orca whales, find a bowl of cioppino made with today's local catch, hang out at the beach, or even be in contact with the water? This is a high price to pay for tolerating California's unsustainable approach to managing its aquatic resources, where so little freshwater flow is allowed to make the life-giving journey to San Francisco Bay and the Golden Gate.

The time is now for Californians to decide whether we really want to pay that price – or the choice will be made for us; the loss of the many ecosystem services and economic benefits the Bay still provides today will become just another cautionary tale to pass on to future generations.

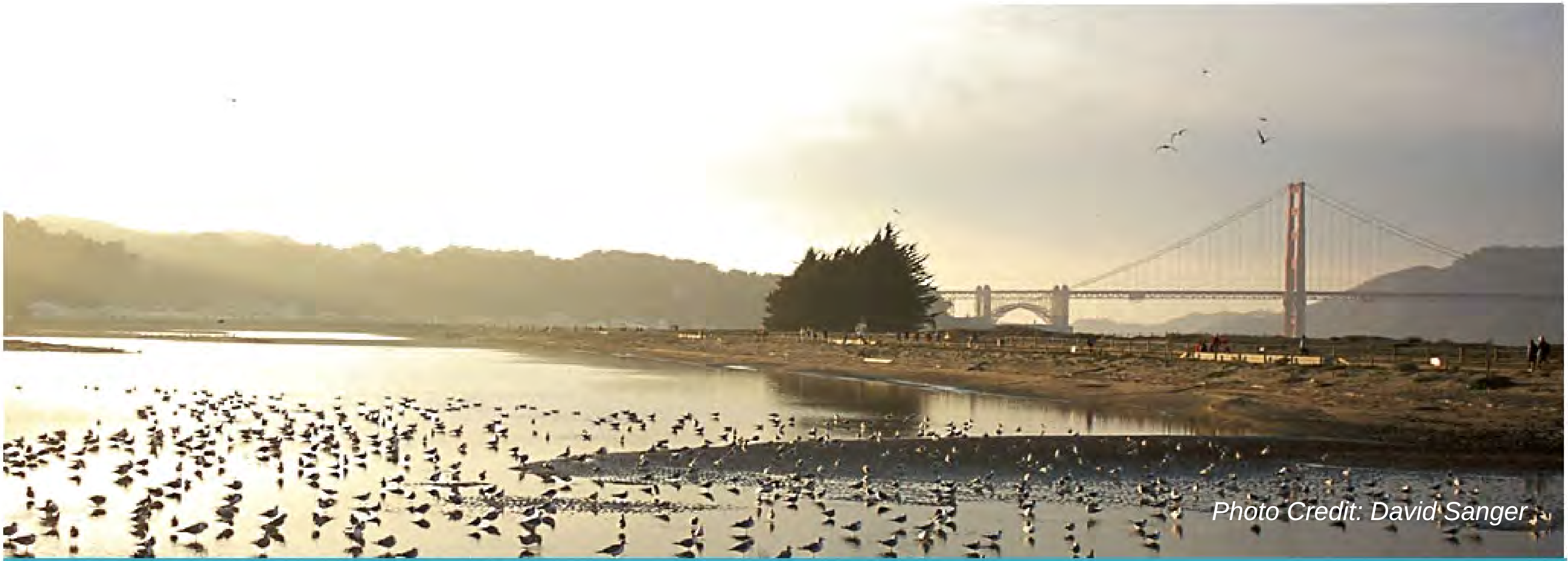


Photo Credit: David Sanger

TURNING THE FLOW BACK ON

WHAT CAN BE DONE TO REVIVE THE FRESHWATER-STARVED ESTUARY?

Fortunately, there's still time to avoid the increasingly likely scenario where native fish species go extinct; toxic algal blooms become common; recreational and commercial fisheries are permanently closed; marshes erode, grow more saline and less diverse; and the Bay Area's tourism and recreational portfolio loses value.

To avoid that scenario, Californians must choose a different pathway for how we manage flows and water supplies in the future. As mentioned in the beginning of this report, while most of the outcomes of water management conflicts are experienced downstream in the Bay, most of the causes – and the solutions –

manifest themselves in the Bay's watershed. Here are some of the essential elements of a watershed-wide solution pathway.

ADOPT STRONGER WATER QUALITY STANDARDS FOR THE BAY ESTUARY NOW, AND UPDATE THEM BASED ON WHETHER ECOLOGICAL TARGETS ARE BEING MET

The federal Clean Water Act requires the states to adopt, and obtain federal approval of, standards that fully protect designated beneficial uses of water, and then to review them every three years to ensure they are achieving their purpose. California last updated water quality standards for the Bay estuary, over 20 years ago, in 1995. In this estuary, the beneficial uses of water most sensitive to human alteration and degradation and most at risk of being extinguished are related to fish and wildlife, including estuarine habitat, fish migration, and coldwater habitat. Many policy-makers, regulators, and independent scientific reviewers have concluded over the last decade that the freshwater flows required by the 1995 standards are not sufficient to protect fish and wildlife beneficial uses of the estuary. For example, the Governor's Delta Vision Task Force, the California State Water Resources Control Board, the California Department of Fish and Wildlife, the National Research Council, and the U.S. Environmental Protection Agency[149] have all made such findings. The promulgation of new, more protective flow standards by the Water Board and the EPA that require substantially more inflow to San Francisco Bay is the single most pressing item on the agenda for saving the estuary. Delays in completing the update, begun in 2009, must come to an end, and new standards updated in short order.

A wealth of scientific evidence supports increasing required flows to save native fish and wildlife populations and restore productivity of the estuarine. But the record also indicates that increased flows and flow variability help control the spread or damage caused by invasive species that have colonized the estuary, and suggests that they might control new invasions as well. Federal and state regulators should consider developing and adopting additional flow requirements that are specifically designed to provide conditions that inhibit the establishment and spread of invasive species.

Get SMART: The new standards for flow (and other water quality parameters) should not only be fully protective of the most sensitive fish and wildlife beneficial uses, but also be linked to a set of biological performance measures that define the desired outcomes for fish and wildlife beneficial uses using SMART (specific, measurable, achievable, relevant, and time-bound) objectives[150]. These SMART objectives should include targets for population viability of key species (i.e., abundance, diversity, productivity, and distribution, as discussed in the previous chapter) and targets for ecological conditions associated with population response (e.g., temperature or habitat availability). Although the Clean Water Act requires triennial review of standards, most standards are not updated more often than once in a generation, and the process is usually politically controversial. Measuring progress toward achieving SMART biological objectives can allow regulators to adjust flows and other environmental safeguards, within a narrow pre-determined range, to achieve better, more timely protection of fish and wildlife uses of the estuary. This adaptive management approach also lends itself to efforts to improve our understanding of the flow regimes, including magnitude, duration, seasonality, and frequency of flows, that will effectively suppress invasive species.

REQUIRE ALL WATER DIVERTERS TO CONTRIBUTE THEIR FAIR SHARE

Currently, the federal Central Valley Project and the State Water Project are assigned the primary responsibility for releasing water from their reservoirs to achieve the flow and water quality standards for the Bay estuary. Strictly speaking, this first and foremost affects the contractors served by the projects, who have water rights that are junior to others in the watershed. The strange reality is that irrigation districts and cities with senior rights, including those parties who exchanged their senior water rights for delivery contracts with the projects, are not directly required by regulators to help attain water quality standards set for the Bay and Delta. This leaves a subset of water users, representing a quarter or less of total diversions, as the parties primarily responsible for meeting water quality standards for the entire estuary[151]. Updated water quality standards that require all water users, including senior water rights holders, to contribute a fair share of the total flow needed to meet standards that are designed to stablize and restore the estuarine ecosystem could generate millions of acre-feet of additional freshwater flows to the Bay Estuary; spreading the obligation among a larger group of water diverters would reduce inequities in current water allocations, as well. Everyone should be responsible for protecting public resources before anyone receives the public's water to use for their own private gain. Any pathway that fails to set and integrate the obligations of this larger subset of water users will not generate sufficient flow to solve the estuary's problems.

More broadly, California's archaic water rights system needs to be modified to reflect the realities of twenty-first century society, law and climate. Not only are different water users treated differently based on priority in time rather than urgency of need, but the state's water resources are wildly over-allocated as a result of historically awarding the right to use water without examining whether adequate supplies exist. Total water rights allocations in California equal five times California's mean annual runoff, and water rights in major river systems in the Bay's watershed account for up to 1000% of natural supply[152]. As long as water rights are so over-allocated, there will always be pressure to withdraw more water from the Bay's watershed than is sustainable in the long term, and corresponding political pressure to weaken water quality standards or other flow-related environmental protections. In the past, water rights reform and groundwater management were both considered third rails in California politics; now the first phases of groundwater reform have become a reality, but not before over-exploitation of these resources caused some communities to run out of water and the earth's surface to subside. The time to consider updating our water rights system has also come; reform needs to happen before the even more awful to contemplate impacts of over-allocation become irreversible.

REDUCE RELIANCE ON THE DELTA AS A SOURCE OF WATER SUPPLY

The upper estuary is ground zero in the battle over how water is managed – and mismanaged – in California, and it is here that the magnitude of the effects of unsustainable water diversions on fish, wildlife, habitat, and ecological processes are most apparent. In 2009 the California Legislature recognized the vulnerability of the upper estuary and the need to reduce human pressure on this ecosystem by passing the Sacramento – San Joaquin Delta Reform Act, which among other things set a new state policy:

> … to reduce reliance on the Delta in meeting California's future water supply needs through a statewide strategy of investing in improved regional supplies, conservation, and water use efficiency. Each region that depends on water from the Delta watershed shall improve its regional self-reliance for water through investment in water use efficiency, water recycling, advanced water technologies, local and regional water supply projects, and improved regional coordination of local and regional water supply efforts.[153]

Regional self-reliance in areas now exporting water from the Bay's watershed means using less water to provide the same goods and services (e.g., through water efficiency, conservation, leak reduction); using water more than once before disposing of it (water recycling); cleaning up degraded water so that it can be used for productive purposes (brackish water reclamation); using local runoff for nonpotable water use (stormwater capture and reuse); and storing water underground in groundwater aquifers during wet years (conjunctive use, water banking, stormwater recharge). According to a 2014 review by the Pacific Institute and the Natural Resources Defense Council, up to 14 million acre-feet of water per year – over half the total amount of water used for human use throughout the Bay's watershed each year – could be saved from combined investments in these strategies[154].

These approaches can also reduce the carbon footprint of water management and respond to shifts in hydrology caused by climate change. Increasing local self-reliance avoids expending the energy needed to transport imported water long distances from its source. For instance, transporting water via the State Water Project represents about 3% of the state's total energy consumption[155]. Using the natural capacity of groundwater basins to clean and store storm runoff for later use reduces much of the energy and expense associated with capturing, treating, and disposing of stormwater. Expanding that capacity by enlarging flood basins and floodways and reoperating existing reservoirs can temporarily capture more of the larger floods that will be typical of a warming climate, and then divert these flows to groundwater recharge areas.

Town and country together: Regional self-reliance also requires that the inequities between urban and agricultural water uses be addressed. Urban water users generally pay a much higher cost for water, invest more in conservation and other demand management strategies, and are held to a higher standard for using water efficiently (e.g., the state's mandated target of reducing per capita water use in the urban sector by 20% vs. the absence of any quantitative target for reducing use in the irrigation sector). Targets for saving water and becoming locally self-reliant should be set as appropriate for each economic sector and each region of the state; permitting and funding decisions by local, state and federal agencies should be linked to performance in meeting these targets.

INTEGRATE FLOW AND HABITAT RESTORATION TO BATTLE CLIMATE CHANGE

The decline of sediment inputs from reducing Bay inflows has contributed to the erosion of marshlands and beaches throughout the Bay estuary and nearby coastal areas. That problem is now greatly magnified by the effect of climate change on sea levels. Rising sea levels are a challenge to the continued existence and quality of the Bay estuary's marshes and to life and property for human communities along the shoreline of the Bay and coastal areas. Significant efforts have been underway for decades to acquire and restore wetland areas around the estuary; more recently, there is serious interest in innovative approaches like combining marsh restoration with construction of earthen levees in order to establish a low-cost and effective regional network of flood barriers[156]. Providing for a more natural pattern of higher winter and spring inflows to the Bay will increase sediment resupply to restored marshes and "horizontal levees," helping maintain them long after the initial construction effort. Restored freshwater and brackish marshes also need enough freshwater inflows at the right times of year to maintain their species composition and diversity. Marsh restoration and flood protection efforts, as well as beach rehabilitations, should consider flow regime requirements during design and evaluation of projects, and as part of the permitting process where appropriate.

Wetlands Photo Credit: David Sanger

WE MUST ACT NOW

The science overwhelmingly indicates that more freshwater flow, following a more natural pattern, must reach the San Francisco Bay estuary to restore its fish, wildlife, water quality, food web, marshes, beaches, coastal fisheries, and other public benefits. The only barriers to action are the general lack of understanding about the severely degraded condition of this freshwater flow-starved estuary and the lack of political will to change the unsustainable way California manages its water resources. Can Californians be made aware of the pending collapse of the Bay estuary ecosystem – and the loss of all which that ecosystem provides us – and motivated to demand action now? Can decision-makers at every level – federal, state, and local – be prevailed upon to take the steps necessary to prevent the destruction of California's greatest aquatic ecosystems before it is too late? The window of opportunity to protect this treasure is closing rapidly.

ENDNOTES

[1] Conomos 1979; McKee et al. 2013; Barnard et al. 2013a; SFEP 2015

[2] TBI 1998

[3] Ibid.

[4] Stine 1994, 1996; Austin 2015

[5] TBI 1998

[6] SWRCB 2010

[7] Richter et al. 2011

[8] Florsheim and Dettinger 2015; SFEP 2015

[9] Knowles 2002

[10] Odum 1970; SFEP 2015

[11] Jassby et al. 1995; Kimmerer 2002 a,b

[12] USFWS 1995; Dege and Brown 2004; Grimaldo et al. 2009

[13] Feyrer et al. 2007, 2010; Sommer et al. 2011; IEP 2015

[14] Kimmerer 2002 a,b

[15] Cloern and Jassby 2012; SFEP 2015

[16] Nichols et al. 1990, Alpine and Cloern 1992

[17] Winder et al. 2011

[18] Majardja et al. 2015

[19] Lyons et al. 2005; Callaway et al. 2007

[20] TBI 1998

[21] Malamud-Roam and Ingram 2003; Malamud-Roam and Ingram 2004

[22] Byrne et al. 2001

[23] Sanderson et al. 2000; Stralberg et al. 2011

[24] Callaway et al. 2007

[25] Takekawa et al. 2006; Parker et al. 2011; Stralberg et al. 2011

[26] Callaway et al. 2007

[27] Goals Project 2015

[28] Peterson et al. 1996

[29] Stahle et al. 2001

[30] Chang et al. 2014

[31] Cloern 1983; Conomos et al. 1979

[32] Pearson 1989

[33] Hurst and Bruland 2008

[34] Largier et al. 2011

[35] Peterson et al. 1994

[36] Fox et al. 1991

[37] TBI 1998

[38] Cloern et al. 2012

[39] Largier 1996

[40] Feyrer et al. 2015

[41] NOAA 2015

[42] McKee et al. 2002

[43] PWA 2002 as cited in McKee et al. 2002

[44] Schoellhamer 2009

[45] Kondolf, 2000; McGrath 2001 pers comm as cited in McKee et al. 2002; SFEP 2015

[46] Schoellhamer et al. 2013; SFEP 2015

[47] Wright and Schoellhamer 2004

[48] Barnard et al. 2013a

[49] Wright & Schoellhamer 2004; Cloern et al. 2011

[50] IEP MAST 2015; Gregory 1993; Gregory and Levings 1998

[51] Baskerville-Bridges 2004, Feyrer et al. 2007, Nobriga et al. 2008, Grimaldo et al. 2009, Sommer and Mejia 2013; Thompson et al. 2010

[52] Nyman et al. 1990, Callaway et al. 2007

[53] Stralberg et al. 2011

[54] TBI 2013

[55] Goals Project 1999

[56] Barnard et al. 2013a

[57] Porterfield 1980

[58] Barnard et al. 2013b and 2013c

[59] Tobias 2014

[60] Nichols & Pamatmat 1988

[61] Nichols et al. 1986

[62] SFEI 2015

[63] Leatherbarrow et al. 2004

[64] Luoma and Presser 2009.

[65] Stewart 2013

[66] Okamoto 2014

[67] Ibid.

[68] Malbrouck and Kestemont 2006; Miller et al. 2010

[69] Lehman et al. 2005; Berg and Sutula 2015

[70] Lehman et al. 2010; UC Santa Cruz 2015

[71] Berg and Sutula 2015

[72] Sanderson et al. 2000; Stralberg et al. 2011; Callaway et al. 2007

[73] Lyons et al. 2005, Callaway et al. 2007

[74] Feyrer et al. 2015; Arthington 2012; SFEP 2015

[75] Robins et al. 2006

[76] Williams 2006; Cunningham et al. 2015

[77] NMFS 2009

[78] Jassby et al. 1995; Kimmerer 2002a

[79] Baxter et al. 1999; Kimmerer 2002a

[80] Jassby et al. 2002

[81] Jassby and Cloern 2000 cited in Jassby 2008

[82] Nichols et al. 1986, Cloern and Jassby 2012

[83] Winder et al. 2011 and sources cited therein

[84] SOTER 2015

[85] Jassby et al. 2002

[86] Winder and Jassby 2010, Winder et al. 2011, Cloern and Jassby 2012

[87] e.g., Kratville 2008; Nobriga and Rosenfield 2015.

[88] Peterson and Vassieriers 2010

[89] Nichols et al. 1990, Winder et al. 2011

[90] Moyle 2008, Berg and Sutula 2015; Mahardja et al. 2015

[91] Lehman et al. 2010

[92] Walters et al. 1985

[93] Cloern 1996; Conomos et al. 1979

[94] Conomos et al. 1979

[95] Monismith, et al. 1996; Cloern 1996

[96] Cloern et al. 1984; Cloern et al. 1989

[97] Cloern 1996

[98] Hurst and Bruland 2008

[99] Bunn and Arthington 2002; Poff and Zimmerman 2010; Pearson 1989; CDFG 1992; Jassby et al. 1995; Baxter et al. 1999; Kimmerer 2002a; Monismith et al. 2002; Rosenfield and Baxter 2007; Sommer et al. 2007; Kimmerer et al. 2009; Feyrer et al. 2015

[100] SWRCB 2010; CDFG 2010; NRC 2010

[101] Stevens and Miller 1983; Jassby et al. 1995; Kimmerer 2002a, b; Mac Nally et al. 2010; Thomson et al. 2010

[102] Michel et al. 2015

[103] Rosenfield and Baxter 2007

[104] Nobriga and Rosenfield 2016

[105] Hughes et al. 2014

[106] Kimmerer 2002a

[107] Jassby et al. 1995; Kimmerer 2002a

[108] Baxter et al. 2010; Kimmerer 2002a; Jassby et al. 1995

[109] Pearson 1989

[110] Feyrer et al. 2010

[111] Jassby and Van Nieuwenhuyse 2005

[112] Healy 1991; Quinn 2005; Marston et al. 2012

[113] TBI 2012

[114] Kimmerer 2008; Cunningham et al. 2015

[115] Nichols et al. 1990; Peterson and Vassieriers 2010; Mahardja et al. 2015

[116] Bennett 2005; J. Hobbs, U.C. Davis, personal communication, December 3, 2009

[117] Bennett 2005; Fisch et al. 2011

[118] Hilborn et al. 2003; Satterthwaite et al. 2014; Sturrock et al. 2015

[119] Lindley et al 2009

[120] TBI et al. 2010

[121] Feyrer et al. 2015

[122] Nobriga and Rosenfield 2015; Sturrock et al 2015; Stevens and Miller 1983

[123] Kimmerer 2006

[124] Kimmerer 2002a; T. Grenier pers. Comm. 2014

[125] e.g., Macarthur and Wilson 1967; Rosenfield 2002

[126] Kimmerer et al. 2009; Feyrer et al. 2007, 2010

[127] Grimaldo et al. 2009

[128] Marston et al. 2012

[129] Jassby and van Nieuwenhuyse 2005

[130] SWRCB 2010; CDFG 2010

[131] Cury et al. 2011

[132] Ford and Ellis 2006; Ford et al. 2010; Ward et al. 2009

[133] Audubon California 2016

[134] Cury et al. 2011

[135] Takekawa et al. 2006

[136] Byrne et al. 2001

[137] Jin 2008; Parker et al. 2011

[138] Takekawa et al. 2006

[139] e.g., American Sportfishing Association 2009 and PFMC 2015

[140] Lindley et al. 2009

[141] Ralston 2005

[142] Kimmerer 2002a

[143] Kohlhorst 1991; Israel et al. 2009

[144] Ford and Ellis 2006; Ford et al. 2010; Ward et al. 2009

[145] Ford et al. 2010

[146] Miller et al. 2010

[147] Berg and Sutula 2015

[148] UC Santa Cruz 2015

[149] Governor's Delta Vision Blue Ribbon Task Force, 2008; SWRCB 2010; NRC 2010; USEPA 2012

[150] TBI et al 2010, exhibit 1; SEP Group 2015, unpublished

[151] DWR 2013a; USBR 2012; USBR 2016

[152] Grantham and Viers 2014

[153] California Water Code Section 85021

[154] Pacific Institute and NRDC 2014

[155] CDWR 2013b

[156] ESA/PWA 2013

REFERENCES

Alpine, A. E., and J. E. Cloern. 1992. Trophic interactions and direct physical effects control phytoplankton biomass and production in an estuary Limnology and Oceanography 37:946-955.

American Sportfishing Association. 2009. Economic Data Supports Efforts to Recover California’s Salmon Fisheries. Available at: http://asafishing.org/newsroom/news-releases/economic-data-supports-efforts-to-recover-californias-salmon-fisheries/

Arthington, A. H. 2012. Environmental Flows: Saving Rivers in the Third Millennium. UC Press.

Audubon California. 2016. Protecting bird habitat in the Bay-Delta region. Website: http://ca.audubon.org/protecting-bird-habitat-bay-delta-region

Austin, J. T. 2015. Floods and Droughts in the Tulare Lake Basin, 2nd edition. Sequoia Parks Conservancy, Three Rivers, California. (see also http://www.tulare-basinwatershed.org/latest-news/making-sense-water-tulare-basin)

Barnard, P.L., D.H. Schoellhamer, B. E. Jaffe, and L. J. McKee. 2013 (a). Sediment transport in the San Francisco Bay Coastal System: an overview. Marine Geology, Special Issue San Francisco Bay 345, 3–19

Barnard, P.L., L. H. Erikson, E. Elias, P. Dartnell. 2013 (b). Sediment transport patterns in the San Francisco Bay Coastal System from cross-validation of bedform asymmetry and modeled residual flux. Marine Geology, Special Issue San Francisco Bay 345, 74–97

Barnard, P.L., A. C. Foxgrover, E. P. L. Elias, L. H. Erikson, J. R. Hein, M. McGann, K. Mizell, R. J. Rosenbauer, P. W. Swarzenski, R. K. Takesue, F. L. Wong, and D. L. Woodrow. 2013 (c). Integration of bed characteristics, geochemical tracers, current measurements, and numerical modeling for assessing provenance of beach sand in the San Francisco Bay Coastal System. Marine Geology 345, 181–206

Baskerville-Bridges, B., J. C. Lindberg, and S. I. Doroshov. 2004. The effect of light intensity, alga concentration, and prey density on the feeding behavior of Delta smelt larvae. American Fisheries Society, Special Publication 39:219-228.

Baxter, R., R. Breuer, L. Brown, L. Conrad, F. Feyrer, S. Fong, K. Gehrts, L. Grimaldo, B. Herbold, P. Hrodey, A. Mueller-Solger, T. Sommer, and K. Souza. 2010. Pelagic Organism Decline Work Plan and Synthesis of Results. Interagency Ecological Program, Sacramento, CA.

Baxter, R., K. Hieb, S. DeLeon, K. Fleming, and J. Orsi. 1999. Report on the 1980-1995 Fish, Shrimp, and Crab Sampling in the San Francisco Estuary, California, Technical Report 63. Editor J. Orsi. California Department of Fish and Game, Stockton, CA, #3075994.

Bennett, W.A. 2005. Critical assessment of the Delta smelt population in the San Francisco Estuary, California. San Francisco Estuary and Watershed Science 3(2): [Article 1]. Available from: http://repositories.cdlib.org/jmie/sfews/vol3/iss2/art1

Berg, M., and M. Sutula. 2015. Factors affecting growth of cyanobacteria with special emphasis on the Sacramento-San Joaquin Delta. Southern California Coastal Water Research Project Technical Report No. 869. Prepared for: The Central Valley Regional Water Quality Control Board and The California Environmental Protection Agency State Water Resources Control Board (Agreement Number 12-135-250). Available at: http://ftp.sccwrp.org/pub/download/DOCUMENTS/TechnicalReports/869_FactorsAffectGrowthOfCyanobacteria-1.pdf

Bunn, S. E., and Arthington, A. H., 2002. Basic principles and ecological consequences of altered flow regimes for aquatic biodiversity. Environmental Management 30:492–507.

Byrne, R., B. L. Ingram, S. Starratt, F. Malamud-Roam, J. N. Collins, and M. E. Conrad. 2001. Carbon-isotope, diatom and pollen evidence for late Holocene salinity change in a brackish marsh in the San Francisco estuary. Quaternary Research 55:66–76.

California Department of Fish and Game (CDFG). 1992. Estuary Dependent Species. Exhibit WRINT-DFG-Exhibit # 6 entered by the California Department of Fish and Game for the State Water Resources Control Board 1992 Water Quality/Water Rights Proceedings on the San Francisco Bay/Sacramento – San Joaquin Delta.

California Department of Fish and Game (CDFG). 2010. Quantifiable Biological Objectives and Flow Criteriafor Aquatic and Terrestrial Species of Concern Dependent on the Delta. Report prepared pursuant to the Sacramento-San Joaquin Delta Reform Act of 2009.

California Department of Water Resources (DWR). 2013a. California Water Plan Update 2013: Investing in Innovation & Infrastructure. Bulletin 160-13.

California Department of Water Resources. 2013b. North-Of-The-Delta Offstream Storage Project EIR/EIS, Preliminary Administrative Draft (Chapter 31: Power, Production and Energy). Available at: http://www.water.ca.gov/storage/docs/NODOS%20Project%20Docs/NODOS_Prelim_Admin_Draft_EIR/31-Power_Energy_prelim_admin_draft_Dec2013_w_figures.pdf

California Water Code Section 85021

Callaway, J. C., V. T. Parker, M. C. Vasey, and L. M. Schile. 2007. Emerging issues for the restoration of tidal marsh ecosystems in the context of predicted climate change. Madroño 54(3):234–248.

Chang, A. L., A. K. Deck, P. D. Malm, K. Willits, S. Attoe, J. L. Fisher, and S. G. Morgan. 2014. Great place to live, but I wouldn't want to raise my kids there: Linking habitat quality and population dynamics of Olympia oysters in San Francisco Bay. State of the Estuary Conference 2014. Handout for poster?

Cloern, J. E. 1984. Temporal dynamics and ecological significance of salinity stratification in an estuary (South San Francisco Bay, USA). Oceanologica Acra 7,137-141.

Cloern, JE. 1996. Phytoplankton bloom dynamics in coastal ecosystems: a review with some general lessons from sustained investigation of San Francisco Bay, California. Reviews of Geophysics 34:127-168

Cloern, J. E., A. E. Alpine, B. E. Cole, R. L. Wong, J. F. Arthur, and M. D. Ball. 1983. River discharge controls phytoplankton dynamics in the northern San Francisco Bay estuary. Estuarine, Coastal and Shelf Science 16:415-429.

Cloern, J. and A. Jassby. 2012. Drivers of change in estuarine-coastal ecosystems: discoveries form four decades of study in San Francisco Bay. Reviews of Geophysics, 50, RG4001, doi:10.1029/2012RG000397.

Cloern, J. E., N. Knowles, L. R. Brown, D. Cayan, M. D. Dettinger, T. L. Morgan, D. H. Schoellhamer, M. T. Stacey, M. van der Wegen, R. W. Wagner, and A. D. Jassby. 2011. Projected evolution of California's San Francisco Bay-Delta-river system in a century of climate change. PLoS One 6:e24465.

Cloern, J. E., T. M. Powell, and L. M. Huzzey. 1989. Spatial and temporal variability in South San Francisco Bay (USA). II. Temporal changes in salinity, suspended sediments, and phytoplankton biomass and productivity over tidal time scales. Estuarine, Coastal and Shelf Science 28:599-613.

Conomos, T. J. 1979. Properties and circulation of San Francisco Bay waters. Pages 47-84 in T. J. Conomos, ed. San Francisco Bay: The Urbanized Estuary. Pacific Division, Amer. Assoc. Advance. Sci., San Francisco, Ca.

Cunningham, C., N. Hendrix, E. Dusek-Jennings, R. Lessard, and R. Hilborn. 2015. Delta Chinook Final Report to the Delta Science Panel.

Cury, P. M., I. L. Boyd, S. Bonhommeau, T. Anker-Nilssen, R. J. M. Crawford, R. W. Furness, J. A. Mills, E. J. Murphy, H. Österblom, M. Paleczny, J. F. Piatt, J.-P. Roux, L. Shannon, and W. J. Sydeman. 2011. Global Seabird Response to Forage Fish Depletion—One-Third for the Birds. Science 334:1703-1706.

Dege, M., and L. R. Brown. 2004. Effect of outflow on spring and summertime distribution of larval and juvenile fishes in the upper San Francisco Estuary. Pages 49–65 in F. Feyrer, L. R. Brown, R. L. Brown, and J. J. Orsi, editors. Early life history of fishes in the San Francisco estuary and watershed. American Fisheries Society, Symposium 39, Bethesda, Maryland.

ESA/PWA. 2013. Analysis Of The Costs And Benefits Of Using Tidal Marsh Restoration As A Sea Level Rise Adaptation Strategy In San Francisco Bay. Prepared for the Bay Institute.
Available at: http://thebayinstitute.blob.core.windows.net/assets/FINAL%20D211228.00%20Cost%20and%20Benefits%20of%20Marshes%20022813.pdf

Feyrer, F., J. E. Cloern, L. R. Brown, M. A. Fish, K. A. Hieb, and R. D. Baxter. 2015. Estuarine Fish Communities Respond to Climate Variability over both River and Ocean Basins. Global change biology.

Feyrer, F., K. Newman, M. Nobriga, and T. Sommer. 2010. Modeling the Effects of Future Outflow on the Abiotic Habitat of an Imperiled Estuarine Fish. Estuaries and Coasts 34:120-128.

Feyrer, F., M. L. Nobriga, T. R. Sommer. 2007. Multidecadal trends for three declining fish species: habitat patterns and mechanisms in the San Francisco Estuary, California, USA. Canadian Journal Fisheries and Aquatic Sciences 64:723-734.

Fisch, K.M., J.M. Henderson, R.S. Burton, and B. May. 2011. Population genetics and conservation implications for the endangered delta smelt in the San Francisco Bay-Delta. Conservation Genetics 12:1421–1434.

Florsheim, J. L. and M. D. Dettinger. 2015. Promoting Atmospheric-River and Snowmelt-Fueled Biogeomorphic Processes by Restoring River-Floodplain Connectivity in California's Central Valley. Chapter 6 in © Springer New York 2015 P. F. Hudson, H. Middelkoop (eds.), Geomorphic Approaches to Integrated Floodplain Management of Lowland Fluvial Systems in North America and Europe, DOI 10.1007/978-1-4939-2380-9_6.

Ford, J. K. B. & Ellis, G. M. 2006 Selective foraging by fish-eating killer whales Orcinus orca in British Columbia. Mar. Ecol. Prog. Ser. 316, 185 – 199. (doi:10.3354/ meps316185)

Ford JKB, Ellis GM, Olesiuk PF, Balcomb KC. 2010. Linking killer whale survival and prey abundance: food limitation in the oceans' apex predator? Biology Letters 6: 139–142.

Fox, J.P., T.R. Mongan, and W.J. Miller. 1991. Long term annual and seasonal trends and surface salinity of San Francisco Bay. Journal of Hydrology 122:93-117.
Goals Project. 1999. Baylands Ecosystem Habitat Goals. A report of habitat recommendations prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project. U.S. Environmental Protection Agency, San Francisco, Calif./S.F. Bay Regional Water Quality Control Board, Oakland, Calif. http://baylandsgoals.org/wp-content/uploads/2015/10/1999sfbaygoals031799.pdf

Goals project. 2015. The Baylands and Climate Change: What We Can Do. Baylands Ecosystem Habitat Goals Science Update 2015 prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project. California State Coastal Conservancy, Oakland, CA.

Governor's Delta Vision Blue Ribbon Task Force, 2008. Our Vision for the California Delta.

Grantham, T.E., and J.H. Viers. 2014. 100 years of California's water rights system: patterns, trends and uncertainty. Environmental Research Letters.

Grimaldo, L. F., T. Sommer. N. Van Ark, G. Jones, E. Holland, P. B. Moyle, and B. Herbold. 2009. Factors affecting fish entrainment into massive water diversions in a tidal freshwater estuary: can fish losses be managed? North American Journal of Fisheries Management 29:1253–1270.

Healy, M.C. 1991. Life history of Chinook salmon (Oncorhynchus tshawytscha), in Pacific salmon life histories, C. Groot and L. Margolis, editors, University of British Columbia Press, Vancouver, British Columbia, B.C. pp. 311-393.

Hilborn, R., Quinn, T.P., Schindler, D.E., and Rogers, D.E. 2003. Biocomplexity and fisheries sustainability. Proc. Natl. Acad. Sci. U.S.A.100(11): 65646568. doi:10.1073/pnas.1037274100.PMID:12743372.

Hughes, B. B., M. D. Levey, J. A. Brown, M. C. Fountain, A. B. Carlisle, S. Y. Litvin, C. M. Greene, W. N. Heady, and M. G. Gleason. 2014. Nursery Functions of U.S. West Coast Estuaries: The State of Knowledge for Juveniles of Focal Invertebrate and Fish Species. The Nature Conservancy, Arlington, VA. 168pp.

Hurst, M. P. and K. W. Bruland. 2008. The effects of the San Francisco Bay plume on trace metal and nutrient distributions in the Gulf of the Farallones. Geochimica et Cosmochimica Acta 72:395-411.

Interagency Ecological Program Management, Analysis and Synthesis Team (IEP MAST). 2015. An updated conceptual model of Delta Smelt biology: our evolving understanding of an estuarine fish. Technical Report 90.

Israel, J., A. Drauch, M. Gingras, and M. Donnellan. 2009. Life history conceptual model for White Sturgeon (Acipenser transmontanus). California Department of Fish and Game, Delta Regional Ecosystem Restoration and Implementation Program.

Jassby, A.D. 2008. Phytoplankton in the Upper San Francisco Estuary: Recent biomass trends, their causes and their trophic significance. San Francisco Estuary and Watershed Science 6:Article 2.

Jassby, A. D., J. E. Cloern, and B. E. Cole. 2002. Annual Primary Production: Patterns and Mechanisms of Change in a Nutrient-Rich Tidal Ecosystem. Limnology and Oceanography 47:698-712.

Jassby, A. D., W. J. Kimmerer, S. G. Monismith, C. Armor, J. E. Cloern, T. M. Powell, J. R. Schubel, and T. J. Vendlinski. 1995. Isohaline Position as a Habitat Indicator for Estuarine Populations. Ecological Applications 5:272-289.

Jassby, A. D. and E. E. Van Nieuwenhuyse. 2005. Low dissolved oxygen in an estuarine channel (San Joaquin River, California): Mechanisms and models based on long-term time series. San Francisco Estuary and Watershed Science 2:1–33.

Jin, C. 2008. Biodiversity dynamics of freshwater wetland ecosystems affected by secondary salinisation and seasonal hydrology variation: a model-based study. Hydrobiologia 598:257-270.

Kimmerer, W. J. 2002a. Effects of freshwater flow on abundance of estuarine organisms: Physical effects or trophic linkages? Marine Ecology Progress Series 243:39-55.

Kimmerer, W.J. 2002b. Physical, biological, and management responses to variable freshwater flow into the San Francisco Estuary. Estuaries 25:1275–1290.

Kimmerer, W. 2006. Response of anchovies dampens effects of the invasive bivalve Corbula amurensis on the San Francisco Estuary foodweb. Marine Ecology Progress Series 324:218.

Kimmerer, W.J. 2008. Losses of Sacramento River Chinook salmon and Delta smelt to entrainment in water diversions in the Sacramento-San Joaquin Delta. San Francisco Estuary and Watershed Science 6(2). http://www.escholarship.org/uc/ item/7v92h6fs/. Accessed April 2015

Kimmerer, W. J., E. S. Gross, and M. L. MacWilliams. 2009. Is the Response of Estuarine Nekton to Freshwater Flow in the San Francisco Estuary Explained by Variation in Habitat Volume? Estuaries and Coasts 32:375-389.

Knowles, N. 2002. Natural and management influences on freshwater inflows and salinity in the San Francisco Estuary at monthly to interannual scales. Water Resources Research: 38: 25-21-25-11.

Kohlhorst, D.W., L.W. Botsford, J. S. Brennan, and G. M. Caillet. 1991. Aspects of the structure and dynamics of an exploited central California population of white sturgeon(Acipenser transmontanus). Acipenser, P. Williot., Ed. CEMAGREF Publ., 277-293.

Kondolf, G. 2000. Changes in flow regime and sediment budget in the Sacramento-San Joaquin river system since 1850: implications for restoration planning.in CALFED Bay-Delta Program Science Conference 2000 Abstracts.

Kratville, D. 2008. Final Species Life History Conceptual Model Sacramento Splittail, Pogonichthys macrolepidotus. Sacramento-San Joaquin Delta Regional Ecosystem Restoration Implementation Plan, California Department of Fish and Wildlife, Ecosystem Restoration Program.

Largier, J. 1996. Hydrodynamic exchange between San Francisco Bay and the Ocean: The role of ocean circulation and stratification. In San Francisco Bay: The ecosystem. Pacific Division, American Association for the Advancement of Science, 69-104.

Largier, J., B. Cheng, and K. Higgason. 2011. Climate Change Impacts: Gulf of the Farallones and Cordell Bank National Marine Sanctuaries. Report of a Joint Working Group of the Gulf of the Farallones and Cordell Bank National Marine Sanctuaries Advisory Councils. Page 121 in Marine Sanctuaries Conservation Series ONMS-11-04. National Oceanic and Atmospheric Administration, Office of National Marine Sanctuaries, Silver Spring, Maryland.

Leatherbarrow J., McKee L., Ganju N., Schoellhamer D., Flegal R. July 25 2003. Presentation to RMP Sources, Pathways, and Loadings Workgroup: Quantifying loads of sediment and contaminants entering San Francisco Bay from the Central Valley: The Mallard Island Study http://www.sfei.org/sites/default/files/SPLWG_july2003_Item3a.pdf

Lehman, P., G. Boyer, C. Hall, S. Waller, and K. Gehrts. 2005. Distribution and toxicity of a new colonial Microcystis aeruginosa bloom in the San Francisco Bay Estuary, California. Hydrobiologia 541:87-99.

Lindley, S.T., C.B. Grimes, M.S. Mohr, W. Peterson, J. Stein, J.T. Anderson, L.W. Botsford, D.L. Bottom, C.A. Busack, T.K. Collier, J. Ferguson, J.C. Garza, A.M. Grover, D.G. Hankin, R.G. Kope P.W. Lawson, A. Low, R.B. MacFarlane, K. Moore, M. Palmer-Zwahlen, F.B. Schwing, J. Smith, C. Tracy, R. Webb, B.K. Wells, and T.H. Williams. 2009. What caused the Sacramento River fall Chinook salmon collapse? NOAA Technical Memorandum. NOAA-TM-NMFS-SWFSC-447. US Department of Commerce.

Luoma, Samuel N. and Presser, Theresa S. 2009. Emerging Opportunities in Management of Selenium Contamination. Environ. Sci. Technol. 43: 8483-8487.

Lyons, K. G., C. A. Brighham, B. H. Traut, and M. Schwartz. 2005. Rare species and ecosystem functioning. Conservation Biology 19:1019-1024.

MacArthur, R.H. and E.O. Wilson. 1967. The Theory of Island Biogeography. Princeton University Press. Princeton, NJ.

Mac Nally, R., J. R. Thomson, W. J. Kimmerer, F. Feyrer, K. B. Newman, A. Sih, W. A. Bennett, L. Brown, E. Fleishman, S. D. Culberson, and G. Castillo. 2010. Analysis of pelagic species decline in the upper San Francisco Estuary using multivariate autoregressive modeling (MAR). Ecological Applications 20:1417-1430.

Mahardja, B., J. L. Conrad, L. Lusher, and B. Schreier. 2015. Abundance trends, distribution, and habitat associations of the invasive Mississippi Silverside (Menidia audens) in the Sacramento-San Joaquin Delta. Submitted to San Francisco Estuary and Watershed Science.

Malamud-Roam, F., and B. L. Ingram. 2003. Holocene sediment records from San Francisco Estuary tidal marshes and their relevance to California paleo-climate variability. Page 213 in XVI Congress of the International Union for Quaternary Research; shaping the Earth; a Quaternary perspective. International Union.

Malamud-Roam, F., and B. L. Ingram. 2004. Late Holocene δ13C and pollen records of paleosalinity from tidal marshes in the San Francisco Bay estuary, California. Quaternary Research 62:134-14.

Malbrouck, C. & and P. Kestemont, 2006. Effects of microcystins on fish. Environmental Toxicology and Chemistry 25: 72–86.

Marston, D. Mesick, C. Hubbard, A., Stanton, D., Fortmann-Roe, S., Tsao, S., and Heyne, T. 2012. Delta Flow Factors Influencing Stray Rate of Escaping Adult San Joaquin River Fall-Run Chinook Salmon (Oncorhynchus tshawytscha). San Francisco Estuary and Watershed Science, 10(4). Permalink: http://www.escholarship.org/uc/item/6f88q6pf

McGrath 2001. James McGrath, Port of Oakland, oral comm., December 2001 as cited in McKee et al. 2002.

McKee, L., N. Ganju, D. Schoellhamer, J. Davis, D. Yee, J. Leatherbarrow, and R. Hoenicke. 2002. Estimates of Suspended-sediment Flux Entering San Francisco Bay from the Sacramento and San Joaquin Delta. SFEI Contribution 65.

McKee, L.J., Lewicki, M., Schoellhamer, D.H., and Ganju, N.K., 2013. Comparison of sediment supply to San Francisco Bay from Coastal and Sierra Nevada watersheds. Marine Geology 345:47–62.

Michel, C. J., A. J. Ammann, S. T. Lindley, P. T. Sandstrom, E. D. Chapman, M. J. Thomas, G. P. Singer, A. P. Klimley, and R. B. MacFarlane. 2015. Chinook salmon outmigration survival in wet and dry years in California's Sacramento River. Canadian Journal of Fisheries and Aquatic Sciences.

Miller M.A., R.M. Kudela, A. Mekebri, D. Crane, S. C. Oates, et al. 2010. Evidence for a Novel Marine Harmful Algal Bloom: Cyanotoxin (Microcystin) Transfer from Land to Sea Otters. PLoS ONE 5(9): e12576. doi:10.1371/journal.pone.0012576.

Monismith, S., Burau, J.R., and Stacey, M., 1996. Stratification dynamics and gravitational circulation in northern San Francisco Bay, In Hollibaugh, J.T., (ed.), San Francisco Bay: The Ecosystem. Pacific Division of the American Association for the Advancement of Science, San Francisco, p. 123–153. Available from http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/docs/cmnt091412/sldmwa/monismith_etal_1996.pdf

Monismith, S. G., W. Kimmerer, J. R. Burau, and M. T. Stacey. 2002. Structure and Flow-Induced Variability of the Subtidal Salinity Field in Northern San Francisco Bay. Journal of Physical Oceanography [J. Phys. Oceanogr.]. 32:3003-3019.

Moyle, P. B. 2008. The Future of Fish in Response to Large-Scale Change in the San Francisco Estuary, California. American Fisheries Society Symposium 64:357-374.

National Marine Fisheries Service (NMFS). 2009. Central Valley Salmon Recovery Plan – public Draft.

National Oceanic and Atmospheric Administration (NOAA). 2015. 2015 Elevated California Sea Lions Strandings in California: FAQs. Available at http://www.westcoast.fisheries.noaa.gov/mediacenter/faq_2015_ca_sea_lion_strandings.pdf

National Research Council (NRC). 2010. A Scientific Assessment of Alternatives for Reducing Water Management Effects on Threatened and Endangered Fishes in California's Bay Delta. Committee on Sustainable Water and Environmental Management in the California Bay-Delta; ISBN: 0-309-12803-X, 104 pages.

Nichols, F. H., J. E. Cloern, S. N. Luoma, and D. H. Peterson. 1986. The Modification of an Estuary. Science 231:567-573.

Nichols, F.H., J.K. Thompson, and L.E. Schemel. 1990. Remarkable invasion of San-Francisco Bay (California, USA) by the Asian clam Potamocorbula amurensis. 2. Displacement of a former community. Marine Ecology Progress Series 66: 95–101.

Nichols, Frederic H. & Pamatmat, Mario M. 1988. The Ecology of the soft-bottom benthos of San Francisco Bay: A community profile. USFWS Biological Report 85(7.19). 73 pp. Available at http://www.nwrc.usgs.gov/techrpt/85-7-23.pdf

Nobriga, M. L., and J. A. Rosenfield. 2016. Population Dynamics of an Estuarine Forage Fish: Disaggregating Forces Driving Long-Term Decline of Longfin Smelt in California's San Francisco Estuary. Transactions of the American Fisheries Society 145:44-58.

Nobriga, M.L., T.R. Sommer, F. Feyrer, and K. Fleming. 2008. Long-term Trends in summertime habitat suitability for Delta smelt (Hypomesus transpacificus). San Francisco Estuary and Watershed Science. 6(1):, Article 1.

Nyman, J., R. DeLaune, and W. Patrick. 1990. Wetland soil formation in the rapidly subsiding Mississippi River deltaic plain: Mineral and organic matter relationships. Estuarine, Coastal and Shelf Science 31:57-69.

Odum, W.E. 1970. Insidious alteration of the estuarine environment. Trans. Am. Fish Soc., 88, 836-847.

Okamoto, A.R. 2014. Shifts in selenium spike. Estuary News, June 2014, Vol. 23 No. 2.

Pacific Fishery Management Council (PFMC). 2015. Stock Assessment and Fishery Evaluation (SAFE) Documents: Review of 2015 Ocean Salmon Fisheries, Appendix D: Historical Economic Data. Available at: http://www.pcouncil.org/wp-content/uploads/2016/02/salsafe2015_Appendix_D.pdf

Pacific Institute and Natural Resources Defense Council (NRDC). 2014. The untapped potential of CA's water supply. available at: http://pacinst.org/publication/ca-water-supply-solutions/

Parker, V. T., J. C. Callaway, L. M. Schile, M. C. Vasey, and E. R. Herbert. 2011. Climate Change and San Francisco Bay-Delta Tidal Wetlands. San Francisco Estuary and Watershed Science 9.

Pearson, D.E. 1989. Survey of fishes and water properties of South San Francisco Bay, California, 1973-1982. NOAA-NMFS Technical Report 78.

Peterson, D.H., D.R. Cayan, J. DiLeo, M. Noble, and M. Dettinger, 1994. The role of climate in estuarine variability. American Scientist, 83, 58-67. (27)

Peterson, D. H., D. R. Cayan, M. D. Dettinger, M. A. Noble, L. G. Riddle, L. E. Schemel, R. E. Smith, R. J. Uncles AND R. A. Walters. 1996. San Francisco Bay Salinity: Observations, Numerical Simulation, and Statistical Models.

Peterson, H. and Vayssieres, M. 2010. Benthic Assemblage Variability in the Upper San Francisco Estuary: A 27-Year Retrospective. San Francisco Estuary and Watershed Science, 8(1). Available at: http://escholarship.org/uc/item/4d0616c6

Poff, N.L., Zimmerman, J.K.H., 2010. Ecological responses to altered flow regimes: a literature review to inform the science and management of environmental flows. Freshw. Biol. 55, 194–205.

Porterfield, G. 1980. Sediment transport of streams tributary to San Francisco, San Pablo, and Suisun Bays, California, 1909–1966. U.S. Geolological Survey Water Resour. Invest. Rep., 80-64, 91 pp.

PWA 2002. Phillip Williams, Phillip Williams & Associates, oral comm., March 2002 as cited in McKee et al. 2002 (PWA 2002).

Quinn, T.P., 2005. The behavior and ecology of Pacific salmon and trout. Seattle: University of Washington Press.

Ralston, S. 2005. An assessment of starry flounder off California, Oregon, and Washington. NOAA Fisheries, Southwest Fisheries Science Center.

Richter, B. D., M. M. Davis, C. Apse, and C. Konrad. 2011. A presumptive standard for environmental flow protection. River Research and Applications 28:1312-1321.

Robins J., Mayer D, Stauton-Smith J, Halliday I, Sawynok B, Sellin M. 2006. Variable growth rates of the tropical estuarine fish barramundi Lates calcarifer (Bloch) under different freshwater flow conditions. Journal of Fish Biology 69:379-391.

Rosenfield, J. A. 2002. Pattern and process in the geographical ranges of freshwater fishes. Global Ecology and Biogeography 11:323-332.

Rosenfield, J. A., and R. D. Baxter. 2007. Population dynamics and distribution patterns of longfin smelt in the San Francisco estuary. Transactions of the American Fisheries Society 136:1577-1592.

Sanderson, E. W, S. L. Ustin, and T. Foin. 2000. The influence of tidal channels on the distribution of salt marsh plant species in Petaluma Marsh, CA, USA. Plant Ecology 146:29-41.

San Francisco Estuary Institute (SFEI). 2015. The Pulse of the Bay: The State of Bay Water Quality, 2015 and 2065. SFEI Contribution #759. San Francisco Estuary Institute, Richmond, CA. Available at: http://www.sfei.org/sites/default/files/biblio_files/2015_RMP_PULSE.pdf

San Francisco Estuary Partnership (SFEP). 2015. The State of the Estuary Report (SOTER).

Satterthwaite, W.H., S.M. Carlson, S.D. Allen-Moran, S. Vincenzi, S.J. Bograd, B.K. Wells. 2014. Match-mismatch dynamics and the relationship between ocean-entry timing and relative ocean recoveries of Central Valley fall run Chinook salmon. Marine Ecology Progress Series. 511: 237–248.

Scientific Evaluation Process (SEP) Group. unpublished. Interim objectives for restoring Chinook salmon (Oncorhynchus tshawytscha) and O. myiss in the Stanislaus River, Administrative Draft. (The SEP Group includes scientific experts from American Rivers, The Bay Institute, The Nature Conservancy, Trout Unlimited, and state and federal agencies). September 2015.

Schoellhamer, D. 2009. Suspended sediment in the Bay: Past a tipping point. Oakland, CA: San Francisco Estuary Institute, 56–65. Available: http://www.sfei.org/sites/default/files/RMP_Pulse09_no583_final4web.pdf.

Schoellhamer, D. H., S. A. Wright, J. Z. Drexler. 2013. Adjustment of the San Francisco estuary and watershed to decreasing sediment supply in the 20th century. Marine Geology 345:63-71.

Sommer, T., C. Armor, R. Baxter, R. Breuer, L. Brown, M. Chotkowski, S. Culberson, F. Feyrer, M. Gingras, B. Herbold, W. Kimmerer, A. Mueller-Solger, M. Nobriga, and K. Souza. 2007. The collapse of pelagic fishes in the Upper San Francisco Estuary. Fisheries (Bethesda) 32:270-277.

Sommer, T., F. H. Mejia, M. L. Nobriga, F. Feyrer, and L. Grimaldo. 2011. The spawning migration of delta smelt in the upper San Francisco Estuary. San Francisco Estuary and Watershed Science 9.

Sommer, T., and F. Mejia. 2013. A place to call home: a synthesis of delta smelt habitat in the upper San Francisco Estuary. San Francisco Estuary and Watershed Science 11(2). Available at: http://www.escholarship.org/uc/ item/32c8t244.

Stahle, D. W., M. D. Therrell, and M. K. Cleaveland. 2001. Ancient Blue Oaks Reveal Human Impact on San Francisco Bay Salinity. EOS, Transactions of the American Geophysical Union 82:141-145.

State Water Resources Control Board (SWRCB). 2010. Development of Flow Criteria for the Sacramento- San Joaquin Delta Ecosystem. Prepared Pursuant to the Sacramento-San Joaquin Delta Reform Act of 2009. http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/deltaflow/docs/final_rpt080310.pdf

Stewart, A.R., Luoma, S.N., Elrick, K.A., Carter,J.L., and van der Wegen, M. 2013. Influence of estuarine processes on spatiotemporal variation in bioavailable selenium. Marine Ecology Progress Series 492:41-56.

Stevens, D.E. & and L.W. Miller. 1983. Effects of river flow on abundance of young Chinook salmon, American shad, longfin smelt, and delta smelt in the Sacramento-San Joaquin River system. North American Journal of Fisheries Management 3:425-437.

Stine, S. 1994. Extreme and persistent drought in California and Patagonia during mediaeval time. Letters to Nature, Department of Geography and Environmental Studies, California State University, Hayward, California, v. 369.

Stine, S. 1996. Climate, 1650-1850. In Sierra Nevada Ecosystem Project (SNEP): Final Report to Congress. Vol. II: Assessments and Scientific Basis for R-37 Management Options. University of California. Wildland Resources Center Report No. 37. University of California, Davis, CA. 1528 pp.

Stralberg, D., M. Brennan, J.C. Callaway, J. K. Wood, L. M. Schile, D. Jongsomjit, M. Kelly, T. Parker, and S. Crooks, 2011. Evaluating Tidal Marsh Sustainability in the Face of Sea Level Rise: A Hybrid Modeling Approach Applied to San Francisco Bay. PLoS ONE 6(11).

Sturrock, A. M., J. D. Wikert, T. Heyne, C. Mesick, A. E. Hubbard, T. M. Hinkelman, P. K. Weber, G. E. Whitman, J. J. Glessner, and R. C. Johnson. 2015. Reconstructing the Migratory Behavior and Long-Term Survivorship of Juvenile Chinook Salmon under Contrasting Hydrologic Regimes. PLoS One 10:e0122380.

Takekawa, J. W., H. Spautz, N. Nur, J. L. Greenier, K. Malamud-Roam, J. C. Nordby, A. Cohen, F. Malamud-Roam, and S. E. Wainwright-De la Cruz. 2006. Environmental threats to tidal marsh vertebrates of the San Francisco Bay Estuary. Studies in Avian Biology 32:176-197.

The Bay Institute (TBI). 1998. From the Sierra to the Sea: The Ecological History of the San Francisco Bay-Delta Watershed. Available at www.bay.org/publications/from -the-sierra-to-the-sea-the-ecological-history-of-the-san-francisco-bay-delta-waters

The Bay Institute (TBI). 2010. Gone with the Flow. Available at http://www.thebayinstitute.org/resources/publications/gone-with-the-flow

The Bay Institute (TBI). 2012. Collateral Damage. Available at http://www.thebayinstitute.org/resources/publications/collateral-damage

The Bay Institute, American Rivers, Environmental Defense Fund, Natural Heritage Institute, and Natural Resources Defense Council. [TBI et al. 2010 exhibits 1-4]. 2010. Written Testimony of Jonathan Rosenfield, Christina Swanson, John Cain, et al. Before the State Water Resources Control Board, Exhibits 1-4, summary, and closing comments. Available at: http://www.bay.org/publications/flow-criteria-for-the-delta-ecosystem

Thomson, J. R., W. J. Kimmerer, L. R. Brown, K. B. Newman, R. Mac Nally, W. A. Bennett, F. Feyrer, and E. Fleishman. 2010. Bayesian change point analysis of abundance trends for pelagic fishes in the upper San Francisco Estuary. Ecological Applications 20:1431-1448.

Tobias, Jimmy. September 16, 2014. Ocean Beach's Sand Supply Dries Up, Leaving Plovers Squeezed. Bay Nature. Available at http://baynature.org/article/ocean-beachs-sand-supply-dries-leaving-plovers-stranded/

U.S. Bureau of Reclamation (USBR). 2012. 2012 deliveries summary. Available at: http://www.usbr.gov/mp/cvo/12deliv.html

U.S. Bureau of Reclamation (USBR). 2016. New Melones operations modeling spreadsheet.

U.S. Environmental Protection Agency USEPA). 2012. Water Quality Challenges in the San Francisco Bay/Sacramento-San Joaquin Delta Estuary: EPA's Action Plan.

U.S. Fish and Wildlife Service (USFWS). 1995a. Recovery plan for the Sacramento/San Joaquin Delta native fishes.

University of California, Santa Cruz. 2015. Assessing SPATT in San Francisco Bay. SFEI Contract 1051. Final Report. Submitted to San Francisco Estuary Institute. Available at: http://sfbaynutrients.sfei.org/sites/default/files/SPATT Final Report May2015.pdf

Walters, R.A., Cheng, R.T., Conomos, T.J. 1985. Time scales of circulation and mixing processes of San Francisco Bay waters. Hydrobiologia 129, 13-36.

Ward, E. J., E. E. Holmes, and K. C. Balcomb. 2009. Quantifying the effects of prey abundance on killer whale reproduction. Journal of Applied Ecology 46: 632–640.

Williams, J. G. 2006. Central Valley Salmon: A Perspective on Chinook and Steelhead in the Central Valley of California. San Francisco Estuary and Watershed Science 4.

Winder, M., and A. D. Jassby. 2010. Shifts in zooplankton community structure: Implications for food-web processes in the upper San Francisco Estuary, Estuaries Coasts, 34(4), 675–690, doi:10.1007/s12237-010-9342

Winder, M., A. D. Jassby, and R. Mac Nally. 2011. Synergies between climate anomalies and hydrological modifications facilitate estuarine biotic invasions, Ecol. Lett., 14, 749–757, doi:10.1111/j.1461-0248.2011.01635.x

Wright, S.A., D.H. Schoellhamer. 2004. Trends in the sediment yield of the Sacramento River, California, 1957–2001. San Francisco Estuary and Watershed Science 2 (2).

GLOSSARY

Abundance

The number of individuals in a population. Often measured as an index calculated based on the number of individuals detected per sample.

Actual Flow or Runoff

The amount of fresh water flowing past a point, measured or calculated at that point or calculated based as the sum of upstream measurements throughout a watershed; in contrast to unimpaired flow or runoff (see below).

Acre Foot (AF)

The amount of water required to cover 1 acre to a depth of 1 foot (approx. the area of an American football field). An acre-foot is approximately 326,000 gallons or 1,233.5 cubic meters.

Algae

Chlorophyll containing single or multi-celled organisms that lives in fresh or salt water.

Anadromous Fish

Fish that are born in freshwater, migrate to the ocean, and return to fresh water in order to as adults to spawn. Anadromous fish in the Bay's watershed include Chinook salmon, steelhead, striped bass, white sturgeon, green sturgeon, and American shad.

Aquifer

An underground geological formation that holds water.

Bay

A body of water connected to an ocean or lake, formed by an indentation of the shoreline.

Bay Inflow

Freshwater flows to San Francisco Bay, originating upstream from its Central Valley watershed, measured or estimated where the Delta enters Suisun Bay (the uppermost portion of San Francisco Bay), and not including the relatively small amount of flow from the local watersheds directly surrounding the Bay.

Benthic

Bottom-dwelling. Refers to organisms that live on the bottom of a water body or the habitat along the bed of a river, estuary, lake, or sea.

Brackish water

Slightly salty water, characteristic of estuarine habitats.

Central Valley Project (CVP)

The federally operated water storage, diversion, and conveyance system that provides water from California's Central Valley and the Trinity River to agricultural, municipal, and industrial users in the Central Valley and Bay Area. Major facilities include Shasta, Trinity, Folsom, Friant, and New Melones Dams (and their reservoirs), the Delta Cross Channel, the Delta-Mendota Canal, the Jones (Tracy) Pumping Plant, and San Luis Reservoir among others.

CFS

Cubic feet per second, a rate of flow measured as a volume of water (cubic feet) passing a point in one second. A flow of 1cfs equals about 2 acre-feet per day or enough to fill a 32-gallon trashcan in just over 4 seconds.

Delta

The uppermost portion of the San Francisco Bay estuary, the Delta is the roughly triangular area formed at the western edge of the Central Valley by the confluence of the Sacramento and San Joaquin Rivers. Bay inflow from the Central Valley passes through the Delta as do numerous types of migratory fish species.

Diversion

See "Water Diversion"

Drought

An extended period, lasting more than one year, during which precipitation and runoff is well below average. Different from the seasonal drought experienced in California every year from late spring through early fall when very little or no rain falls.

Ecosystem

The biological and abiotic (non-living) parts of the environment in a particular area and the interaction of those parts.

Endangered Species

Species or distinct populations of plants and animals that are protected by federal or state laws that are specifically intended to prevent extinction and to protect habitats of those species.

Erosion

The wearing away of the land surface by wind or water.

Export

See “Water Export”

Estuary

A partly enclosed coastal body of brackish water with one or more rivers or streams flowing into it, and with a free connection to the open ocean. Estuaries are formed by the mixing of fresh water and saline water and represent a transition zone between river environments and marine environments.

Habitat

The physical, chemical, and biological context within which an organism or assemblage of organisms live.

Harmful algal bloom (HAB, aka Toxic algal bloom)

A proliferation of cyanobacteria that cause negative impacts to other organisms via natural production of toxins.

Introduced (or “exotic”) species

Populations of plants and animals that are not native to a specific area, which become established and self-sustaining after individuals have been transported into an ecosystem intentionally or unintentionally. Introduced species may alter the natural ecology of an area, via competition for resources, alteration of ecosystem processes and native habitats, and/or predation on native species.

Microcystis

A genus of cyanobacteria that lives in fresh water and produces a powerful toxin (microcystin).

MAF

Million acre-feet.

Nutrient

Any substance, which enhances the growth of plants and animals.

Pacific Flyway

A major north-south corridor for migratory birds on the west coast of the Americas, extending from Alaska to Patagonia. Every year, migratory birds travel some or all of this distance both in spring and in fall, following food sources, heading to breeding grounds, or travelling to overwintering sites.

Plankton

A diverse group of organisms that live in the water column of large bodies of water and that cannot swim against a current. Includes photosynthetic organisms (phytoplankton) and tiny primary consumers (zooplankton). They provide a crucial source of food to many large aquatic organisms, such as fish and whales.

Population Viability

The ability of a population to persist and to avoid extinction. The viability of a population reflects the number of individuals, changes in the birth rate, mortality rate, fecundity, genetic and life-history diversity of individuals in a population, and geographic distribution.

Productivity

Relates to factors such as birth, maturation, and death rates that determine a population’s growth rate.

Residence Time

The average amount of time that a moving particle (e.g., molecule of water) spends in a particular area.

Runoff

The portion of precipitation that enters surface waters during a given period of time. In California, on average about one-third of the precipitation becomes runoff while the rest is “consumed” – evaporated and transpired – by plants or evaporated from the ground.

Salmon

A common name for at least six species of fish. Four races of Chinook salmon reproduce in the rivers of the Central Valley – more distinct populations of this species than in any other single watershed in their range. Named for the time of year during which they re-enter freshwater and begin their migration upstream to spawn, these races (or “runs”) are the spring, fall, late-fall and winter runs.

Salinity Gradient

The spatial distribution of the range of salinities between fresh and marine that is one of the defining characteristics of any estuarine ecosystem. This gradient generates a range of habitats and ecological assemblages composed of organisms with different tolerances for salinity.

San Francisco Bay

The central portion of the Bay estuary, composed of the open water embayments (from north to south, Suisun, San Pablo, Central and South Bays) upstream of the Golden Gate and downstream from the Delta.

San Francisco Bay Estuary

The area – of which San Francisco Bay is the central region – where fresh water and salt water mix, from the tidally influenced portions of the Sacramento – San Joaquin Delta where river flows enter the estuary to local nearshore waters in the Gulf of the Farallones outside the Golden Gate.

Sediment

Fine soil or mineral particles that settle to the bottom of the water or are suspended in the water.

Spatial Distribution

The arrangement of a population in space. Not to be confused with dispersal, which is the movement of individuals away from the area where they were born. Distribution patterns can change throughout a species’ life cycle – the population is generally considered to be at greatest risk when its geographic range is most limited or in life stages that are least mobile.

State Water Project (SWP)

The state-operated water storage, diversion, and conveyance system that provides water from the Feather River and “surplus” water to agricultural, municipal, and industrial users. Major facilities include Oroville Dam and Reservoir, the Banks Delta Pumping Plant, the California, South Bay, and North Bay Aqueducts, San Luis Reservoir, and Castaic Lake.

TAF

Thousand acre-feet.

Toxic Algal Blooms

(see Harmful Algal Blooms)

Trophic Levels

The relative position an organism occupies in a food web – what it eats and what eats it. The word trophic derives from the Greek trophē referring to food or feeding. Phytoplankton are primary producers. Organisms that eat phytoplankton are primary consumers. Organisms that eat animals (either as part of their diet or exclusively) are secondary consumers. These organisms all exist at different trophic levels. Individuals may change trophic levels as they pass through different life stages.

Turbidity

The cloudiness or haziness of water caused by tiny particles -- similar to smoke in air. Turbidity is roughly the opposite of water clarity.

Unimpaired Flow or Runoff

Quantity of water that would have flowed passed a point without upstream dams or water diversions (which would “impair” the runoff from reaching that point). Unimpaired runoff is calculated with existing land use (but without dams and diversions) and does not assume that the landscape has been returned to its historic, “natural” state.

Watershed

The total land surface that drains water to a particular waterbody.

Water Diversion

Removal of water from its natural course in order to serve human purposes (e.g., agricultural irrigation).

Water Export

A specific type of water diversion where water is removed from its watershed of origin and transported to an entirely different watershed or moved back upstream in the same watershed. The largest export project involves pumping water from the Delta portion of the San Francisco Bay Estuary via the State Water Project and federal Central Valley Project pumps to the San Joaquin Valley and Southern California.

Wetlands

Areas where saturation with water is the dominant factor determining the nature of soil development. These areas can be identified, even when soils are temporarily drier, by unique plants that have adapted to oxygen-deficient (anaerobic) soils. Wetlands may be very productive and diverse habitats and influence the rate of flow and water quality in adjacent environments.

Letter 10 Planning and Conservation League/ Pacific Coast Federation of Fishermen's Associations/ Environmental Water Caucus

PLANNING AND CONSERVATION LEAGUE
PACIFIC COAST FEDERATION OF FISHERMEN'S ASSOCIATIONS
PCFFA
STEWARDS OF THE FISHERIES
Environmental Water Caucus

October 17, 2016

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VIA EMAIL AND U.S. MAIL

Subject: Comments on Draft EIR for the Water Supply Contract Extension Project

Dear Mr. Alvarez:

On behalf of the Planning and Conservation League, Pacific Coast Federation of Fishermen's Associations and the Environmental Water Caucus representing hundreds of thousands of members and groups in California, we are writing to provide input on the Draft Environmental Impact Report for the Department of Water Resources' ("DWR") Water Supply Contract Extension Project ("DEIR"). The proposed project and DEIR fail to satisfy the requirements of CEQA and DWR's obligations under state law. As we explained in our scoping comments submitted on October 10, 2014, DWR's proposal to extend the term of existing State Water Project ("SWP") contracts for an additional 50 years necessarily implicates the urgent need to modernize other contract terms to reflect the current realities of climate change, restricted surface water supplies, declining water quality and environmental health of the Bay-Delta estuary, existing statutory requirements, and other current and anticipated changes that have occurred since these contracts were originally executed. DWR's failure to address these important issues while proposing to extend the contracts to 2085 is inexcusable and irreconcilable with Governor Brown's recognition in the 2016 California Water Action Plan of the "broad agreement that the state's water management system is currently unable to satisfactorily meet both ecological and human needs, too exposed to wet and dry climate cycles and natural disasters, and inadequate to handle the additional pressures of future population growth and climate change."[1]

Moreover, DWR's proposal and the analysis on which it is based are legally flawed. First, DWR concludes that extending SWP contracts and water deliveries for another 50 years would result in no impact on the environment. But this conclusion is based on at least two faulty assertions that fatally taint the entire analysis. The first faulty assumption is that the SWP contracts would be extended to 2085 in any case, with or without this proposed project, "upon receipt of Article 4 letters from the Contractors," without any other changes to the contracts. DEIR at ES-6. The second faulty assumption is that SWP operations and facilities will not change based on the more affordable financing and broader construction authority that the 50-year extension would provide. Second, DWR incorrectly asserts that the "proposed project is separate and independent from the California WaterFix project," DEIR at 6-3, which causes DWR to impermissibly piecemeal the impacts of extending the contracts from the impacts of California WaterFix ("WaterFix"). Third, DWR and the SWP Contractors have recognized that multiple additional modifications to the SWP contracts will be necessary in order to implement WaterFix, whose modifications have been impermissibly excluded from this project and its impact analysis.

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[1] http://resources.ca.gov/docs/california_water_action_plan/Final_California_Water_Action_Plan.pdf, at 1. All cited documents are incorporated herein by reference.

DWR should reject the proposed project and prepare a new project and California Environmental Quality Act ("CEQA") analysis that considers the full suite of contract modifications and related impacts that are necessary to modernize the State Water Project and keep it functional beyond 2035.

I. The DEIR's Conclusion that the Proposed Project Would Cause No Environmental Impacts Is Flawed

A. DWR Improperly Conflates the "No Project" Alternative with the Proposed Project

The premise of the DEIR's no impacts conclusion is that the SWP contracts would be extended to 2085 with or without the proposed project because of Article 4 of the contracts. Thus, DWR defines the "no project" alternative as extension of the contracts from 2035 to 2085 with no changes to any existing contract terms or operations. DEIR at 7-6. But DWR inexplicably selects a 2085 contract extension date under this alternative, thus rendering it essentially identical to the proposed project. This selection, which is not supported by any analysis or reasoning, undermines the impact analysis.

Article 4 allows for extension of the contracts on terms that are mutually agreed to. *See, e.g.*, DEIR at 7-9. The Contractors may not simply demand that the contracts be extended indefinitely, or for 50 years as DWR assumes in the DEIR, nor does DWR have to acquiesce to such demands under Article 4. Indeed, the DEIR recognizes that "it is uncertain how far beyond 2035 the Contracts would be extended under this alternative." DEIR at 7-11.[2] But the DEIR randomly selects 2085 as the expiration date, noting that this "is the same as the proposed project." This unjustified assumption impermissibly skews the impact analysis. If a shorter date were selected, then DWR would continue to face constraints on its ability to finance and construct additions and improvements to the SWP, leading to impacts very different from those anticipated under the proposed project, which would facilitate such construction. The DEIR acknowledges that DWR would continue to face constraints on its ability to sell bonds under this scenario, thus limiting the ability to finance significant upgrades to SWP facilities, but fails to recognize that reality in its impact analysis. *Id.* at 7-4 to 7-6.

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[2] The DEIR also recognizes that "DWR and the Contractors have made many amendments to the Contracts to address matters that have arisen over the past 55 years." DEIR at 2-12. Implementation and extension of the contracts over the next 69 years – to 2085 – should be no different, but the "no project" alternative unreasonably assumes it will be.

The Ninth Circuit Court of Appeals recently held that even where a statute mandates renewal, which is not the case here, the federal equivalent of CEQA, the National Environmental Policy Act ("NEPA"), "imposes obligations on agencies considering major federal actions that may affect the environment … [and] [a]n Agency may not evade these obligations by contracting around them." *Pac. Coast Fed'n of Fishermen's Ass'ns v. U.S. Dep't of the Interior*, 2016 WL 3974183 at *2 (9th Cir. July 25, 2016). As the Ninth Circuit noted, "a 'no action' alternative is 'meaningless' if it assumes the existence of the very plan being proposed." *Id.* at *1. The court held that the United States Bureau of Reclamation ("Reclamation") violated NEPA by failing to consider an alternative that would reduce water deliveries in a renewed contract. *Id.* at *3.[3]

A reduced delivery scenario under the "no action" alternative is more likely than the one that DWR has put forward. In fact, DWR itself has recently published and commissioned documents that assert that SWP deliveries will be far less in a "no action" future, under which new facilities are not constructed and upgraded. For example, the draft Bay Delta Conservation Plan prepared by DWR in 2013 projects that by 2025, Delta exports will fall to a range of 3.4-3.9 million acre-feet ("MAF") per year on average, a reduction of about 1 MAF or more on average from today's levels. *See, e.g.,* DWR, public draft Bay Delta Conservation Plan, at Table 9.A-2 (Nov. 2013) (available at http://baydeltaconservationplan.com/Libraries/Dynamic_Document_Library/Public_Draft_BDCP_Appendix_9A_-_Economic_Benefits_of_the_BDCP_and_Take_Alternatives.sflb.ashx). DWR's economic consultant for the WaterFix project recently reiterated this level of exports under a "no action" alternative, finding that Delta exports from existing SWP and Central Valley Project ("CVP") facilities are likely to decline to 3.9 MAF by 2020, "a reduction of 0.8 maf from current levels." The Brattle Group, Draft California WaterFix Economic Analysis, at 6 (Nov. 15, 2015) (available at http://www.restorethedelta.org/wp-content/uploads/2016/09/CA-WaterFix-Economic-Analysis-Sunding.pdf). DWR has presented similar reduced SWP delivery scenarios as likely in its most recent SWP delivery capability report. DWR, 2015 SWP Delivery Capability Report, at Appendices (https://msb.water.ca.gov/documents/86800/c97c3baa-0189-4154-bf19-aa88392026ac). Indeed, DWR's largest contractor, the Metropolitan Water District of Southern California, relied on the reduced "ECLO" SWP delivery projections in its 2015

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[3] As discussed *infra* at note 5, DWR incorrectly rejected the "reduced deliveries" alternative here.

Urban Water Management Plan. MWD, 2015 Urban Water Management Plan, at 2-13 ("Under the 2015 SWP Delivery Capability Report with existing conveyance and low outflow requirements scenario, the delivery estimates for the SWP for 2020 conditions … [are] equivalent to 976 TAF for Metropolitan, under long-term average condition.") (available at http://www.mwdh2o.com/PDF_About_Your_Water/2.4.2_Regional_Urban_Water_Management_Plan.pdf).

Because DWR anticipates that, without the addition of significant new SWP facilities, SWP deliveries are likely to decline significantly in the near future, the "no action" alternative should be revised to reflect a shorter contract extension and reduced delivery estimates over the life of this project. That assumption, which better matches DWR's, and its contractors' projections elsewhere, would lead to a different impact analysis than the one presented in the DEIR, with a greater disparity of future deliveries between the "no action" and "proposed project" alternatives. The DEIR should be revised to reflect those differences.

B. The DEIR Admits that the Proposed Project Will Allow DWR to Implement Projects with Potentially Significant Environmental Impacts

The DEIR states that a core purpose of the project is to "[e]nsure DWR can finance SWP expenditures beyond 2035." DEIR at ES-3. As DWR explains: "In order for DWR to sell bonds for 30 years or more, which would provide more affordable financing to the Contractors for the SWP costs associated with constructing and repairing the SWP facilities allocated to water supply, it is necessary to extend the expiration dates of the Contracts." DEIR at 1-2; *see also id.* at 4-1 (recognizing that DWR could not "as a practical matter" issue bonds with a maturity date beyond 2035 without extending the contract terms as proposed); *id.* at 5-4 ("the current Contracts require existing capital obligations to be repaid by 2035, causing a sharp increase in capital charges to contractors toward the end of the 2035 repayment period"). While the DEIR admits that this more affordable financing will increase the likelihood of modifications to the SWP that will have significant environmental impacts, it fails to analyze the impact of those reasonably foreseeable projects. Further, the proposed project would explicitly authorize DWR to extend the physical components of the SWP beyond current facilities, and thereby increase the likelihood of projects with significant environmental impacts. We adopt by reference previous comments submitted by PCL et. al. during the contract extension public comments on the SWP contract extension negotiation sessions and referenced in our scoping comments.

CEQA requires that an EIR identify and describe the significant indirect environmental impacts that will result from the project, including actions that are a foreseeable consequence of the project, such as the construction and modification of SWP facilities here that the contract extension would make possible. 14 Cal. Code of Regs. § 15126.2(a); *City of Hayward v. Board* *of Trustees of Cal. State Univ.*, 242 Cal. App. 4th 833, 859 (2015) (EIR on plan to expand campus deficient for not analyzing increased student use of parks). For example, the DEIR notes that "[c]apital projects that could be financed in whole or in part by the sale of longer term bonds (if available as the result of contract extension) include: (1) reinforcing Perris Dam at Lake Perris against seismic failure … ; (2) reconstructing the Ronald B. Robie Thermalito pump-generating plant … ; (3) implementing the Oroville hydroelectric license project; and (4) obtaining a renewed Federal Energy Regulatory Commission (FERC) license for the SWP's southern hydroelectric plants." DEIR at 5-7. Each of these anticipated projects would likely have significant environmental impacts. Similarly, the DEIR notes that:

> Because of physical and water quality limitations, the diversion at Barker Slough cannot deliver the maximum Table A water requested. In order to address these facility limitations and meet projected future water delivery needs of the North Bay Contractors, DWR is considering constructing a new intake and pumping plant facility in the Sacramento River and a new segment of NBA Conveyance pipeline that would be operated in conjunction with the existing Barker Slough Pumping Plant…[T]he NBA Alternate Intake Project (NBA AIP) would enable the NBA to deliver the total water supply allocation (Table A amounts) to the North Bay Contractors.

DEIR at 2-5 to 2-6; *see also* http://www.water.ca.gov/engineering/Projects/Current/NBA/. Given the current stresses on and over-allocation of the Delta ecosystem, there can be no question that increasing SWP diversions from the Delta would cause potentially significant environmental impacts.[4] Yet, that is what DWR proposes to do with the NBA AIP, which project would be more likely to occur with the more affordable financing available under the proposed extended contract term. *See, e.g.,* http://www.scwa2.com/home/showdocument?id=918 at 5 (Solano County Water Agency discussing the challenges of funding the project, which "capital costs are estimated at about $550 million" and "is expected to be financed by the State Water Project with revenue bonds," and explaining that "[f]ull payment by SCWA and Napa County would be a significant financial burden to our rate payers").

The DEIR anticipates that other SWP modifications will be made more likely with the contract extension and which are also likely to have potentially significant environmental impacts. In fact, the DEIR notes that the contracts themselves "require DWR to make all reasonable efforts to complete the water supply facilities necessary to deliver the Table A amounts in the Contracts." DEIR at 2-12.[5] DWR's pursuit of such facilities "necessary to deliver the Table A amounts in the Contracts," including WaterFix with its stated purpose of enabling full contract deliveries, would significantly increase diversions and exports within and upstream of the Delta, causing significant environmental impacts. *See, e.g.*, DWR Application to USACE to Implement WaterFix, at 8 (Aug. 24, 2015) (available at https://s3.amazonaws.com/californiawater/pdfs/5n2mg_Complete_Final_CA_Water_Fix_USACE_404_Permit_Application.pdf) (the "purposes of the proposed actions are to … restore and protect the ability of the SWP and CVP to deliver up to full contract amounts … consistent with the terms and conditions of water delivery contracts held by SWP contractors."). As DWR's most recent SWP Capability Report admits, "[u]nder existing conditions, the average annual delivery of Table A water … is 2,550 taf/year," far less than the nearly 4.2 MAF of annual Table A amounts in the contracts,[6] and the "future inability of the SWP to deliver water to meet demands of certain [south-of-delta] contractors is a very real concern." *Id.* at 10.

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[4] *See, e.g.,* DWR's 2015 SWP Capability Report at 1-2 (available at https://msb.water.ca.gov/documents/86800/144575dd-0be1-4d2d-aeff-8d7a2a7b21e4).

[5] The proposed project's extension of this contract provision for another 50 years also undermines DWR's asserted basis for rejecting an alternative that would reduce Table A deliveries. The DEIR states that "Reducing Table A amounts proportionately for all the Contractors by amendment would not change the amount of water being

Finally, the proposed project includes new authorization for "SWP revenue bonds to be issued to: (1) finance repairs, additions, and betterments to most facilities of the SWP without regard to whether the facilities were in existence prior to January 1, 1987, which is the current Contract requirement in Article 1(hh)(8); and (2) finance other capital projects (not already in the list in Article 1(hh) for which revenue bonds could be sold) when mutually agreed to by DWR and at least 80 percent of the affected Contractors." DEIR at 4-5 (emphasis added). This new authorization to finance and build new SWP facilities that were not in existence prior to January 1, 1987, is likely to cause significant impacts beyond those contained in the current contracts, including, but not limited to, increasing the likelihood of the new SWP diversion and conveyance facilities envisioned by WaterFix, which DWR has already acknowledged will cause significant environmental impacts. *See, e.g*, Letter from Jake Campos, STIFEL, to Mary Lou Cotton, SWPCA at 4 (March 19, 2014) (Exhibit A) (without contract amendments, "DWR's legal counsel has concluded that BDCP is not on the list of approved projects that are eligible for funding, including through bond financing"). The DEIR's failure to identify and analyze those impacts fails to comply with CEQA.

Thus, DWR's conclusions in the DEIR that the proposed project would not "alter the existing authority to build new or modify existing facilities" or "result in construction or modification of SWP facilities," DEIR at 5-96, and that "SWP water supply would not change under the proposed project" are contradicted by the facts. *See* DEIR at 5-6. The proposed project makes increased SWP water supply more likely by explicitly authorizing new facilities that are not

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delivered to the Contractors…." DEIR at 7-3. This assertion is not true if DWR is simultaneously obligating itself through 2085, as the proposed project would do, "to make all reasonable efforts to complete the water supply facilities necessary to deliver the Table A amounts in the Contracts." Nor is it true if the proposed project increases the ability of DWR to expand SWP facilities to increase deliveries, as it would do. Thus, the DEIR also suffers from failing to analyze a reasonable range of alternatives, including a reduced contract amount alternative, as well as modifications to other contract terms.

[6] *Id.* at 2.

authorized under the current contract, extending DWR's obligation to build out the SWP to achieve full Table A amounts, and making SWP expansion and extension projects more affordable. DWR's failure to analyze the impacts of these and related SWP modifications is impermissible piecemealing under CEQA. A far better solution would be to adjust Table A amounts to reflect more realistic delivery terms, now and in the future, and to omit the SWP contract term that "require[s] DWR to make all reasonable efforts to complete the water supply facilities necessary to deliver the Table A amounts."

II. The DEIR Improperly Piecemeals Reasonably Foreseeable SWP Changes and Contract Modifications with Potentially Significant Environmental Impacts

The DEIR asserts that the "proposed project is separate and independent from the WaterFix project," DEIR at 6-3, and excludes numerous other SWP contract modifications that are reasonably foreseeable.

CEQA defines a "project" as the whole of an action that has a potential for resulting in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment. The entire project being proposed must be described in the EIR, and the project description must not be artificially truncated so as to minimize project impacts. *City of Santee v. County of San Diego* (1989) 214 Cal. App. 3d 1438, 1450. A project description must include all relevant aspects of a project, including reasonably foreseeable future activities that are part of the project. *Laurel Heights Improvement Assn. v. Regents of the University of California* (1988) 47 Cal.3d 376. Responsibility for a project cannot be avoided by limiting the title or description of the project. *Rural Land Owners Association v. Lodi City Council* (3d Dist. 1983) 143 Cal. App.3d 1013, 1025.

The DEIR fails to meet these requirements of CEQA because, among other things, it fails to analyze the impacts of the proposed WaterFix project, even though several Contractors have admitted that the proposed SWP contract extension is a necessary condition for financing WaterFix. In addition, the DEIR excludes consideration of other contract changes that are being anticipated to enable implementation of the proposed California WaterFix project.

The SWP Contractors have recognized that the proposed project is necessary to enable financing and implementation of WaterFix. For example, in September, 2014, staff at the Metropolitan Water District of Southern California acknowledged that the proposed SWP contract amendments are a necessary step in financing what was then called the Bay Delta Conservation Plan, now known as WaterFix. *See* MWD, Special Committee on Bay-Delta Presentation Re. Review Status of BDCP Cost Allocation Discussions (September 23, 2014) (available at http://edmsidm.mwdh2o.com/idmweb/cache/MWD%20EDMS/003735248-1.pdf) (Exhibit B). Similarly, Kern County Water Agency staff explained in September 2013 that "DWR and SWP Contractors need to come to agreement on a contract extension that matches the term of the

BDCP and provides the SWP Contractors with a more appropriate role in managing SWP expenses." Kern County Water Agency, "Resolution of Issues Necessary to Inform a Development of a Business Case to Support a Decision on Continued Funding for the Bay Delta Conservation Plan and the Delta Habitat Conservation and Conveyance Program," at 1 (Sept. 23, 2013) (Exhibit C).

Several financing agencies similarly reiterated the need to extend the contracts to enable WaterFix. In response to a State Water Project Contractors Authority's request for proposal regarding financing the BDCP in March 2014, Morgan Stanley stated,

> "***Water Supply Contracts***. We understand that DWR's water supply contracts are in the process of being extended, likely to 2085, or 50 years from 2035 when most expire. Clearly, in order to finance the substantial costs associated with CM1 in the BDCP, the extension of these contracts is essential to allow for the amortization of financing payments over a long period of time."[7]

Raymond James echoed that the "current contracts between DWR and the water contractors … will have to be renegotiated in order to fund the tunnels…. Investors will be concerned about the extension of those terms through the life of the bonds." Raymond James and Associates, Inc., Response to Request for Qualifications and Proposals for Underwriting Services, at 9 (March 19, 2014) (Exhibit E).

In addition, the Contractors have identified a number of other contract amendments that are likely when and if the proposed WaterFix is approved, but which are excluded from the proposed project and DEIR. For example, in a November 2013 presentation, the State Water Contractors identified a number of recommended alternatives for financing WaterFix, all of which require SWP contract amendments. State Water Contractors Management Briefing to DHCCP SWP Cost Allocation Working Group, at 9 (November 8, 2013) (Exhibit F) ("Contract Amendment Likely Needed to Reflect Different Cost Allocations and Different Water Supply Deliveries, and Allowance for Annual Sales"); *see also id.* at 13 ("SWP Contract Amendment Needed" for Alternative 2C); *id.* at 17 (Alternative 4A "Would Require Contract Amendment"). On April 1, 2014, the State Water Contractors considered another set of financing options for WaterFix, all of which, again, would require amendments to existing SWP contracts. State Water Contractors Presentation to SWP Cost Allocation Workgroup, April 1, 2014 (Exhibit G).

DWR and the Contractors have indicated that they will make financing decisions on WaterFix by the end of this year. Those pending, near-term decisions are likely to have a significant impact on the scope of amendments needed to SWP contracts, but also the range of impacts associated with those impacts. *See, e.g.,* Email from Stephen Arakawa Re. Kern County Proposal on

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[7] Morgan Stanley, "State Water Project Contractors Authority: Response to Request for Qualifications and Proposals for Underwriting Services," at 8 (March 19, 2014).

BDCO [*sic*] Cost Allocation, January 30, 2014 (Exhibit H) (Kern County Water Agency propose financing strategies for a smaller, "urban-only" 6,000 cubic feet per second ("cfs") WaterFix facility because Kern is not supportive of the current 9,000 cfs approach). DWR should suspend the current SWP contract amendment proposal until these discussions are final and the full suite of amendments and impacts can be considered in a comprehensive fashion, as CEQA requires.

The attempt by the DEIR to separate the WaterFix financing and related issues to some future analysis runs afoul of CEQA's requirements to define the project to encompass the whole of the action. It must be revised in a recirculated CEQA analysis.

We appreciate the opportunity to provide our input and urge DWR to address these issues in a revised project and EIR.

Sincerely,

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Letter 11 AquAlliance/California Sportfishing Protection Alliance/California Water Network

AQUALLIANCE
DEFENDING NORTHERN CALIFORNIA WATERS

CALIFORNIA SPORTFISHING PROTECTION ALLIANCE
CSPA
Since 1983

california
water impact
network

October 17, 2016

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Subject: Comments on the Draft Environmental Impact Report for the *Water Supply Contract Extension Project*

Dear Mr. Alvarez:

AquAlliance, the California Sportfishing Protection Alliance, and the California Water Impact Network submit additional comments and questions for the Draft Environmental Impact Report (DEIR) for the *Water Supply Contract Extension Project* (Project).

I. Items of Omission That Must be Corrected

The percent of use by sector must be added to the regions discussed in Section 5.2.18.2 that do not have it, such as: "Water use in the Sacramento River and San Joaquin River hydrologic regions is mostly for agricultural production, including a variety of crops as well as livestock management, followed by environmental and urban use. Irrigation using both groundwater and surface water dominates water use volume, but municipal water use has grown along with the rising population." (pp. 5-140 - 5-141) Without this information the public is unable to adequately understand the existing conditions.

The percent of water used by state contractors for all sectors and water transfer sales must also be quantified. Just one of the many examples that need additional disclosure is found in the paragraph on Castaic Lake WA that provided no numeric data at all.[1] There are also omissions of water transfers purchases altogether, let alone quantification of how much transferred water is part of a portfolio for districts such as Palmdale WD.[2] All contractors that participate in water transfer sales or purchases must be identified, the range of water amounts sold or purchased must be quantified, and the portfolio percentage by district must be disclosed. Without this information the public is unable to adequately understand the existing conditions therefore the DEIR must be revised and recirculated for public comment.

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[1] DWR 2016. Draft Environmental Impact Report for the Water Supply Contract Extension Project. "In addition to SWP supplies, Castaic Lake WA receives supplies from two other water districts in Kern County, and has access to groundwater and recycled water. The agency is a wholesaler to four retail purveyors, who deliver supplies to primarily M&I users (Castaic Lake Water Agency 2011)." p. 5-143

II. Cumulative Impact Analysis is Inadequate

CEQA states that assessment of the project's incremental effects must be "viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects." (CEQA Guidelines § 15065(a)(3).) "[A] cumulative impact consists of an impact which is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts." (CEQA Guidelines § 15065(a)(3).)

An EIR must discuss significant cumulative impacts. CEQA Guidelines §15130(a). Cumulative impacts are defined as two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts. CEQA Guidelines § 15355(a). "[I]ndividual effects may be changes resulting from a single project or a number of separate projects. CEQA Guidelines § 15355(a). A legally adequate cumulative impacts analysis views a particular project over time and in conjunction with other related past, present, and reasonably foreseeable future projects whose impacts might compound or interrelate with those of the project at hand. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time. CEQA Guidelines § 15355(b). The cumulative impacts concept recognizes that "[t]he full environmental impact of a proposed . . . action cannot be gauged in a vacuum." *Whitman v. Board of Supervisors* (1979) 88 Cal. App. 3d 397, 408 (internal quotation omitted).

A. The DEIR failed to include significant projects

The DEIR's failure to include significant projects includes, but is not limited to:

- The Delta Stewardship Council's Plan
- The Long-Term Water Transfer Program (aka 10-Year Water Transfer Program)

The failure to consider and analyze major projects in preparing the DEIR signifies that it must be revised and recirculated for public comment.

B. The DEIR Fails to Demonstrate the Project Will not Create Physical Environmental Impacts

Among many statements in the DEIR, one makes it quite obvious that the Project has the extremely high potential for serious environmental impacts: "Extending the Contracts' expiration dates to 2085 will enable DWR to finance SWP expenditures beyond 2035 and continue to receive a reliable stream of revenues from Contractors for the ***construction, operation, and maintenance of the SWP***." (p. 6-3) (emphasis added) This is followed by the lead agency's conclusory statements that fall flat without any supporting disclosure or analysis:

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[2] *Id.* p. 5-144.

"[i]mplementation of the proposed project would not result in physical environmental impacts; therefore, it would not contribute to any cumulative effect and would not compound or increase an environmental impact of these other projects. As a result, the proposed project would have no cumulative impacts." (p. 6-4) How is it remotely possible that over the next 69 years (from the present to 2085) the "[c]onstruction, operation, and maintenance of the SWP" will *not* result in an impact to the environment? The DEIR's failure to disclose, consider, and analyze what construction, operations, and maintenance will occur in conjunction with cumulative projects in the DEIR signifies that it must be revised and recirculated for public comment.

C. The DEIR Obfuscates the Projects Timing with the WaterFix

The DEIR seeks to isolate the Project from the WaterFix. "The proposed project is separate and independent from the California WaterFix project. The proposed project would need to occur regardless of the outcome of California WaterFix." (p. 6-4) While SWP contracts would inevitably need to be renewed starting in 2035, the timing of the Project's contract renewals is directly tied to the WaterFix and the DEIR reveals it later in the same paragraph: "It has become more challenging in recent years to affordably finance capital expenditures for the SWP since revenue bonds used to finance these expenditures are not sold with maturity dates that extend beyond the year 2035, the year the first Contract would expire. Not extending the Contracts would continue to exacerbate the revenue bond compression problem that DWR and the Contractors are currently facing." Revenue bonds are the primary way for the State to fund the WaterFix, therefore marrying the Contract Renewal Project with the WaterFix. The DEIR must be revised with a candid discussion of the symbiotic connection between the Project and the WaterFix and recirculated for public comment.

Our groups respectfully request notification of any meetings or actions that address this Project.

Sincerely,

B. Vlamis

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Letter 12 Friends of the River

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October 17, 2016

Ted Alvarez   Via Email
State Water Project Analysis Office
Department of Water Resources
P.O. Box 942836
Sacramento, CA 94236-0001
Email: watercontractextension@water.ca.gov

Re: Comments on Draft EIR for the Water Supply Contract Extension Project

Dear Mr. Alvarez:

Friends of the River objects to approval of the above proposed project to extend the term of existing State Water Project (SWP) contracts for an additional 50 years. The Draft Environmental Impact Report (DEIR) and proposed project fail to comply with the California Environmental Quality Act (CEQA) and other provisions of state law including the Delta Reform Act. If the Department of Water Resources (DWR) wishes to continue considering the contract extension, in order to proceed in the manner required by law including CEQA it will be necessary for DWR to prepare and circulate for public review and comment a new, revised DEIR.

To avoid unnecessary repetition and to conserve resources Friends of the River hereby adopts and incorporates herein by reference as though fully set forth herein all of the comments made this same date, October 17, 2016, in the joint comment letter to you from the Natural Resources Defense Council (NRDC), Defenders of Wildlife, and The Bay Institute. Because of the importance of the issues and magnitude of the CEQA violations we do add the following comments to amplify or add to as the case may be, the joint comments made by NRDC et al.

FAILURE TO PROPERLY DEVELOP AND ANALYZE ALTERNATIVES REDUCING EXPORTS

Development of alternatives increasing flows through the Delta by reducing exports has always been a direct and obvious first step to complying with NEPA and CEQA in the course of accomplishing the co-equal goals established by the Delta Reform Act, California Water Code § 85054:

> ‘Coequal goals’ means the two goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem. The coequal goals shall be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place.

The alternative of increasing flows through the imperiled Delta by reducing exports is so obvious that the Ninth Circuit recently reversed in part a district court decision denying environmental plaintiffs summary judgment because the challenged environmental document issued by Reclamation under NEPA "did not give full and meaningful consideration to the alternative of a reduction in maximum water quantities." *Pacific Coast Federation of Fishermen's Assn's v. U.S. Dept. of the Interior,* __Fed.Appx.__, 2016 WL 3974183 *3 (9th Cir., No. 14-15514, July 25, 2016)(Not selected for publication). "Reclamation's decision not to give full and meaningful consideration to the alternative of a reduction in maximum interim contract water quantities was an abuse of discretion, and the agency did not adequately explain why it eliminated this alternative from detailed study." *Id.* at *2. Reclamation's "reasoning in large part reflects a policy decision to promote the economic security of agricultural users, rather than an explanation of why reducing maximum contract quantities was so infeasible as to preclude study of its environmental impacts." *Id.* at *3.

The requirement under NEPA for Reclamation to consider the obvious alternative of reducing exports to increase flows through the Delta is so obvious that the Ninth Circuit's decision was not selected for publication because no new legal analysis was required to reach the decision.[1] The decision pertained to ***interim two-year contract renewals***. If the alternative of reducing exports must be considered during renewal of two-year interim contracts it most assuredly must be considered during the course of deciding whether to ***extend contracts 50 years***.

We presented *A Sustainable Water Plan for California* (Environmental Water Caucus, May 2015) as a reasonable alternative to the California Water Fix Delta Water Tunnels over a year ago. The plan is at: http://ewccalifornia.org/reports/ewcwaterplan9-1-2015.pdf. The actions called for by this alternative include: reducing exports to no more than 3,000,000 acre-feet in all years in keeping with State Water Board Delta flow criteria (for inflow as well as outflow); water efficiency and demand reduction programs including urban and agricultural water conservation, recycling, storm water recapture and reuse; reinforced levees above PL 84-99 standards; installation of improved fish screens at existing Delta pumps; elimination of irrigation water applied on up to 1.3 million acres of drainage-impaired farmlands south of the Bay-Delta; return the Kern Water Bank to State control; restore Article 18 urban preference; restore the original intent of Article 21 surplus water in SWP contracts; conduct feasibility study for Tulare Basin water storage; provide fish passage above and below Central Valley rim dams for species of concern; and retain cold water for fish in reservoirs. We also requested that the range of reasonable alternatives include reducing exports both more and less than the 3,000,000 acre feet limit called for by this alternative.

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[1] In *California v. Block,* 690 F.2 753, 765-769 (9th Cir. 1982), the project at issue involved allocating to wilderness, non-wilderness or future planning, remaining roadless areas in national forests throughout the United States. The court held that the EIS failed to pass muster under NEPA because of failure to consider the alternative of increasing timber production on federally owned lands currently open to development; and also because of failure to allocate to wilderness a share of the subject acreage "at an intermediate percentage between 34% and 100%." 690 F.2d at 766. Like the situation here where the Water Fix agencies claim a trade-off involved between water exports and Delta restoration (RDEIR/SDEIS ES 4-6), the Forest Service program involved "a trade-off between wilderness use and development. This trade-off however, cannot be intelligently made without examining whether it can be softened or eliminated by increasing resource extraction and use from already developed areas." 690 F.2d at 767. Here, likewise, trade-offs cannot be intelligently analyzed without examining whether the impacts of alternatives reducing exports can be softened or eliminated by increasing water conservation, recycling, and eventually retiring drainage-impaired agricultural lands in the areas of the exporters from production. *Accord, Oregon Natural Desert Assn. v. Bureau of Land Management*, 625 F.3d 1092, 1122-1124 (9th Cir. 2010) (EIS uncritical alternatives analysis privileging of one form of use over another violated NEPA). Here, the BDCP alternatives analysis has unlawfully privileged water exports over protection of Delta water quality, water quantity, public trust values, and ESA values.

A Sustainable Water Plan for California is a carefully conceived modern, 21st-century Plan alternative. It is an example of the kinds of alternatives to extending the contracts 50 years that DWR must consider in order to proceed in the manner required by law.

There is more. On August 1, 2016, the Council on Environmental Quality (CEQ) issued a Memorandum for Heads of Federal Departments and Agencies: *Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews.* The *Final Guidance* fits this situation perfectly:

> The analysis of climate change impacts should focus on those aspects of the human environment that are impacted by both the proposed action and climate change. Climate change can make a resource, ecosystem, human community, or structure more susceptible to many types of impacts and lessen its resilience to other environmental impacts apart from climate change. This increase in vulnerability can exacerbate the effects of the proposed action. *For example, a proposed action may require water from a stream that has diminishing quantities of available water because of decreased snow pack in the mountains, or add heat to a water body that is already warming due to increasing atmospheric temperatures.* Such considerations are squarely within the scope of NEPA and can inform decisions on whether to proceed with, and how to design, the proposed action to eliminate or mitigate impacts exacerbated by climate change. (*Final Guidance,* p. 21)(Emphasis added).

Logically, the Final Guidance issued by CEQ is as pertinent to CEQA review as it is to NEPA review of proposed projects.

Here, climate change will be reducing, in the long-term, mountain snowpack and mountain stream runoff thereby reducing freshwater flows in the San Francisco Bay-Delta watershed and in the Delta itself. Among other things, reduction in flows will add heat to the water exacerbating impacts to fish, fish habitat, and human health. At the same time, climate change induced rising sea levels will exacerbate the salinity intrusion in the Delta.

The *Final Guidance* states that:

> Agencies should consider applying this guidance to projects in the EIS or EA preparation stage *if this would inform the consideration of differences between alternatives* or address comments raised through the public comment process with sufficient scientific basis that *suggest the environmental analysis would be incomplete* without application of the guidance, and the additional time and resources needed would be proportionate to the value of the information included. (*Final Guidance,* p. 34)(Emphasis added).

The projections of long-term reduced San Francisco Bay Delta watershed runoff and rising sea levels inducing greater salinity intrusion continue to worsen. This will be reducing available water supply making existing delivery levels all the more infeasible as well as exacerbating the adverse environmental impacts if nevertheless contracts are extended. This makes the absence of proper development and consideration of alternatives increasing freshwater flows through the Delta by reducing exports all the more prejudicial to any kind of meaningful, informed public review. The failure to properly assess climate change impacts here is extremely serious.

The failure to properly evaluate a range of reasonable alternatives violates CEQA. An EIR must "describe a range of reasonable alternatives to the project . . . which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives." 14 Code Cal. Regs (CEQA Guidelines) § 15126.6(a). "[T]he discussion of alternatives shall focus on alternatives to the project or its location which are capable of avoiding or substantially lessening any significant effects of the project, even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly." § 15126.6(b).

Recirculation of a new Draft EIR/EIS will be required by CEQA Guidelines section 15088.5(a) for several reasons including the failure to properly develop and evaluate the required range of reasonable alternatives increasing Delta flows by reducing exports.

In short, the fundamental flaws in the treatment of alternatives and other deficiencies as set forth here and by the NRDC have led to a DEIR "so fundamentally and basically inadequate and conclusory in nature that meaningful public review and comment were precluded." These deficiencies are so serious that we include the text of CEQA guideline section 15088.5(a).[2] Again, recirculation of a new, revised DEIR is required by CEQA.

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[2] § 15088(a) provides:
A lead agency is required to recirculate an EIR when significant new information is added to the EIR after public notice is given of the availability of the draft EIR for public review under Section 15087 but before certification. As used in this section, the term "information" can include changes in the project or environmental setting as well as additional data or other information. New information added to an EIR is not "significant" unless the EIR is changed

DWR IS ALSO VIOLATING THE DELTA REFORM ACT

On May 18, 2016, the Superior Court, County of Sacramento, issued its 73 page ruling in the *Delta Stewardship Council Cases* (Judicial Council Coordination Proceeding No. 4758) that invalidated the Delta Plan adopted by the Delta Stewardship Council pursuant to the Delta Reform Act. The court found the adopted Plan violated the Delta Reform Act because it failed to include quantified or otherwise measurable targets associated with achieving reduced Delta reliance (Ruling p. 12), failed to include quantified or otherwise measurable targets associated with restoring more natural flows (Ruling p. 36), and failed to promote options for water conveyance and storage systems. (Ruling pp. 38, 72).[3]

The Delta Reform Act declared in Water Code § 85086(b):

> It is the intent of the Legislature to establish an accelerated process to determine instream flow needs of the Delta for the purposes of facilitating the planning decisions that are required to achieve the objectives of the Delta Plan.

The Water Quality Control Plan for the San Francisco Bay/San Joaquin -Sacramento Delta Estuary (WQCP) (Water Rights Decision 1641, D-1641) was adopted in 1995, and amended without substantive changes in 2006. The State Water Board is in the process of a periodic update of the WQCP, which is occurring in phases

The Bay-Delta Plan was 15 years out of date when the Delta Reform Act was enacted. The Plan is now 20 years out of date. The Act is being ignored by DWR in its refusal to await updating the Bay-Delta Plan and compliance with the Delta Reform Act before deciding whether to extend the contracts. For DWR, it as if the Delta Reform Act of 2009 was not enacted into law.

The Delta Reform Act (Water Code § 85021) provides that:

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in a way that deprives the public of a meaningful opportunity to comment upon a substantial adverse environmental effect of the project or a feasible way to mitigate or avoid such an effect (including a feasible project alternative) that the project's proponents have declined to implement. “Significant new information” requiring recirculation include, for example, a disclosure showing that:
(1) A new significant environmental impact would result from the project or from a new mitigation measure proposed to be implemented.
(2) A substantial increase in the severity of an environmental impact would result unless mitigation measures are adopted that reduce the impact to a level of insignificance.
(3) A feasible project alternative or mitigation measure considerably different from others previously analyzed would clearly lessen the significant environmental impacts of the project, but the project's proponents decline to adopt it.
(4) The draft EIR was so fundamentally and basically inadequate and conclusory in nature that meaningful public review and comment were precluded.

[3] On June 24, 2016 the court issued its Ruling clarifying its earlier Ruling, by determining: “To be clear, the Delta Plan is invalid and must be set aside until proper revisions are completed."

> The policy of the State of California is to reduce reliance on the Delta in meeting California's future water supply needs through a statewide strategy of investing in improved regional supplies, conservation, and water use efficiency. . . .

Delta Reform Act policies also include (Water Code § 85020 (c):

> Restore the Delta ecosystem, including its fisheries and wildlife, as the heart of a healthy estuary and wetland ecosystem.

CONCLUSION

A new, revised DEIR must be prepared and recirculated for public review and comment correcting the deficiencies identified by the NRDC. Among the necessary revisions is the proper development and consideration of the CEQA required range of reasonable alternatives reducing exports and evaluation of the reduced freshwater runoff and exacerbated adverse impacts of exporting water from the Delta as a result of worsening climate change.

A new, revised DEIR must be prepared and recirculated for public review and comment requiring compliance with the Delta Reform Act and measuring extension of the contracts and those impacts against the requirements of the Delta Reform Act. Instead, DWR is proceeding as if the Delta Reform Act has not become a key part of the law of the State of California applicable to Delta flows and exports from the Delta. This failure also constitutes failure to proceed in the manner required by law.

Sincerely,

E. Robert Wright

E. Robert Wright
Senior Counsel, Friends of the River

BOARD OF DIRECTORS
SANTA CLARA VALLEY WATER DISTRICT

RESOLUTION NO. 18 - 63

MAKING RESPONSIBLE AGENCY FINDINGS PURSUANT TO THE CALIFORNIA ENVIRONMENTAL QUALITY ACT TO USE THE DEPARTMENT OF WATER RESOURCES' FINAL ENVIRONMENTAL IMPACT REPORT FOR THE WATER SUPPLY CONTRACT EXTENSION PROJECT TO AUTHORIZE EXECUTION OF THE CONTRACT AMENDMENT BETWEEN DEPARTMENT OF WATER RESOURCES AND THE SANTA CLARA VALLEY WATER DISTRICT

WHEREAS, the California Department of Water Resources ("DWR") and individual contractors of the State Water Resources Development System Water Supply Contracts ("Water Supply Contracts" or "Contracts") entered into public negotiations to extend the Contracts' terms and the negotiations resulted in an Agreement in Principle Concerning Extension of the State Water Project Supply Contracts; and

WHEREAS, the Water Supply Contract Extension Project ("Project") is proposed by the DWR to extend the terms and modify certain financial provisions of the Contracts; and

WHEREAS, the Project is not considered a "project" as the term is defined in CEQA (Pub. Res. Code §§ 21000, et seq.) and the State CEQA Guidelines (14 CCR §§ 15000, et seq.) because the Project has no potential to result in either a direct or reasonably foreseeable indirect physical change in the environment; and

WHEREAS, nevertheless DWR as the CEQA lead agency conducted CEQA review of the Project through preparation of an Environmental Impact Report and certified a Final Environmental Impact Report (FEIR) for the Project on November 13, 2018; and

WHEREAS, the FEIR concludes that the Project would not result in any physical environmental impacts; and

WHEREAS, the Santa Clara Valley Water District ("District") is a party to a long-term Water Supply Contract with DWR; and

WHEREAS, DWR and the District are proposing to enter into a contract extension amendment to extend the term of and make certain financial and reporting changes to the Water Supply Contract; and

WHEREAS, before approving or authorizing the execution of the contract extension amendment, the District in its limited role as a responsible agency must consider DWR's FEIR and make findings if needed;

NOW, THEREFORE BE IT RESOLVED that the Board of Directors of Santa Clara Valley Water District does hereby find:

1. The Board has considered the environmental impacts of the Project as shown in DWR's FEIR prior to making a decision on the Project.

2. In its independent judgment, the Board finds that the FEIR is adequate for the District's use to authorize execution of the contract extension amendment between DWR and the District.

3. The Chief Executive Officer is authorized and directed, on behalf of the District's Board of Directors, to execute any such documents and to perform any such acts as may be deemed necessary or appropriate to accomplish the intent of this resolution.

PASSED AND ADOPTED by the Board of Directors of Santa Clara Valley Water District by the following vote on December 12, 2018:

AYES: Directors G. Kremen, J. Varela, T. Estremera, N. Hsueh, B. Keegan, R. Santos

NOES: Directors L. LeZotte

ABSENT: Directors None

ABSTAIN: Directors None

SANTA CLARA VALLEY WATER DISTRICT

By Richard P. Santos

RICHARD P. SANTOS
Chair/Board of Directors

ATTEST: MICHELE L. KING, CMC

Michele L. King
Clerk/Board of Directors

5750 Almaden Expressway, San Jose, CA 95118-3614 | (408) 265-2600 | www.valleywater.org

Santa Clara Valley
Water District

December 19, 2018

Mr. Ted Alvarez, P.E.
Department of Water Resources
State Water Project Analysis Office
1416 Ninth Street, P.O. Box 942836
Sacramento, CA 94236-0001

Subject: Amendment No. 24 to Water Supply Contract Between the State of California Department of Water Resources and Santa Clara Valley Water District for Continued Service and the Terms and Conditions Thereof (Extension Amendment).

Reference: SCVWD Agenda 12/12/18, Item 2.3

Dear Mr. Alvarez,

Enclosed please find two originals of the above referenced Amendment Agreement, approved by the Santa Clara Valley Water District Board of Directors during their December 12, 2018, meeting, and executed by the District's Chief Executive Officer Norma Camacho.

Please obtain remaining signatures and return one fully executed original to my attention at the District in the pre-addressed envelope provided herein.

If you have any questions, please feel free to contact me at 408-630-2659 or by email at ndominguez@valleywater.org.

Sincerely,

Natalie F. Dominguez

Natalie F. Dominguez, CMC
Assistant Deputy Clerk II
Office of the Clerk of the Board

Enclosures

cc: Board
Staff

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SCVWD ENACTED COPY
Contract Administration Unit
AGMT: A0052-24 **FILE:** N/A

STATE OF CALIFORNIA
CALIFORNIA NATURAL RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES

AMENDMENT NO. 24 (THE CONTRACT EXTENSION AMENDMENT) TO WATER SUPPLY CONTRACT BETWEEN THE STATE OF CALIFORNIA DEPARTMENT OF WATER RESOURCES AND SANTA CLARA VALLEY WATER DISTRICT FOR CONTINUED SERVICE AND THE TERMS AND CONDITIONS THEREOF

THIS AMENDMENT to the Water Supply Contract is made this 4th day of JANUARY, 2019, pursuant to the provisions of the California Water Resources Development Bond Act, the Central Valley Project Act, and other applicable laws of the State of California, between the State of California, acting by and through its Department of Water Resources, herein referred to as the "State," and Santa Clara Valley Water District, herein referred to as the "District."

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RECITALS

A. The State and the District entered into and subsequently amended a water supply contract (the "contract"), dated November 20, 1961, providing that the State shall supply certain quantities of water to the District and providing that the District shall make certain payments to the State, and setting forth the terms and conditions of such supply and such payments; and

B. Article 2 of the contract provides that the contract shall remain in effect for the longest of the following: (1) the project repayment period, which, as defined in the contract, is to end on December 31, 2035; (2) 75 years from the original date of the contract; and (3) the period ending with the latest maturity date of any bond issue used to finance the construction costs of project facilities; and

C. The longest of the above referenced periods in Article 2 would have ended in this contract on November 20, 2036; and

D. Article 4 of the contract provides that the District, by written notice to the State at least six (6) months prior to the expiration of the term of the contract (as specified in Article 2), may elect to receive continued service under the contract under certain conditions specified therein and under other terms and conditions that are reasonable and mutually agreed upon by the State and the District; and

E. The State, the District and representatives of certain other State Water Project Contractors have negotiated and executed a document (Execution Version dated June 18, 2014), the subject of which is "Agreement in Principle Concerning Extension of the State Water Project Water Supply Contracts" (the "Agreement in Principle"); and

F. The Agreement in Principle describes the terms and conditions of the continued service upon which the State and the District mutually proposed to develop contractual amendments consistent with the Agreement In Principle; and

G. The State, the District and those Contractors intending to be subject to the contract amendments contemplated by the Agreement in Principle subsequently prepared an amendment to their respective contracts to implement the provisions of the Agreement in Principle, and such amendment was named the "Amendment for Continued Service and the Terms and Conditions Thereof"; and

H. The State and the District desire to implement continued service under the contract under the terms and conditions of this Amendment for Continued Service and the Terms and Conditions Thereof to the water supply contract; and

I. The District's execution of this Amendment for Continued Service and the Terms and Conditions Thereof is the equivalent of the District's election under Article 4 to receive continued service under the contract under the conditions provided in Article 4, and the mutually agreed terms and conditions herein are the other reasonable and equitable terms and conditions of continued service referred to in Article 4.

NOW, THEREFORE, IT IS MUTUALLY AGREED that the following changes and additions are hereby made to the District's water supply contract with the State:

AMENDED CONTRACT TEXT

I. ARTICLES 1, 2, 22 THROUGH 29, 50 AND 51 ARE DELETED IN THEIR ENTIRETY AND REPLACED WITH THE FOLLOWING TEXT:

1. DEFINITIONS.

When used in this contract, the following terms shall have the meanings hereinafter set forth:

(a) **"Additional Project Conservation Facilities"** shall mean the following facilities and programs, which will serve the purpose of preventing any reduction in the Minimum Project Yield as hereinafter defined:

(1) Those Project Facilities specified in Section 12938 of the Water Code;

(2) Those facilities and programs described in (A), (B), (C), (D), and (E) below which, in the State's determination, are engineeringly feasible and capable of producing Project Water which is economically competitive with alternative new water supply sources, *provided* that in the State's determination, the construction and operation of such facilities and programs will not interfere with the requested deliveries of Annual Table A Amount to any Contractor other than the sponsoring Contractor, and will not result in any greater annual charges to any Contractor other than the sponsoring Contractor than would have occurred with the construction at the same time of alternative new water supply sources which are either reservoirs located north of the Delta or off-Aqueduct storage reservoirs located south or west of the Delta designed to supply water to the California Aqueduct.

The following facilities and programs shall hereinafter be referred to as "Local Projects":

(A) On-stream and off-stream surface storage reservoirs not provided for in Section 12938 of the Water Code, that will produce Project Water for the System for a period of time agreed to by the sponsoring Contractor;

(B) Groundwater storage facilities that will produce Project Water for the System for a period of time agreed to by the sponsoring Contractor;

(C) Waste water reclamation facilities that will produce Project Water for the System for a period of time agreed to by the sponsoring Contractor;

(D) Water and facilities for delivering water purchased by the State for the System for a period of time agreed to by the sponsoring Contractor; *provided* that the economic test specified herein shall be applied to the cost of these facilities together with the cost of the purchased water; and

(E) Future water conservation programs and facilities that will reduce demands by the sponsoring Contractor for Project Water from the System for a period of time agreed to by the sponsoring Contractor and will thereby have the effect of increasing Project Water available in the Delta for distribution.

(3) Whether a Local Project described in (2) above shall be considered economically competitive shall be determined by the State by comparing, in an engineering and economic analysis, such Local Project with alternative new water supply sources which are either reservoirs located north of the Delta or off-Aqueduct storage reservoirs located south or west of the Delta designed to supply water to the California Aqueduct. The analysis for such alternative new water supply sources shall use the average cost per acre-foot of yield in the latest studies made for such sources by the State and shall compare those facilities with the proposed Local Project using commonly accepted engineering economics. In the case of a Local Project to be funded in part by the State as part of the System and in part from other sources, the economic analysis specified herein shall be applied only to the portion to be funded by the State as part of the System.

(4) The Local Projects in (2) above shall not be constructed or implemented unless or until:

(A) The sponsoring Contractor signs a written agreement with the State which:

(i) Contains the sponsoring Contractor's approval of such facility or program;

(ii) Specifies the yield and the period of time during which the water from the Local Project shall constitute Project Water; and

(iii) Specifies the disposition of such Local Project or of the yield from such Local Project upon the expiration of such period of time.

(B) All Contractors within whose boundaries any portion of such Local Project is located, and who are not sponsoring Contractors for such Local Project give their written approval of such Local Project.

(5) "Sponsoring Contractor" as used in this Article 1(a) shall mean the Contractor or Contractors who either will receive the yield from facilities described in 2(A), (B), (C), or (D) above, or agree to reduce demands for Project Water from the System pursuant to 2(E) above.

(6) In the event of a shortage in water supply within the meaning of Article 18(a), the determination of whether to count, in whole or in part, the yield from facilities described in 2(A), (B), (C), or (D) above, or the reduced demand from future conservation programs described in 2(E) above in the allocation of deficiencies among Contractors will be based on a project-by-project evaluation taking into consideration such factors as any limitation on the use of the water from such facilities and whether the sponsoring Contractor has access to Project Water from the Delta as an alternate to such facilities.

(b) **"Agricultural Use"** shall mean any use of water primarily in the production of plant crops or livestock for market, including any use incidental thereto for domestic or stock-watering purposes.

(c) **"Annual Table A Amount"** shall mean the amount of Project Water set forth in Table A of this Contract that the State, pursuant to the obligations of this contract and applicable law, makes available for delivery to the District at the delivery structures provided for the District. The term Annual Table A Amount shall not be interpreted to mean that in each year the State will be able to make that quantity of Project Water available to the District. The Annual Table A Amounts and the terms of this contract reflect an expectation that under certain conditions only a lesser amount, allocated in accordance with this contract, may be made available to the District. This recognition that full Annual Table A Amounts will not be deliverable under all conditions does not change the obligations of the State under this contract, including but not limited to, the obligations to make all reasonable efforts to complete the Project Facilities, to perfect and protect water rights, and to allocate among Contractors the supply available in any year, as set forth in Articles 6(b), 6(c), 16(b) and 18, in the manner and subject to the terms and conditions of those articles and this contract. Where the term "annual entitlement" appears elsewhere in this contract, it shall mean "Annual Table A Amount." The State agrees that in future amendments to this and other Contractor's contracts, in lieu of the term "annual entitlement," the term "Annual Table A

Amount" will be used and will have the same meaning as "annual entitlement" wherever that term is used.

(d) **"Area of Origin Statutes"** shall mean Sections 10505 and 11460 through 11463 of the Water Code as now existing or hereafter amended.

(e) **"Article 51(e) Amounts"** shall mean the annual amounts determined pursuant to Article 51(e)(1).

(f) **"Billing Transition Date"** shall mean January 1 of the first calendar year starting at least six (6) months after the Contract Extension Amendment Effective Date.

(g) **"Burns-Porter Bond Act"** shall mean the California Water Resources Development Bond Act, comprising Chapter 8, commencing at Section 12930, of Part 6 of Division 6 of the Water Code, as enacted in Chapter 1762 of the Statutes of 1959.

(h) **"Capital Costs"** shall mean all costs Incurred subsequent to authorization of a facility for construction by the Legislature or by administrative action pursuant to Section 11290 of the Water Code and to the Burns-Porter Bond Act, including those so Incurred prior to the beginning of the Project Repayment Period as herein defined and any accrued unpaid interest charges thereon at the rates specified herein, which are properly chargeable to the construction of and the furnishing of equipment for the facilities of the System, including the costs of surveys, engineering studies, exploratory work, designs, preparation of construction plans and specifications, acquisition of lands, easements and rights-of-way, and relocation work, all as shown upon the official records of the Department of Water Resources.

(i) **"Carry-over Table A Water"** shall mean water from a Contractor's Annual Table A Amount for a respective year, which is made available for delivery by the State in the next year pursuant to Article 12(e).

(j) **"Central Valley Project Act"** shall mean the Central Valley Act comprising Part 3, commencing at Section 11100, of Division 6 of the Water Code.

(k) **"Contract Extension Amendment"** shall mean the substantially similar amendments to the Contractors' Water Supply Contracts that include, among other things, an extension of the term of the contract to December 31, 2085.

(l) **"Contract Extension Amendment Effective Date"** shall mean the date on which the Contract Extension Amendment becomes effective with regard to this contract. The State shall provide a written notice to the District specifying the Contract Extension Amendment Effective Date once the applicable conditions set out in the Contract Extension Amendment have been met.

(m) **"Contractor"** shall mean any entity that has executed, or is an assignee of, a contract of the type published in Department of Water Resources Bulletin No. 141, dated November 1965, with the State for a dependable supply of water made available by the System, except such water as is made available by the facilities specified in Section 12934(d)(6) of the Water Code, as such contracts have been amended from time to time.

(n) **"Delta"** shall mean the Sacramento-San Joaquin Delta as defined in Section 12220 of the Water Code on the date of approval of the Burns-Porter Bond Act by the voters of the State of California.

(o) **"East Branch Aqueduct"** shall mean that portion of the San Joaquin Valley-Southern California Aqueduct specified in Section 12934(d)(2) of the Water Code extending from the South Portal of the Tehachapi Tunnels to a terminus in the vicinity of Perris, Riverside County.

(p) **"Economic Useful Life"** shall mean the period during which the State expects to derive economic benefit from using an asset, as determined by the State.

(q) **"Financial Information System"** shall mean the system of record designated by the State as the authoritative source for the recording of all financial data values relating to the System.

(r) **"Financing Costs"** shall mean the following:

(1) principal of and interest on Revenue Bonds,

(2) debt service coverage required by the applicable bond resolution or indenture in relation to such principal and interest,

(3) deposits to reserves required by the bond resolution or indenture in relation to such Revenue Bonds, and

(4) premiums for insurance or other security obtained in relation to such Revenue Bonds.

(s) **"Incurred"** shall mean the following with respect to the timing of a cost:

(1) Capital Costs and operation, maintenance, and power costs allocated irrespective of the amount of Project Water delivered to the Contractors are "Incurred" when the expenditure for the good, service or other consideration is recorded in the State's financial information system, regardless of the date the good, service or other consideration is provided; and

(2) operation, maintenance, and power costs allocated in an amount which is dependent upon and varies with the amount of Project Water delivered to the Contractors are "Incurred" when the good, service or other consideration is provided, regardless of when the expenditure for the good, service or other

consideration is recorded in the financial information system.

(t) **"Initial Project Conservation Facilities"** shall mean the following Project Facilities specified in Section 12934(d) of the Water Code:

(1) All those facilities specified in subparagraph (1) thereof.

(2) Those facilities specified in subparagraph (3) thereof to the extent that they serve the purposes of water conservation in the Delta, water supply in the Delta, and transfer of water across the Delta.

(3) A reservoir near Los Banos in Merced County as specified in subparagraph (2) thereof.

(4) The reach of the San Joaquin Valley-Southern California Aqueduct extending from the Delta to a reservoir near Los Banos in Merced County, to the extent required for water conservation through conveyance of water diverted from the Delta to offstream storage in such reservoir as determined by the State.

(5) Those facilities specified in subparagraph (5) thereof which are incidental to the facilities included under (1), (2), (3), and (4) above.

(6) Those facilities specified in subparagraph (7) thereof which are necessary and appurtenant to the facilities included under (1), (2), (3), (4), and (5) above.

(u) **"Interruptible Water"** shall mean Project Water available as determined by the State that is not needed for fulfilling Contractors' Annual Table A Amount deliveries as set forth in their water delivery schedules furnished pursuant to Article 12 or for meeting project operational requirements, including storage goals for the current or following years.

(v) **"Manufacturing Use"** shall mean any use of water primarily in the production of finished goods for market.

(w) **"Maximum Annual Table A Amount"** shall mean the maximum annual amount set forth in Table A of this contract, and where the term "maximum annual entitlement" appears elsewhere in this contract it shall mean "Maximum Annual Table A Amount."

(x) **"Minimum Project Yield"** shall mean the dependable annual supply of project water to be made available assuming completion of the initial project conservation facilities and additional project conservation facilities. The project's capability of providing the Minimum Project Yield shall be determined by the State on the basis of coordinated operations studies of initial project conservation facilities and additional project conservation facilities, which studies shall be based upon factors including but not limited to:

(1) the estimated relative proportion of deliveries for agricultural use to deliveries for municipal use assuming Maximum Annual Table A Amounts for all Contractors and the characteristic distributions of demands for these two uses throughout the year; and

(2) agreements now in effect or as hereafter amended or supplemented between the State and the United States and others regarding the division of utilization of waters of the Delta or streams tributary thereto.

(y) **"Monterey Amendment"** shall mean the substantially similar amendments to Contractors' Water Supply Contracts that included, among other provisions, the addition of Articles 51 through 56.

(z) **"Municipal Use"** shall mean all those uses of water common to the municipal water supply of a city, town, or other similar population group, including uses for domestic purposes, uses for the purposes of commerce, trade or industry, and any other use incidental thereto for any beneficial purpose.

(aa) **"Nonproject Water"** shall mean water made available for delivery to Contractors that is not Project Water as defined in Article 1(ah).

(ab) **"Project Facilities"** shall mean those facilities of the System which will, in whole or in part, serve the purposes of this contract by conserving water and making it available for use in and above the Delta and for export from the Delta and from such additional facilities as are defined in Article 1(a)(2), and by conveying water to the District. Such Project Facilities shall consist specifically of "Project Conservation Facilities" and "Project Transportation Facilities", as hereinafter defined.

(ac) **"Project Conservation Facilities"** shall mean such Project Facilities as are presently included, or as may be added in the future, under 1(a) and 1(t).

(ad) **"Project Interest Rate"** shall mean the following:

(1) Prior to the Billing Transition Date, the weighted average interest rate on bonds, advances, or loans listed in this section to the extent the proceeds of any such bonds, advances, or loans are for construction of the State Water Facilities defined in Section 12934(d) of the Water Code, the additional project conservation facilities, and the supplemental conservation facilities (except off-aqueduct power facilities; water system facilities; advances for delivery structures, measuring devices and excess capacity; and East Branch Enlargement Facilities). The Project Interest Rate shall be calculated as a decimal fraction to five places by dividing (i) the total interest cost required to be paid or credited by the State during the life of the indebtedness or advance by (ii) the total

of the products of the various principal amounts and the respective terms in years of all such amounts. The bonds, advances, or loans used in calculating the project interest rate shall be:

(A) General obligation bonds issued by the State under the Bond Act, except that any premium received on the sale of these bonds shall not be included in the calculation of the project interest rate,

(B) Revenue Bonds issued after May 1, 1969,

(C) Bonds issued by the State under any other authority granted by the Legislature or the voters,

(D) Bonds issued by any agency, district, political subdivision, public corporation, or nonprofit corporation of this State,

(E) Funds advanced by any Contractor without the actual incurring of bonded debt therefore, for which the net interest cost and terms shall be those which would have resulted if the Contractor had sold bonds for the purpose of funding the advance, as determined by the State,

(F) Funds borrowed from the General Fund or other funds in the Treasury of the State of California, for which the total interest cost shall be computed at the interest rate earned over the period of such borrowing by moneys in the Surplus Money Investment Fund of such Treasury invested in securities, and

(G) Any other financing capability available in the Treasury of the State of California at whatever interest rate and other financing costs are provided in the law authorizing such borrowing. However, the use of other financing from the State Treasury is intended to involve only short term borrowing at interest rates and other financing costs no greater than those charged to other State agencies during the same period until such time as the Department can sell bonds and reimburse the source of the short term borrowing from the proceeds of the bond sale.

(2) On and after the Billing Transition Date, the Project Interest Rate shall be four and six hundred and ten thousandths percent (4.610%) per annum.

(ae) **"Project Repayment Period"** shall mean that period of years commencing on January 1, 1961, and extending until December 31, 2035.

(af) **"Project Revenues"** shall mean revenues derived from the service of Project Water to Contractors and others, and from the sale or other disposal of electrical energy generated in connection with operation of Project Facilities.

(ag) **"Project Transportation Facilities"** shall mean the following Project Facilities:

(1) All those facilities specified in subparagraph (2) of Section 12934(d) of the Water Code except: The reservoir near Los Banos in Merced County; the reach of the San Joaquin Valley-Southern California Aqueduct extending from the Delta to the reservoir near Los Banos in Merced County, to the extent required for water conservation as determined by the State; the North Bay Aqueduct extending to a terminal reservoir in Marin County; the South Bay Aqueduct extending to terminal reservoirs in the Counties of Alameda and Santa Clara; the Pacheco Pass Tunnel Aqueduct extending from a reservoir near Los Banos in Merced County to a terminus in Pacheco Creek in Santa Clara County; and the Coastal Aqueduct beginning on the San Joaquin Valley-Southern California Aqueduct in the vicinity of Avenal, Kings County, and extending to a terminus at the Santa Maria River.

(2) Facilities for the generation and transmission of electrical energy of the following types:

(A) Hydroelectric generating and transmission facilities, whose operation is dependent on the transportation of Project Water, or on releases to channels downstream of Project Facilities defined under (1) above. Such facilities shall be called "project aqueduct power recovery plants", and

(B) All other generating and associated transmission facilities, except those dependent on water from Project Conservation Facilities, for the generation of power. These facilities shall be called "off-aqueduct power facilities" and shall consist of the State's interest in the Reid-Gardner and any other generating and associated transmission facilities, constructed or financed in whole or in part by the State, which are economically competitive with alternative power supply sources as determined by the State.

(3) Those facilities specified in subparagraph (7) of Section 12934(d) of the Water Code which are necessary and appurtenant to the facilities included under (1) and (2) above.

(ah) **"Project Water"** shall mean water made available for delivery to the Contractors by the Project Conservation Facilities and the Project Transportation Facilities included in the System.

(ai) **"Revenue Bonds"** shall mean the following types of instruments payable from the sources provided in the Central Valley Project Act: revenue bonds, notes, refunding bonds, refunding notes, bond anticipation notes, certificates of indebtedness, and other evidences of indebtedness.

(aj) **"Subject to Approval by the State"** shall mean subject to the determination and judgment of the State as to acceptability.

(ak) **"Supplemental Conservation Facilities"** shall mean those facilities provided for in Section 12938 of the Water Code which will serve the purpose of supplying water in addition to the Minimum Project Yield and for meeting local needs.

(al) **"Supplemental Water"** shall mean water made available by Supplemental Conservation Facilities, in excess of the Minimum Project Yield.

(am) **"System"** shall mean the State Water Resources Development System as defined in Section 12931 of the Water Code.

(an) **"System Revenue Account"** shall mean the special account created pursuant to Water Code Section 12937(b) into which are deposited all revenues derived from the sale, delivery or use of water or power and all other income or revenue, derived by the State, from the System, with the exception of revenue attributable to facilities financed with revenue bonds issued pursuant to the Central Valley Project Act (Water Code Section 11100 et seq.).

(ao) **"Water Supply Contract"** shall mean one of the contracts described in the definition of Contractor in Article 1(m).

(ap) **"Water System Facilities"** shall mean the following facilities to the extent that they are financed with Revenue Bonds or to the extent that other financing of such facilities is reimbursed with proceeds from Water System Facility Revenue Bonds:

(1) The North Bay Aqueduct,

(2) The Coastal Branch Aqueduct,

(3) Delta Facilities, including Suisun Marsh facilities, to serve the purposes of water conservation in the Delta, water supply in the Delta, transfer of water across the Delta, and mitigation of the environmental effects of Project Facilities, and to the extent presently authorized as project purposes, recreation and fish and wildlife enhancement,

(4) Local projects as defined in Article 1(a)(2) designed to develop no more than 25,000 acre-feet of project yield from each project,

(5) Land acquisition prior to December 31, 1995, for the Kern Fan Element of the Kern Water Bank,

(6) Additional pumps at the Banks Delta Pumping Plant,

(7) The transmission line from Midway to Wheeler Ridge Pumping Plant,

(8) Repairs, additions, and betterments to Project Facilities,

(9) A Project Facilities corporation yard,

(10) A Project Facilities operation center, and

(11) Capital projects which are approved in writing by the State and eighty (80) percent of the affected Contractors as "Water System Facilities", *provided* that the approving Contractors' Table A amounts exceed eighty (80) percent of the Table A amounts representing all affected Contractors and *provided further* that "affected Contractors" for purposes of this subdivision (11) shall mean those Contractors which would be obligated to pay a share of the debt service on Revenue Bonds issued to finance such project.

(aq) **"Water System Facility Revenue Bonds"** shall mean Revenue Bonds issued after January 1, 1987 for Water System Facilities identified in Article 1(ap).

(ar) **"West Branch Aqueduct"** shall mean that portion of the San Joaquin Valley-Southern California Aqueduct specified in Section 12934(d)(2) of the Water Code extending from the South Portal of the Tehachapi Tunnels to a terminus in the vicinity of Newhall, Los Angeles County.

(as) **"Year"** shall mean the 12-month period from January 1 through December 31, both dates inclusive.

(at) **"Year of Initial Water Delivery"** shall mean the year when Project Water will first be available for delivery to a Contractor pursuant to its contract with the State.

2. TERM OF CONTRACT.

This contract shall become effective on the date first above written and shall remain in effect for the longer of the following:

1. December 31, 2085, or

2. The period ending with the latest maturity date of any bond issue used to finance the construction costs of Project Facilities.

22. DELTA WATER CHARGE

The payments to be made by each Contractor shall include an annual charge designated as the Delta Water Charge, which shall be separately calculated and stated for costs Incurred prior to the Billing Transition Date and costs Incurred on or after the Billing Transition Date.

(a) **Delta Water Charge for Costs Incurred Prior to the Billing Transition Date**. The provisions of this subdivision (a) shall apply only to costs Incurred prior to the Billing Transition Date.

(1) *Recovery of Costs of Project Conservation Facilities*. The Delta Water Charge for costs Incurred prior to the Billing Transition Date, together with the total revenues derived prior to the Billing Transition Date from the sale or other disposal of electrical energy generated in connection with operation of Project Conservation Facilities, shall return to the State during the Project Repayment Period all costs of the Project Conservation Facilities Incurred prior to the Billing Transition Date, including capital, operation, maintenance, power, and replacement costs, which are allocated to the purpose of water conservation in, above, and below the Delta pursuant to subdivisions (c)(1) through (c)(3) of this article.

(2) *Components of Charge.* For each Contractor receiving Project Water in any year through December 31, 1969, the Delta Water Charge shall be the product of $3.50 and the Contractor's Annual Table A Amount for the respective year. For each Contractor receiving Project Water in the year 1970, the Delta Water Charge shall be the product of $6.65 and the Contractor's Annual Table A Amount for that year. The $6.65 rate for the year 1970 shall consist of a capital component of $5.04 and a minimum operation, maintenance, power and replacement component of $1.61. For each Contractor receiving Project Water in the year 1971, the Delta Water Charge shall be the product of $7.24 and the Contractor's Annual Table A Amount for that year. The $7.24 rate for the year 1971 shall consist of a capital component of $5.44 and a minimum operation, maintenance, power and replacement component of $1.80.

After December 31, 1971, the Delta Water Charge for costs Incurred prior to the Billing Transition Date shall consist and be the sum of the following components as these are computed in accordance with subdivisions (a)(3) and (a)(4) of this article: a capital component; a minimum operation, maintenance, power and replacement component; and a variable operation, maintenance, power and replacement component.

(3) *Charge Components Expressed as Rates*. The Capital Cost, the minimum operation, maintenance, power, and replacement, and the variable operation, maintenance, power, and replacement components of the Delta Water

Charge for costs Incurred prior to the Billing Transition Date, together with that portion of the revenues derived prior to the Billing Transition Date from the sale or other disposal of electrical energy generated in connection with operation of Project Conservation Facilities which is allocated by the State to repayment of the respective category of costs, shall return to the State during the Project Repayment Period, respectively, the following categories of the costs allocated to the purpose of water conservation in, above, and below the Delta pursuant to subdivisions (c)(1) through (c)(3) of this article:

(A) Capital Costs;

(B) operation, maintenance, power, and replacement costs Incurred irrespective of the amount of Project Water delivered to the Contractors; and

(C) operation, maintenance, power, and replacement costs Incurred in an amount which is dependent upon and varies with the amount of Project Water delivered to the Contractors;

provided that each of the above categories of costs shall be inclusive of the appropriate costs properly chargeable to the generation and transmission of electrical energy in connection with operation of Project Conservation Facilities. Each component of the Delta Water Charge for costs Incurred prior to the Billing Transition Date shall be computed on the basis of a rate which, when charged during the Project Repayment Period for each acre-foot of the sum of the yearly totals of Annual Table A Amounts of all Contractors, will be sufficient, together with that portion of the revenues derived prior to the Billing Transition Date from the sale or other disposal of electrical energy generated in connection with operation of Project Conservation Facilities which is allocated by the State to repayment of the respective category of costs, to return to the State during the Project Repayment Period all costs included in the respective category of costs covered by that component. Each such rate shall be computed in accordance with the following formula:

$$\frac{(c_1 - r_1)(1+i)^{-1} + (c_2 - r_2)(1+i)^{-2} + \cdots + (c_n - r_n)(1+i)^{-n}}{e_1(1+i)^{-1} + e_2(1+i)^{-2} + \cdots + e_n(1+i)^{-n}}$$

Where:

i = The Project Interest Rate.

c = The total costs included in the respective category of costs and Incurred during the respective year of the Project Repayment Period (prior to the Billing Transition Date).

r = That portion of the revenues derived from the sale or other disposal of electrical energy allocated by the State to repayment of the costs included in the respective category and Incurred during the respective year of the Project Repayment Period (prior to the Billing Transition Date).

1, 2, and n appearing below c and r = The respective year of the Project Repayment Period during which the costs included in the respective category are Incurred, n being the last year of the Project Repayment Period.

e = With respect to the Capital Cost and minimum operation, maintenance, power, and replacement components, the total of Annual Table A Amounts of all Contractors for the respective year of the Project Repayment Period.

e = With respect to the variable operation, maintenance, power, and replacement component, the total of the amounts of Project Water delivered to all Contractors for the respective year of the expired portion of the Project Repayment Period, together with the total of Annual Table A Amounts of all Contractors for the respective year of the unexpired portion of the Project Repayment Period.

1, 2, and n appearing below e = The respective year of the Project Repayment Period in which the Annual Table A Amounts or Project Water deliveries occur, n being the last year of the Project Repayment Period.

n used as an exponent = The number of years in the Project Repayment Period.

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(4) *Determination of Charge Components.* The Capital Cost and minimum operation, maintenance, power, and replacement components of the Delta Water Charge for costs Incurred prior to the Billing Transition Date shall be the product of the appropriate rate computed under subdivision (a)(3) of this article and the Contractor's Annual Table A Amount for the respective year. The

variable operation, maintenance, and power component of the charge shall be the product of the appropriate rate computed under subdivision (a)(3) of this article and the number of acre-feet of Project Water delivered to the Contractor during the respective year; *provided*, that when Project Water has been requested by a Contractor and delivery thereof has been commenced by the State, and, through no fault of the State, such water is wasted as a result of failure or refusal by the Contractor to accept delivery thereof, such variable component during such period shall be the product of such rate per acre-foot and the sum of the number of acre-feet of Project Water delivered to the Contractor and the number of acre-feet wasted.

(5) *Redetermination of Rates.* The rates to be used in determining the components of the Delta Water Charge pursuant to subdivision (a)(4) of this article and to become effective on January 1, 1970, shall be computed by the State in accordance with subdivision (a)(3) of this article prior to that date. Such computation shall include an adjustment which shall account for the difference, if any, between revenues received by the State under the Delta Water Charge prior to January 1, 1970, and revenues which would have been received under the charge prior to that date had it been computed and charged in accordance with subdivisions (a)(3) and (4) of this article. Upon such computation, a document establishing such rates shall be prepared by the State and attached to this contract as an amendment of this article. The State shall recompute such rates each year thereafter, and each such recomputation shall take account of and reflect increases or decreases from year to year in projected costs, outstanding reimbursable indebtedness of the State Incurred to construct the Project Conservation Facilities described in subdivisions (c)(1) through (c)(3) of this article, Annual Table A Amounts, deliveries of Project Water, Project Interest Rate, revenues from the sale or other disposal of electrical energy, and all other factors which are determinative of such rates. In addition, each such recomputation shall include an adjustment of the rates for succeeding years which shall account for the differences, if any, between projections of costs used by the State in determining such rates for all preceding years, and actual costs Incurred by the State during such years. Upon each such recomputation, an appropriately revised copy of the document establishing such rates shall be prepared by the State and attached to this contract as an amendment of this article.

(6) *Water System Facility Revenue Bond Charges.* Notwithstanding provisions of Article 22(a)(1) through (5), the capital and the minimum operation, maintenance, power and replacement component of the Delta Water Charge for costs Incurred prior to the Billing Transition Date shall include an annual charge to recover the District's share of the portion of the Water System Facility Revenue Bond Financing Costs allocable to Project Conservation Facilities for Capital Costs Incurred prior to the Billing Transition Date. Charges to the District for these costs shall be calculated in accordance with Article 50(a).

(b) **Delta Water Charge for Costs Incurred On or After the Billing Transition Date**. The provisions of this subdivision (b) of this article shall apply only to costs Incurred on or after the Billing Transition Date.

(1) *Components of the Delta Water Charge for Costs Incurred On or After the Billing Transition Date.* The Delta Water Charge for costs Incurred on or after the Billing Transition Date shall consist of the following components as these are computed in accordance with subdivisions (b)(2) through (b)(4) of this article:

(A) Capital component,

(B) Minimum operation, maintenance, power, and replacement component, and

(C) Variable operation, maintenance, and power component.

(2) *Determination of Charge Components.* These three components of the Delta Water Charge for each calendar year, together with that portion of the revenues derived during such calendar year from the sale or other disposal of electrical energy generated in connection with operation of Project Conservation Facilities which is allocated by the State to repayment of the respective category of costs, shall return to the State during such calendar year the following categories, respectively, of the costs allocated pursuant to subdivisions (c)(1) through (c)(3) of this article to the purpose of water conservation in, above, and below the Delta.

(A) the capital component consisting of Capital Costs of Project Conservation Facilities to be recovered during such calendar year as and to the extent provided in subdivision (b)(3) of this article,

(B) the minimum operation, maintenance, power, and replacement component consisting of operation, maintenance, power, replacement costs of Project Conservation Facilities Incurred during such calendar year irrespective of the amount of Project Water delivered to the Contractors, and

(C) the variable operation, maintenance, and power component consisting of operation, maintenance, and power costs of Project Conservation Facilities Incurred during such calendar year in an amount which is dependent upon and varies with the amount of Project Water delivered to the Contractors;

provided that each of the above categories of costs shall be inclusive of the appropriate costs properly chargeable to the generation and transmission of electrical energy in connection with operation of Project Conservation Facilities; and *provided further* that revenues generated in connection with the sale or other disposal of electrical energy generated in connection with operation of Project Conservation Facilities shall not reduce or be credited against charges pursuant to subdivision (b)(3)(D)(i) of this article (charges for Water System Facility Revenue Bond Financing Costs).

(3) *Categories of Capital Costs.*

(A) The amount of the capital component of the Delta Water Charge shall be determined in three steps as follows:

(i) first, an allocation to the District of Capital Costs of Project Conservation Facilities as provided in subdivisions (c)(1) through (c)(3) of this article,

(ii) second, a determination of the type and source of payment of each Capital Cost in accordance with subdivision (b)(3)(B) of this article, and

(iii) third, a computation of the annual payment to be made by the District as provided in subdivision (b)(3)(C) and (b)(3)(D) of this article.

(B) Annual Capital Costs of Project Conservation Facilities shall be divided into five categories of type and source of payment:

(i) Project Conservation Facility Capital Costs paid with the proceeds of Water System Facility Revenue Bonds,

(ii) Project Conservation Facility Capital Costs to be paid with the proceeds of Bonds issued under the Burns-Porter Bond Act,

(iii) Project Conservation Facility Capital Costs to be paid with amounts in the SWRDS Reinvestment Account,

(iv) Project Conservation Facility Capital Costs to be paid annually for assets that will have a short Economic Useful Life or the costs of which are not substantial, and

(v) Project Conservation Facility Capital Costs prepaid by the District.

(C) The projected amounts of Project Conservation Facility Capital Costs in each such category to be allocated annually to the District shall be determined by the State in accordance with the cost allocation principles and procedures set forth in subdivision (c)(1) through (c)(3) and (b)(6) of this article, which principles and procedures shall be controlling as to allocations of Capital Costs to the District; *provided* that these amounts shall be subject to redetermination by the State in accordance with Article 28. Such projected amounts will be set forth in Table B by the State.

TABLE B
PROJECTED ALLOCATIONS TO SANTA CLARA VALLEY WATER DISTRICT OF PROJECT CONSERVATION FACILITY CAPITAL COSTS INCURRED ON OR AFTER THE BILLING TRANSITION DATE

	Projected Allocations in Thousands of Dollars				
Year	**Costs to be Paid with Proceeds of Water System Facility Revenue Bonds**	**Costs to be Paid with the Proceeds of Bonds issued under the Burns-Porter Bond Act**	**Costs to be Paid with Amounts in the SWRDS Reinvest-ment Account**	**Costs to be Paid Annually for Assets That Will Have a Short Economic Useful Life or the Costs of which are Not Substantial**	**Costs Prepaid by the District**
1*					
2					
3					

* Year commencing with the Billing Transition Date.

(D) The annual amount to be paid by the District under the capital component of the Delta Water Charge for each calendar year for costs Incurred on or after the Billing Transition Date shall consist of the following categories:

(i) Water System Facility Revenue Bonds: a charge determined in accordance with Article 50(b) to recover Water System Facility Revenue Bond Financing Costs Incurred during such calendar year that relate to the financing of Project Conservation Facilities,

(ii) Burns-Porter Act Bonds: a charge to recover the amount to be paid by the State of California during such calendar year in accordance with the Burns-Porter Bond Act for the principal of and interest on bonds issued under the Burns-Porter Bond Act on or after the Billing Transition Date for Project Conservation Facility Capital Costs,

(iii) SWRDS Reinvestment Account: a charge determined in accordance with subdivision (b)(5) of Article 61 to amortize Project Conservation Facility Capital Costs Incurred during prior calendar years (but not prior to the Billing Transition Date) that have been paid with amounts from the SWRDS Reinvestment Account, and

(iv) Capital Assets with Short Economic Life or Costs of which are Not Substantial: a charge to recover the Capital Costs to be Incurred during such calendar year of Project Conservation Facility assets with a short Economic Useful Life or the costs of which are not substantial as determined by the State and any such Capital Costs Incurred but not charged in the prior two calendar years.

(E) The projected amounts of each category of charges to be paid annually by the District under this capital component shall be determined by the State in accordance with the cost allocation principles and procedures set forth in this subdivision (b), which principles and procedures shall be controlling as to allocations of types of capital component charges to the District; *provided* that these amounts shall be subject to redetermination by the State in accordance with Article 28. Such amounts are projected to be as set forth in Table C by the State.

TABLE C
PROJECTED CHARGES TO SANTA CLARA VALLEY WATER DISTRICT UNDER THE CAPITAL COMPONENT OF THE DELTA WATER CHARGE FOR COSTS INCURRED ON OR AFTER THE BILLING TRANSITION DATE

Year	Projected Charges in Thousands of Dollars			
	Costs to be Paid with Proceeds of Water System Facility Revenue Bonds	**Costs to be Paid with the Proceeds of Bonds issued under the Burns-Porter Bond Act**	**Costs to be Paid with Amounts in the SWRDS Reinvestment Account**	**Costs to be Paid Annually for Assets That Will Have a Short Economic Useful Life or the Costs of which are Not Substantial**
1				
2				
3				

* Year commencing with the Billing Transition Date.

(4) *Minimum Operation, Maintenance, Power and Replacement Charge – Determination; Repayment Table.*

The amount to be paid each year by the District under the minimum operation, maintenance, power, and replacement component of the Delta Water Charge shall be determined by the State in accordance with the cost allocation principles and procedures set forth in subdivision (b)(6)(A) of this article; *provided* that these amounts shall be subject to redetermination by the State in accordance with Article 28. Such amounts are projected to be as set forth in Table D by the State.

TABLE D
DELTA WATER CHARGE -- ESTIMATED MINIMUM OPERATION, MAINTENANCE, POWER AND REPLACEMENT COMPONENT FOR COSTS INCURRED ON OR AFTER THE BILLING TRANSITION DATE
SANTA CLARA VALLEY WATER DISTRICT

Year	Total Annual Payment by District
1*	
2	
3	
4	

* Year commencing with the Billing Transition Date.

(5) *Variable Operation, Maintenance and Power Charge–Determination; Repayment Table.*

The amount to be paid each year by the District under the variable operation, maintenance and power component of the Delta Water Charge shall be determined by the State in accordance with the cost allocation principles and procedures set forth in subdivision (b)(6)(B) of this article; *provided* that these amounts shall be subject to redetermination by the State in accordance with Article 28. Such amounts are projected to be as set forth in Table E by the State.

TABLE E
DELTA WATER CHARGE -- ESTIMATED VARIABLE OPERATION, MAINTENANCE AND POWER COMPONENT FOR COSTS INCURRED ON OR AFTER THE BILLING TRANSITION DATE
SANTA CLARA VALLEY WATER DISTRICT

Year	Total Annual Payment by District
1*	
2	
3	
4	

* Year commencing with the Billing Transition Date.

(6) *Allocation of Charges to the District.*

(A) The capital and minimum operation, maintenance, and power components of the Delta Water Charge for each calendar year for costs Incurred on or after the Billing Transition Date shall be allocated to the District in proportion to the ratio of the District's Annual Table A Amount for such calendar year to the total of the Annual Table A Amounts for all Contractors for such calendar year.

(B) The variable operation, maintenance, and power component of the Delta Water Charge for each calendar year for costs Incurred on or after the Billing Transition Date shall be allocated to the District in proportion to the ratio of the number of acre-feet of Project Water delivered to the District during such calendar year to the number of acre-feet of Project Water delivered to all Contractors during such calendar year; *provided* that when Project Water has been requested by a Contractor and delivery thereof has been commenced by the State, and, through no fault of the State, such water is wasted as a result of failure or refusal by the Contractor to accept delivery thereof, such variable component during such period shall be calculated as if the number of acre-feet wasted had been delivered.

(7) *Delta Water Charge -- Repayment Schedule.*

The amounts to be paid by the District for each year on or after the Billing Transition Date under the Capital Cost component, minimum operation, maintenance, power and replacement component and the variable operation, maintenance, and power component of the Delta Water Charge shall be set forth by the State in Table F, which Table F shall constitute a summation of Tables C, D, and E; *provided* that each of the amounts set forth in Table F shall be subject to redetermination by the State in accordance with Article 28; *provided further* that the principles and procedures set forth in this Article 22 shall be controlling as to such amounts. Such amounts shall be paid by the District in accordance with the provisions of Article 29.

TABLE F
REPAYMENT SCHEDULE -- DELTA WATER CHARGE FOR COSTS INCURRED ON OR AFTER THE BILLING TRANSITION DATE
SANTA CLARA VALLEY WATER DISTRICT

Year	Capital Cost Component	Minimum Component	Variable Component	Total
1*				
2				
3				
4				

* Year commencing with the Billing Transition Date.

(c) **Provisions Applicable to the Delta Water Charge for Costs Incurred Both Before and On or After the Billing Transition Date**. The provisions of this subdivision (c) shall be applicable to costs Incurred both prior to and on or after the Billing Transition Date.

(1) *Allocation of Costs to Project Purposes.*

(A) Prior to the time that Additional Project Conservation Facilities or Supplemental Conservation Facilities are constructed, the Delta Water Charge shall be determined on the basis of an allocation to project purposes, by the separable cost-remaining benefits method, of all actual and projected costs of all those Initial Project Conservation Facilities located in and above the Delta, and upon an allocation to the purposes of water conservation and water transportation, by the proportionate use of facilities method, of all actual and projected costs of the following Project Facilities located below the Delta: The aqueduct intake facilities at the Delta, Pumping Plant I (Harvey O. Banks Delta Pumping Plant), the aqueduct from the Delta to San Luis Forebay (O'Neill Forebay), San Luis Forebay (O'Neill Forebay), and San Luis Reservoir: *provided,* that all of the actual and projected costs properly chargeable to the generation and transmission of electrical energy in connection with operation of Project Conservation Facilities shall be allocated to the purpose of water conservation in, above, and below the Delta; *provided further*, that allocations to purposes the cost of which are to be paid by the United States shall be as determined by the United States.

(B) Wherever reference is made, in connection with the computation, determination, or payment of the Delta Water Charge, to the costs of any facility or facilities included in the System, such reference shall be only to those costs of such facility or facilities that are reimbursable by the Contractors as determined by the State.

(C) The State, in fixing and establishing prices, rates, and charges for water and power, shall include as a reimbursable cost of any state water project an amount sufficient to repay all costs incurred by the State, directly or by contract with other agencies, for the preservation of fish and wildlife and determined to be allocable to the costs of the project works constructed for the development of that water and power, or either. Costs incurred for the enhancement of fish and wildlife or for the development of public recreation shall not be included in the prices, rates, and charges for water and power, and shall be nonreimbursable costs. Such recreational purposes include, but are not limited to, those recreational pursuits generally associated with the out-of-doors, such as camping, picnicking, fishing, hunting, water contact sports, boating, and sightseeing, and the associated facilities of campgrounds, picnic areas, water and sanitary facilities, parking areas, viewpoints, boat launching ramps, and any others necessary to make project land and water areas available for use by the public. In administering this Contract "development of public recreation" shall include recreation capital and operation and maintenance.

(2) *Additional Conservation Facilities.* Commencing in the year in which the State first awards a major construction contract for construction of a major feature of Additional Project Conservation Facilities, or first commences payments under a contract with a federal agency in the event a major feature of Additional Project Conservation Facilities is constructed by such federal agency under an agreement requiring the State to pay all or part of the costs of such construction, the Delta Water Charge shall be determined on the basis of the foregoing allocations and upon an allocation to project purposes, by the separable costs-remaining benefits method and subject to the foregoing provisos, of all projected costs of such feature of the Additional Project Conservation Facilities; *provided,* that if the agreement with such federal agency allows repayment of costs of a portion of a facility to be deferred, the associated costs of such portion shall be excluded from the Delta Water Charge computations until repayment of such deferred costs or interest thereon is commenced by the State; *provided, further,* that all costs of Additional Project Conservation Facilities Incurred prior to the award of a major construction contract, shall be included in the Delta Water Charge computations in the year in which they are Incurred.

(3) *Supplemental Conservation Facilities.* Upon the construction of the Supplemental Conservation Facilities, the Delta Water Charge shall be paid by

all Contractors for Supplemental Water, as well as by Contractors for Project Water, and, together with revenues derived from the sale or other disposal of electrical energy generated in connection with operation of Project Conservation Facilities and Supplemental Conservation Facilities, shall return to the State, in addition to those costs of the Project Conservation Facilities allocated to the purpose of water conservation, in, above, and below the Delta pursuant to subdivision (c)(1) of this article, all costs of such Supplemental Conservation Facilities, including capital, operation, maintenance, power, and replacement costs which are allocated to the purpose of water conservation, in, above, and below the Delta pursuant hereto. Commencing in the year in which the State first awards a major construction contract for construction of a major feature of any Supplemental Conservation Facilities, or first commences payments under a contract with a federal agency in the event a major feature of Supplemental Conservation Facilities is constructed by such federal agency under an agreement requiring the State to pay all or part of the costs of such construction, the Delta Water Charge shall be determined on the basis of the allocations made pursuant to subdivision (c)(1) of this article, and upon an allocation to project purposes, by the separable costs-remaining benefits method and subject to provisos corresponding to those contained in such subdivision (c)(1), of all projected costs of such feature of the Supplemental Conservation Facilities. Commencing in the same year, the computation of the rates to be used in determining the components of the Delta Water Charge shall include the Annual Table A Amounts under all contracts for Supplemental Water. If the repayment period of any bonds sold to construct Supplemental Conservation Facilities or the repayment period under any agreement with a federal agency for repayment of the costs of Supplemental Conservation Facilities constructed by such federal agency extends beyond the repayment period of the contract, the Delta Water Charge shall be determined and redetermined on the basis of such extended repayment period as the State determines to be appropriate; *provided,* that if the agreement with such federal agency allows repayment of costs of a portion of a facility to be deferred, the associated costs of such portion shall be excluded from the Delta Water Charge computations until repayment of such deferred costs or interest thereon is commenced by the State.

(4) *Local Projects.* The determination of the Delta Water Charge shall be made by including the appropriate costs and quantities of water, calculated in accordance with subdivisions (a) and (b) above, for all Additional Project Conservation Facilities as defined in Article 1(a). In the event a Local Project as defined in Article 1(a)(2) will, pursuant to written agreement between the State and the sponsoring Contractor, be considered and treated as an Additional Project Conservation Facility for less than the estimated life of the facility, the Delta Water Charge will be determined on the basis of that portion of the appropriate cost and water supply associated with such facility as the period of time during which such facility shall be considered as an Additional Project Conservation Facility bears to the estimated life of such facility. No costs for the construction or implementation of any Local Project are to be included in the

Delta Water Charge unless and until the written agreement required by Article 1(a) has been entered into.

(5) *Water Purchased By the State.* In calculating the Delta Water Charge under subdivisions (a) and (b) of this article, the component for operation, maintenance, power and replacement costs shall include, but not be limited to, all costs to the State Incurred in purchasing water, which is competitive with alternative sources as determined by the State, for delivery as Project Water.

(6) *Replacement Cost Treatment.* Replacement costs of Project Conservation Facilities shall be treated as either Capital Costs or as minimum operation, maintenance, power, and replacement costs, as determined by the State considering the Economic Useful Life of the asset being replaced and other relevant factors.

23. TRANSPORTATION CHARGE.

The payments to be made by each Contractor shall include an annual charge designated as the Transportation Charge, which shall be separately stated and calculated for costs Incurred prior to the Billing Transition Date and costs Incurred on or after the Billing Transition Date.

(a) **Transportation Charge for Costs Incurred Prior to the Billing Transition Date**. The provisions of this subdivision (a) and Articles 24(a) and (c), 25 and 26 shall apply to costs Incurred prior to the Billing Transition Date.

(1) *Recovery of Costs of Project Transportation Facilities.* The Transportation Charge for costs Incurred prior to the Billing Transition Date shall return to the State during the Project Repayment Period such costs of all Project Transportation Facilities necessary to deliver Project Water to the Contractor and which are allocated to the Contractor in accordance with the cost allocation principles and procedures hereinafter set forth.

(2) *Components of Transportation Charge for Costs Incurred Prior to the Billing Transition Date.* The Transportation Charge for costs Incurred Prior to the Billing Transition Date shall consist of a capital component; a minimum operation, maintenance, power, and replacement component; and a variable operation, maintenance and power component, as these components are defined in and determined under Articles 24(a) and (c), 25, and 26, respectively.

(b) **Transportation Charge for Costs Incurred On or After the Billing Transition Date**. The provisions of this subdivision (b) and Articles 24(b) and (c), 25 and 26 shall apply to costs Incurred on or after the Billing Transition Date.

(1) *Recovery of Costs of Project Transportation Facilities.* The Transportation Charge for costs Incurred on or after the Billing Transition Date shall return to the State during each such calendar year all costs which are Incurred on or after the Billing Transition Date of all Project Transportation Facilities necessary to deliver Project Water to the District and which are allocated to the District in accordance with the cost allocation principles and procedures hereinafter set forth.

(2) *Components of Transportation Charge.* The Transportation Charge for costs Incurred on or after the Billing Transition Date shall consist of a capital component; a minimum operation, maintenance, and power component; and a variable operation, maintenance, and power component, as these components are defined in and determined under Articles 24(b) and (c), 25, and 26, respectively.

(c) **Segregation of Aqueduct Reaches for All Transportation Charge Purposes**. For the purpose of allocations of costs among Contractors pursuant to subdivisions (a) and (b) of this article, and Articles 24, 25 and 26, the Project Transportation Facilities shall be segregated into such aqueduct reaches as are determined by the State to be necessary for such allocations of costs. Subject to such modifications as are determined by the State to be required by reason of any request furnished by the District to the State pursuant to Article 17(a) of this contract, or by reason of contracts entered into by the State with other Contractors, the aqueduct reaches of the Project Transportation Facilities, a portion of the costs of which may be allocated to the District, are established as provided in Table G; *provided* that those costs of the aqueduct reaches from the Delta through the outlet of San Luis Reservoir which are allocated to the purpose of water conservation in, above, and below the Delta for the purpose of determining the Delta Water Charge, as hereinbefore set forth, shall not be included in the Transportation Charge.

TABLE G
PROJECT TRANSPORTATION FACILITIES NECESSARY TO DELIVER WATER TO SANTA CLARA VALLEY WATER DISTRICT

Aqueduct Reach	Major Features of Reach
Delta through Bethany Forebay:	Intake Canal Fish Protective Facilities Aqueduct Pumping Plant I (Delta Pumping Plant) Aqueduct (Including Interim Intake Canal and Interim Pumping Plant)
Bethany Forebay to Doolan-Livermore Junction:	South Bay Pumping Plant Aqueduct - min. capacity 300 cfs
Doolan-Livermore Junction through Patterson Reservoir:	Aqueduct - min. capacity 300 cfs Patterson Reservoir
Patterson Reservoir to Del Valle Branch:	Aqueduct - min. capacity 265 cfs
Del Valle Branch	Aqueduct - min. capacity 265 cfs Del Valle Pumping Plant Aqueduct - min. capacity 108 cfs Del Valle Reservoir
Del Valle Branch to South Livermore Turnout:	Aqueduct - min. capacity 265 cfs
South Livermore Turnout to Vallecitos Turnout	Aqueduct - min. capacity 255 cfs
Vallecitos Turnout to Alameda-Bayside Turnout	Aqueduct - min. capacity 255 cfs
Alameda-Bayside Turnout to Penitencia Turnout:	Aqueduct – min. capacity 180 cfs

(This table was labeled Table I in original contract provisions)

(d) **Provisions Applicable to the Transportation Charge for Costs Incurred Both Before and On or After the Billing Transition Date.**

(1) Wherever reference is made, in connection with the computation, determination, or payment of the Transportation Charge, to the allocation or payment of costs of any facility or facilities included in the System, such reference shall be only to those costs of such facility or facilities which are reimbursable by the Contractors as determined by the State.

(2) The State, in fixing and establishing prices, rates, and charges for water and power, shall include as a reimbursable cost of any state water project an amount sufficient to repay all costs incurred by the State, directly or by contract with other agencies, for the preservation of fish and wildlife and determined to be allocable to the costs of the project works constructed for the development of that water and power, or either. Costs incurred for the enhancement of fish and wildlife or for the development of public recreation shall not be included in the prices, rates, and charges for water and power, and shall be nonreimbursable costs. Such recreational purposes include, but are not limited to, those recreational pursuits generally associated with the out-of-doors, such as camping, picnicking, fishing, hunting, water contact sports, boating, and sightseeing, and the associated facilities of campgrounds, picnic areas, water and sanitary facilities, parking areas, viewpoints, boat launching ramps, and any others necessary to make project land and water areas available for use by the public. In administering this Contract "development of public recreation" shall include recreation capital and operation and maintenance.

24. TRANSPORTATION CHARGE -- CAPITAL COMPONENTS.

(a) **Transportation Charge Capital Component for Costs Incurred Prior to the Billing Transition Date**. The provisions of this subdivision (a) shall apply only to Capital Costs Incurred prior to the Billing Transition Date.

(1) *Recovery of Capital Costs of Project Transportation Facilities Incurred Prior to the Billing Transition Date.* The amount of the capital component of the Transportation Charge for Capital Costs Incurred prior to the Billing Transition Date shall be determined in two steps as follows:

(A) first, an allocation of such costs to the Contractor in accordance with subdivision (a)(2) of this article, and

(B) second, a computation of annual payments to be made by the Contractor of such allocated costs and interest thereon, computed at the Project Interest Rate in accordance with subdivision (a)(3) of this article.

(2) *Allocation of Capital Costs of Project Transportation Facilities Incurred Prior to the Billing Transition Date.* The total amount of Capital Costs Incurred prior to the Billing Transition Date of each aqueduct reach to be returned to the State shall be allocated among all Contractors entitled to delivery of Project Water from or through such reach by the proportionate use of facilities method of cost allocation and in accordance with Article 23(c) and subdivision (c)(1) of this article.

The projected amounts of Capital Costs to be allocated annually to the District under the capital component of the Transportation Charge shall be determined by the State in accordance with the cost allocation principles and procedures set forth in this subdivision (a) and subdivision (c)(1) of this article, which principles and procedures shall be controlling as to allocations of Capital Costs to the District. Such amounts will be set forth in Table H by the State as soon as designs and cost estimates are prepared by it subsequent to receipt of requests from the District as to the maximum monthly delivery capability to be provided in each aqueduct reach for transport and delivery of Project Water to the District, pursuant to Article 17(a), *provided* that these amounts shall be subject to redetermination by the State in accordance with Article 28.

TABLE H
PROJECTED ALLOCATIONS OF CAPITAL COSTS INCURRED PRIOR TO THE BILLING TRANSITION DATE OF PROJECT TRANSPORTATION FACILITIES TO SANTA CLARA VALLEY WATER DISTRICT

Year	Projected Allocation in Thousands of Dollars
1*	
2	
3	
4	

* Year in which State commences construction of Project Transportation Facilities.
(This table was labeled Table C in original contract provisions)

(3) *Determination of Capital Component of Transportation Charge for Costs Incurred Prior to the Billing Transition Date.* The District's annual payment of its allocated Capital Costs Incurred prior to the Billing Transition Date and interest thereon, computed at the Project Interest Rate and compounded annually, shall be determined in accordance with a repayment schedule established by the State and determined in accordance with the principles set forth in (A), (B), and (C) below, which principles shall be controlling as to the District's payment of its allocated Capital Costs. The District's repayment schedule will be set forth in Table I by the State as soon as designs and cost estimates are prepared by it subsequent to receipt of requests from the District as to the maximum monthly delivery capability to be provided in each aqueduct reach for transport and delivery of Project Water to the District, pursuant to Article 17(a); *provided* that the amounts set forth in Table I shall be subject to redetermination by the State, pursuant to Article 28.

(A) The District's annual payment shall be the sum of the amounts due from the District on the District's allocated Capital Costs for the then current year and for each previous year where each such amount will pay, in not more than fifty (50) equal annual installments of principal and interest, the District's allocated Capital Costs for the respective year and interest thereon, computed at the Project Interest Rate and compounded annually.

(B) The District may make payments at a more rapid rate if approved by the State.

(C) Such annual Transportation Charge payments shall cease when all allocated Capital Costs and interest thereon, computed at the Project Interest Rate and compounded annually, are repaid.

TABLE I
TRANSPORTATION CHARGE FOR COSTS INCURRED PRIOR TO THE BILLING TRANSITION DATE -- CAPITAL COST COMPONENT
SANTA CLARA VALLEY WATER DISTRICT
(In Thousands of Dollars)

Year	Annual Payment of Principal	Annual Interest Payment	Total Annual Payment by District
1*			
2**			
3			
4			

* Year in which State commences construction of Project Transportation Facilities.

** Year of first payment.

(This table was labeled Table D in original contract provisions)

(4) Notwithstanding provisions of subdivisions 24(a)(1) through (a)(3) of this article, the capital component of the Transportation Charge for costs Incurred prior to the Billing Transition Date shall include an annual charge to recover the District's share of the portion of Water System Facility Revenue Bond Financing Costs allocable to Project Transportation Facilities. Charges to the District for these costs shall be calculated in accordance with Article 50(a).

(b) **Transportation Charge Capital Component for Costs Incurred On or After the Billing Transition Date**. The provisions of this subdivision (b) shall apply only to Capital Costs Incurred on or after the Billing Transition Date.

(1) The amount of the capital component of the Transportation Charge for costs Incurred on or after the Billing Transition Date shall be determined in three steps as follows:

(A) first, an allocation of Capital Costs to the Contractor as provided in subdivision (b)(2) of this article,

(B) second, a determination of the type and source of payment of each Capital Cost as provided in subdivision (b)(3) of this article, and

(C) third, a computation of the annual payment to be made by the Contractor as provided in subdivision (b)(4) and (b)(5) of this article.

(2) The total amount of Capital Costs of each aqueduct reach to be returned to the State under the Transportation Charge for costs Incurred on or after the Billing Transition Date shall be allocated among all Contractors entitled to delivery of Project Water from or through the reach by the proportionate use of facilities method of cost allocation and in accordance with Article 23(c) and subdivision (c)(1) of this article.

(3) Annual Capital Costs of Project Transportation Facilities shall be divided into five categories of type and source of payment:

(A) Project Transportation Facility Capital Costs paid with the proceeds of Water System Facility Revenue Bonds,

(B) Project Transportation Facility Capital Costs paid with the proceeds of bonds issued under the Burns-Porter Bond Act,

(C) Project Transportation Facility Capital Costs paid with amounts in the SWRDS Reinvestment Account,

(D) Project Transportation Facility Capital Costs paid annually for assets that will have a short Economic Useful Life or the costs of which are not substantial, and

(E) Project Transportation Facility Capital Costs prepaid by the District.

The projected amounts of Project Transportation Facility Capital Costs of each type to be allocated annually to the District shall be determined by the State in accordance with the cost allocation principles and procedures set forth in Article 23(c)(1) through (c)(3) and this subdivision (b)(3), which principles and procedures shall be controlling as to allocations of each type of Capital Costs to the District; *provided* that these amounts shall be subject to redetermination by the State in accordance with Article 28. Such projected amounts will be set forth in Table J by the State.

TABLE J
PROJECTED ALLOCATIONS TO SANTA CLARA VALLEY WATER DISTRICT OF PROJECT TRANSPORTATION FACILITY CAPITAL COSTS INCURRED ON OR AFTER THE BILLING TRANSITION DATE

Year	Allocations in Thousands of Dollars				
	Costs to be Paid with Proceeds of Water System Facility Revenue Bonds	**Costs to be Paid with the Proceeds of Bonds issued under the Burns-Porter Bond Act**	**Costs to be Paid with Amounts in the SWRDS Reinvest-ment Account**	**Costs to be Paid Annually for Assets That Will Have a Short Economic Useful Life or the Costs of which are Not Substantial**	**Costs Prepaid by the District**
1*					
2					
3					

* Year commencing with the Billing Transition Date

(4) The capital component of the Transportation Charge for a calendar year for costs Incurred on or after the Billing Transition Date shall consist of the following to the extent the related Capital Costs are allocated to the District:

(A) Water System Facility Revenue Bond: a charge determined in accordance with Article 50(b) to recover Water System Facility Revenue Bond Financing Costs Incurred during such calendar year that relate to the financing of Water System Facilities that are Project Transportation Facilities,

(B) Burns-Porter Act Bonds: a charge to recover the amount to be paid by the State of California during such calendar year in accordance with the Burns-Porter Bond Act for the principal of and interest on bonds issued under the Burns-Porter Bond Act on or after the Billing Transition Date for Project Transportation Facility Capital Costs,

(C) SWRDS Reinvestment Account: a charge determined in accordance with subdivision (b)(5) of Article 61 to amortize Project Transportation Facility Capital Costs Incurred during prior calendar years (but not prior to the Billing Transition Date) that have been paid with amounts from the SWRDS Reinvestment Account, and

(D) Capital Assets with Short Economic Life or Costs of which are Not Substantial: a charge to recover the Capital Costs to be Incurred during such calendar year of Project Transportation Facility assets with a short Economic Useful Life or the costs of which are not substantial as determined by the State and any such Capital Costs Incurred but not charged in the prior two calendar years,

(5) *Projected Charges.* The projected amounts of the charges to be allocated annually to the District under the capital component of the Transportation Charge for costs Incurred on or after the Billing Transition Date shall be determined by the State in accordance with the cost allocation principles and procedures set forth in this Article, which principles and procedures shall be controlling as to allocations of capital component charges to the District; *provided* that these amounts shall be subject to redetermination by the State in accordance with Article 28. Such amounts are projected to be as set forth in Table K by the State.

TABLE K
PROJECTED CHARGES UNDER THE CAPITAL COMPONENT OF THE TRANSPORTATION CHARGE FOR COSTS INCURRED ON OR AFTER THE BILLING TRANSITION DATE TO SANTA CLARA VALLEY WATER DISTRICT

Year	Projected Charges in Thousands of Dollars			
	Costs to be Paid with Proceeds of Water System Facility Revenue Bonds	Costs to be Paid with the Proceeds of Bonds issued under the Burns-Porter Bond Act	Costs to be Paid with Amounts in the SWRDS Reinvestment Account	Costs to be Paid Annually for Assets That Will Have a Short Economic Useful Life or the Costs of which are Not Substantial
1*				
2				
3				

* Year commencing with the Billing Transition Date.

(c) **Provisions Applicable to the Transportation Charge For Costs Incurred Both Prior To and On or After the Billing Transition Date**. The provisions of this subdivision (c) shall be applicable to Capital Costs Incurred both prior to and on or after the Billing Transition Date.

(1) *Proportionate Use Factors.* The measure of the proportionate use by each Contractor of each reach shall be the average of the following two ratios:

(A) the ratio of the Contractor's Maximum Annual Table A Amount to be delivered from or through the reach to the total of the Maximum Annual Table A Amounts of all Contractors to be delivered from or through the reach from the year in which charges are to be paid through the end of the Project Repayment Period, and

(B) the ratio of the capacity provided in the reach for the transport and delivery of Project Water to the Contractor to the total capacity provided in the reach for the transport and delivery of Project Water to all Contractors served from or through the reach from the year in which charges are to be paid through the end of the Project Repayment Period.

Allocations of Capital Costs to the District pursuant hereto shall be on the basis of relevant values which will be set forth in Table L by the State as soon as designs and cost estimates are prepared by it subsequent to receipt of requests from the District as to the maximum monthly delivery capability to be provided in each aqueduct reach of the Project Transportation Facilities for the transport and delivery of Project Water to the District, pursuant to Article 17(a); *provided* that these values shall be subject to redetermination by the State in accordance with Article 28; *provided further* that the principles and procedures set forth in this subdivision shall be controlling as to allocations of Capital Costs to the District. Proportionate use of facilities factors for prior years shall not be adjusted by the State in response to changes or transfers of Table A Amounts among Contractors unless otherwise agreed by the State and the parties to the transfer and unless there is no impact on past charges or credits of other Contractors.

TABLE L

[TABLE L shall set forth the relevant values that shall serve as the basis for allocation of all Transportation Charge Costs]

(This table was labeled Table B in original contract provisions)

(2) *Determinations Using Proportionate Use Factors.* The total amount in each category of Capital Costs allocated to a Contractor shall be the sum of the products obtained when there is multiplied, for each aqueduct reach necessary to deliver water to the Contractor, the total amount of the Capital Costs of the reach in that category to be returned to the State under the Transportation Charge by the average of the two foregoing ratios for such reach as such average is set forth in the appropriate table included in its contract.

(3) *Excess Capacity.* In the event that excess capacity is provided in any aqueduct reach for the purpose of making Project Water available in the future to an agency or agencies with which the State has not executed contracts at the time of any allocation of costs pursuant to this subdivision, the prospective Maximum Annual Table A Amount or Amounts to be supplied by such excess capacity, as determined by the State, shall be deemed to be contracted for by such agency or agencies for the purpose of such allocation of costs, to the end that the Capital Costs of providing such excess capacity are not charged to any Contractor entitled by virtue of an executed contract to the delivery of Project Water from or through that aqueduct reach at the time of such allocation. Where additional capacity is provided in any aqueduct reach to compensate for loss of water due to evaporation, leakage, seepage, or other causes, or to compensate for scheduled outages for purposes of necessary investigation, inspection, maintenance, repair or replacement of the facilities of the Project Facilities, then, for the purpose of any allocation of costs pursuant to this subdivision:

(A) the Maximum Annual Table A Amount to be delivered from or through the reach of each Contractor entitled to delivery of Project Water from or through the reach shall be increased by an amount which bears the same proportion to the maximum annual delivery capability provided by such additional capacity that the Contractor's Maximum Annual Table A Amount to be delivered from or through the reach bears to the total of the Maximum Annual Table A Amounts to be delivered from or through the reach under all contracts; and

(B) the capacity provided in the reach for each Contractor entitled to delivery of Project Water from or through the reach shall be increased in the same proportion that the Contractor's Maximum Annual Table A Amount to be delivered from or through the reach is increased pursuant to (A) above.

(4) *Power Facilities.* The Capital Costs of project aqueduct power recovery plants shall be charged and allocated in accordance with this Article 24.

The Capital Costs of off-aqueduct power facilities shall be charged and allocated in accordance with Article 25(d).

(5) *Capital Costs of Excess Capacity.* In the event that any Contractor, pursuant to Article 12(b), requests delivery capacity in any aqueduct reach which will permit maximum monthly deliveries to such Contractor in excess of the percentage amounts specified in such Article 12(b) for the uses designated therein, such Contractor shall furnish to the State, in advance of the construction of such aqueduct reach, funds sufficient to cover the costs of providing such excess capacity, which funds shall be in an amount which bears the same proportion to the total Capital Costs of such reach, including the costs of providing such excess capacity, as such excess capacity bears to the total capacity of such reach, including such excess capacity. For the purpose of any allocation of costs pursuant to subdivision (c)(1) of this article, the total Capital Costs of such aqueduct reach shall be allocated among all Contractors entitled to delivery of Project Water from or through the reach in the following manner:

(A) The costs which would have been Incurred for such reach had no such excess capacity been provided shall be estimated by the State and allocated among all such Contractors in the manner provided in such subdivision (c)(1); and

(B) the amount of the difference between such estimated costs and the projected actual costs of such reach shall be allocated to the Contractor or Contractors for which such excess capacity is provided.

Where such excess capacity is provided for more than one Contractor, the costs allocated to them under (B) above shall be further allocated between or among them in amounts which bear the same proportion to the total of such allocated costs as the amount of such excess capacity provided for the respective Contractor bears to the total of such excess capacity provided in such reach. In the event that the funds advanced by a Contractor pursuant to this subdivision are more or less than the costs so allocated to such Contractor under (B) above, the account of such Contractor shall be credited or debited accordingly.

(6) *Replacement Cost Treatment*. Replacement costs of Project Transportation Facilities shall be treated as either Capital Costs or as minimum operation, maintenance, power and replacement costs, as determined by the State considering the Economic Useful Life of the asset being replaced and other relevant factors.

(7) *East Branch Enlargement.* Notwithstanding provisions of Articles 24(a) through 24(c), Capital Costs associated with East Branch Enlargement Facilities as defined in Article 49(a) shall be collected under the capital component of the East Branch Enlargement Transportation Charge Article 49(d). Any Capital Costs of off-aqueduct power facilities associated with deliveries

through East Branch Enlargement Facilities shall be charged and allocated in accordance with Article 25(d).

25. TRANSPORTATION CHARGE -- MINIMUM OPERATION, MAINTENANCE, POWER, AND REPLACEMENT COMPONENT.

The provisions of this article shall apply to costs incurred both prior to and on or after the Billing Transition Date.

(a) **Purpose**. The minimum operation, maintenance, power, and replacement component of the Transportation Charge shall return to the State those costs of the Project Transportation Facilities necessary to deliver water to the Contractor which constitute operation, maintenance, power, and replacement costs Incurred irrespective of the amount of Project Water delivered to the Contractor and which are allocated to the Contractor pursuant to subdivision (b) of this article; *provided* that to the extent permitted by law, the State may establish reserve funds to meet anticipated minimum replacement costs; and deposits in such reserve funds by the State: (1) shall be made in such amounts that such reserve funds will be adequate to meet such anticipated costs as they are incurred, and (2) shall be deemed to be a part of the minimum replacement costs for the year in which such deposits are made.

(b) **Allocation**. The total projected minimum operation, maintenance, power, and replacement costs of each aqueduct reach of the Project Transportation Facilities for the respective year shall be allocated among all Contractors entitled to delivery of Project Water from such facilities by the proportionate use of facilities method of cost allocation, in the same manner and upon the same bases as are set forth for the allocation of Capital Costs in subdivisions (c)(1) through (c)(3) of Article 24; *provided* that such minimum operation, maintenance, power, and replacement costs as are Incurred generally for the Project Transportation Facilities first shall be allocated to each aqueduct reach in an amount which bears the same proportion to the total amount of such general costs that the amount of the costs Incurred directly for the reach bears to the total of all direct costs for all aqueduct reaches.

(c) **Determination; Repayment Table**. The amount to be paid each year by the District under the minimum operation, maintenance, power, and replacement component of the Transportation Charge shall be determined in accordance with subdivision (b) of this article on the basis of the relevant values to be set forth for the respective aqueduct reaches in Table L, included in Article 24; *provided* that these values shall be subject to redetermination by the State in accordance with Article 28. Such amounts and any appropriate interest thereon for costs incurred prior to the Billing Transition Date shall be set forth by the State in Table M as soon as designs and cost estimates have been prepared by it subsequent to receipt of requests from the District as to the maximum monthly delivery capability to be provided in each aqueduct reach for transport and delivery of Project Water to the District, pursuant to Article 17(a); *provided* that the amounts set forth in Table M shall be subject to redetermination by the State in accordance with Article 28.

TABLE M
TRANSPORTATION CHARGE -- MINIMUM OPERATION MAINTENANCE, POWER, AND REPLACEMENT COMPONENT
SANTA CLARA VALLEY WATER DISTRICT

Year	Total Annual Payment by District*
1**	
2	
3	
4	

* Payment shall start with respect to each aqueduct reach in the year following the year in which the State completes construction of the respective reach.

** Year in which the State commences construction of Project Transportation Facilities.

(This table was labeled Table E in original contract provisions)

(d) **Off-Aqueduct Power Facilities**. Notwithstanding the provisions of subdivisions (a) through (c) of this Article or of Article 1(h), the costs of off-aqueduct power facilities shall be determined and allocated as follows:

(1) The off-aqueduct power costs shall include all annual costs the State incurs for any off-aqueduct power facility, which shall include, but not be limited to, power purchases, annual Financing Costs, and associated operation and maintenance costs of such facility, less any credits, interest earnings, or other monies received by the State in connection with such facility or Revenue Bonds issued to finance the Capital Costs of such facility. In the event the State finances all or any part of an off-aqueduct power facility directly from funds other than bonds or borrowed funds, in lieu of such annual principal and interest payments, the repayment of Capital Costs as to that part financed by such other funds shall be determined on the basis of the schedule that would have been required under Article 24.

(2) The annual costs of off-aqueduct power facilities as computed in (1) above shall initially be allocated among Contractors in amounts which bear the same proportions to the total amount of such power costs that the total estimated electrical energy (kilowatt hours) required to pump through Project Transportation Facilities the desired delivery of Annual Table A Amounts for that year, as submitted pursuant to Article 12(a)(1) and as may be modified by the State pursuant to Article 12(a)(2), bears to the total estimated electrical energy

(kilowatt hours) required to pump all such amounts for all Contractors through Project Transportation Facilities for that year, all as determined by the State.

(3) An interim adjustment in the allocation of the power costs calculated in accordance with (2) above, may be made in May of each year based on April revisions in approved schedules of deliveries of project and nonproject water for Contractors for such year. A further adjustment shall be made in the following year based on actual deliveries of project and nonproject water for Contractors; *provided, however,* that in the event no deliveries are made through a pumping plant, the adjustments shall not be made for that year at that plant.

(4) To the extent the monies received or to be received by the State from all Contractors for off-aqueduct power costs in any year are determined by the State to be less than the amount required to pay the off-aqueduct power costs in such year, the State may allocate and charge that amount of off-aqueduct power costs to the District and other Contractors in the same manner as costs under the capital component of the Transportation Charge are allocated and charged. After that amount has been so allocated, charged and collected, the State shall provide a reallocation of the amounts allocated pursuant to this paragraph (4), such reallocation to be based on the allocations made pursuant to (2) and (3) above for that year, or in the event no such allocation was made for that year, on the last previous allocation made pursuant to (2) and (3) above. Any such reallocation of costs incurred prior to the Billing Transition Date shall include appropriate interest thereon at the Project Interest Rate.

(e) The total minimum operation, maintenance, power and replacement component due that year from each Contractor shall be the sum of the allocations made under the proportionate use of facilities method provided in subdivision (b) of this article and the allocations made pursuant to subdivision (d) of this article for each Contractor.

(f) Notwithstanding provisions of Articles 25(a) through 25(c) and 25(e), minimum operation, maintenance, power, and replacement costs associated with deliveries through East Branch Enlargement Facilities as defined in Article 49(a) shall be collected under the minimum operation, maintenance, power, and replacement component of the East Branch Enlargement Transportation Charge as determined under Article 49(e).

26. TRANSPORTATION CHARGE -- VARIABLE OPERATION, MAINTENANCE AND POWER COMPONENT.

The provisions of this article shall apply to costs Incurred both prior to and on or after the Billing Transition Date.

(a) **Purpose.** The variable operation, maintenance, and power component of the Transportation Charge shall return to the State those costs of the Project Transportation Facilities necessary to deliver water to the Contractor which constitute operation, maintenance, power and replacement costs Incurred in an amount which is dependent upon and varies with the amount of Project Water delivered to the Contractor and which are allocated to the Contractor pursuant to (1) and (2) below; *provided* that to the extent permitted by law, the State may establish reserve funds to meet anticipated variable replacement costs; and deposits in such reserve funds by the State: (1) shall be made in such amounts that such reserve funds will be adequate to meet such anticipated costs as they are incurred, and (2) shall be deemed to be a part of the variable replacement costs for the year in which such deposits are made.

(b) **Determination.** The amount of this variable operation, maintenance, and power component shall be determined as follows:

(1) *Determination of Charge Per Acre-Foot.* There shall be computed for each calendar year for each aqueduct reach of the Project Transportation Facilities a charge per acre-foot of water which will return to the State the total projected variable operation, maintenance and power costs of the reach for such calendar year. This computation shall be made by dividing such total by the number of acre-feet of Project Water estimated to be delivered from or through the reach to all Contractors during the year.

(2) *Determination of Charge Per Reach to the Contractor.* The amount of the variable component shall be the product of the sum of the charges per acre-foot of water, determined under (1) above, for each aqueduct reach necessary to deliver water to the Contractor, and the number of acre-feet of Project Water delivered to the Contractor during the year through such reach; *provided* that when Project Water has been requested by a Contractor and delivery thereof has been commenced by the State, and, through no fault of the State, such water is wasted as a result of failure or refusal by the Contractor to accept delivery thereof, the amount of such variable component to be paid by such Contractor during such period shall be the product of the above sum and the sum of the number of acre-feet of Project Water delivered to the Contractor and the number of acre-feet wasted.

(c) **Credit Relating to Project Aqueduct Power Recovery Plants.** There shall be credited against the amount of the variable operation, maintenance, and power component to be paid by each Contractor, as determined pursuant to subdivision (a) of this article, a portion of the projected net value of any power recovered during the respective year at project aqueduct power recovery plants located upstream on the particular aqueduct reach from the delivery structures for delivery of Project Water to the Contractor. Such portion shall be in an amount which bears the same proportion to such projected net value that the number of acre-feet of Project Water delivered to the Contractor through such plants during the year bears to the number of acre-feet of Project Water delivered to all Contractors through such plants during the year.

(d) **Determination of Total Variable Component Charge**. The amount to be paid each year by the District under the variable operation, maintenance, and power component of the Transportation Charge shall be determined in accordance with subdivision (a) of this article for the respective aqueduct reaches in Table L included in Article 24. Such amounts and any appropriate interest thereon for costs incurred prior to the Billing Transition Date shall be set forth by the State in Table N as soon as designs and cost estimates are prepared by it subsequent to receipt of requests from the District as to the maximum monthly delivery capability to be provided in each aqueduct reach for transport and delivery of Project Water to the District, pursuant to Article 17(a); *provided* that the amounts set forth in Table N shall be subject to redetermination by the State in accordance with Article 28.

TABLE N
TRANSPORTATION CHARGE -- ESTIMATED VARIABLE OPERATION, MAINTENANCE, AND POWER COMPONENT
SANTA CLARA VALLEY WATER DISTRICT

Year	Total Annual Payment by District*
1**	
2	
3	
4	

* Payments start with year of initial water delivery.

** Year in which the State commences construction of the Project Conservation Facilities.

(This table was labeled Table F in original contract provisions)

(e) **No Separate Variable Component for East Branch Enlargement Facilities**. There shall be no separate variable operation, maintenance, and power component for deliveries of water through East Branch Enlargement Facilities defined in Article 49(a).

27. TRANSPORTATION CHARGE -- REPAYMENT SCHEDULE.

The amounts to be paid by the District for each year under the Capital Cost and minimum operation, maintenance, power, and replacement components of the Transportation Charge, and under the variable operation, maintenance, and power component of such charge on the basis of then estimated deliveries, shall be set forth by the State in Table O as soon as designs and cost estimates have been prepared by it subsequent to receipt of requests from the District as to the maximum monthly delivery capability to be provided in each aqueduct reach for transport and delivery of Project Water to the District, pursuant to Article 17(a), which Table O shall constitute a summation of Tables I, K, M, and N; *provided* that each of the amounts set forth in Table O shall be subject to redetermination by the State in accordance with Article 28; *provided further* that the principles and procedures set forth in Articles 24, 25, and 26 shall be controlling as to such amounts. Such amounts shall be paid by the District in accordance with the provisions of Article 29.

TABLE O
REPAYMENT SCHEDULE--TRANSPORTATION CHARGE
SANTA CLARA VALLEY WATER DISTRICT

Year	Capital Cost Component	Minimum Component	Variable Component	Total
1*				
2**				
3				
4				

* Year in which State commences construction of Project Transportation Facilities.

** Year of first payment.

(This table was labeled Table G in original contract provisions)

28. DELTA WATER CHARGE AND TRANSPORTATION CHARGE -- REDETERMINATION.

(a) **Redetermination of Transportation Charges for Costs Incurred Prior to the Billing Transition Date**. The provisions of this subdivision (a) shall apply only to costs Incurred prior to the Billing Transition Date.

(1) *Determinative Factors Subject to Retroactive Change*. The State shall redetermine the values and amounts set forth in Tables H through O (referred to in the original contract provisions as Tables B through G) of this contract in the year following the year in which the State commences construction of the Project Transportation Facilities and each year thereafter during the Project Repayment Period in order that the Transportation Charge to the District and the components thereof may accurately reflect the increases or decreases from year to year in projected costs, outstanding reimbursable indebtedness of the State Incurred prior to the Billing Transition Date to construct the Project Transportation Facilities described in Table G of this contract, Annual Table A Amounts, estimated deliveries, Project Interest Rate, and all other factors which are determinative of such charges. In addition, each such redetermination shall include an adjustment of the components of the Transportation Charge to be paid by the District for succeeding years which shall account for the differences, if any, between those factors used by the State in determining the amounts of such components for all preceding years and the factors as then currently known by the State. Such adjustment shall be computed by the State and paid by the District or credited to the District's account in the manner described in (b) and (c) below.

(2) *Adjustment: Transportation Charge -- Capital Component For Costs Incurred Prior to the Billing Transition Date*. Adjustments for prior underpayments or overpayments of the capital component of the Transportation Charge to the District for costs Incurred prior to the Billing Transition Date, together with accrued interest charges or credits thereon computed at the then current Project Interest Rate on the amount of the underpayment or overpayment and compounded annually for the number of years from the year the underpayment or overpayment occurred to and including the year following the redetermination, shall be paid in the year following the redetermination; *provided* that the District may elect to exercise the option whereby when the redetermined Transportation Charge for the following year, with adjustments, including adjustments of the operation, maintenance, power, and replacement components provided for in subdivision (a)(3) of this article, is more or less than the last estimate of the charge provided pursuant to Article 27 for the corresponding year, without adjustments, an amount equal to the total of such difference shall be deducted

from or added to the adjusted capital component for that year and paid or credited in accordance with the following schedule:

Percent that Transportation Charge for costs Incurred prior to the Billing Transition Date differs from last estimate (+ or -)	**Period, in years, for amortizing the difference in indicated charge**
for 10% or less	no amortization
more than 10%, but not more than 20%	2
more than 20%, but not more than 30%	3
more than 30%, but not more than 40%	4
more than 40%	5

Such payments or credits shall be equal semi-annual amounts of principal and interest on or before the 1st day of January and the 1st day of July, with interest computed at the Project Interest Rate and compounded annually, during varying amortization periods as set forth in the preceding schedule; *provided* that for the purpose of determining the above differences in the Transportation Charge for costs Incurred prior to the Billing Transition Date, the variable operation, maintenance, and power component shall be computed on the basis of the same estimated Project Water deliveries as was assumed in computing pursuant to Article 26(c).

(3) *Adjustment: Transportation Charge -- Minimum and Variable Components for costs Incurred prior to the Billing Transition Date*. One-twelfth of the adjustments for prior underpayments or overpayments of the District's minimum and variable operation, power, and replacement components for each year shall be added or credited to the corresponding components to be paid in the corresponding month of the year following the redetermination, together with accrued interest charges or credits thereon computed at the then current Project Interest Rate on the amount of the underpayment or overpayment and compounded annually for the number of years from the year the underpayment or overpayment occurred to and including the year following the redetermination.

(4) *Exercise of Option*. The option provided for in subdivision (a)(2) of this article shall be exercised in writing on or before the January 1 due date of the first payment of the capital component of the Transportation Charge for the year in which the option is to become effective. Such option, once having been exercised, shall be applicable for all of the remaining years of the Project Repayment Period.

(5) *Project Interest Rate Adjustments.* Notwithstanding the provisions of subdivision (a)(2) of this article, adjustments for prior overpayments and

underpayments shall be repaid beginning in the year following the redetermination by application of a unit rate per acre-foot which, when paid for the projected portion of the District's Annual Table A Amount will return to the State, during the Project Repayment Period, together with interest thereon computed at the Project Interest Rate and compounded annually, the full amount of the adjustments resulting from financing after January 1, 1987, from all bonds, advances, or loans listed in Article 1(ad) except for Article 1(ad)(3) and except for bonds issued by the State under the Central Valley Project Act after January 1, 1987 for facilities not listed among the Water System Facilities in Article 1(ap). Notwithstanding the immediately preceding exception, such amortization shall also apply to any adjustments in this component charge resulting from a change in the Project Interest Rate due to any refunding after January 1, 1986 on bonds issued under the Central Valley Project Act. However, amortization of adjustments resulting from items listed in subdivisions (1)(ad)(4) through (7) of Article 1 shall be limited to a period which would allow the Department to repay the debt service on a current basis until such time as bonds are issued to reimburse the source of such funding. In no event shall this amortization period be greater than the Project Repayment Period.

(6) *No Adjustment of Water System Facility Revenue Bond Financing Costs*. The use of Water System Facility Revenue Bonds for financing facilities listed in Article 1(ap) shall not result in adjustments for prior underpayments or overpayments of the capital component of the Transportation Charge to the District under the provisions of this article. In place of making such adjustments, charges to the District for Water System Facility Revenue Bond Financing Costs will be governed by Article 50(a).

(b) **Redetermination of Delta Water Charges and Transportation Charges for Costs Incurred On or After the Billing Transition Date**. The provisions of this subdivision (b) shall apply only to costs Incurred on or after the Billing Transition Date.

(1) *Determinative Factors Subject to Retroactive Change*. The State shall redetermine the values and amounts set forth in Tables B through F and Tables J through O of this contract each calendar year commencing on or after the Billing Transition Date in order that the Delta Water Charge and the Transportation Charge to the District for costs Incurred on or after the Billing Transition Date and the components thereof may accurately reflect the increases or decreases from year to year in projected costs, outstanding reimbursable indebtedness of the State Incurred to construct Project Conservation Facilities and Project Transportation Facilities, Annual Table A Amounts, estimated deliveries, and all other factors which are determinative of such charges. In addition, each such redetermination shall include an adjustment of the components of the Delta Water Charge and Transportation Charge to be paid by the District for succeeding years which shall account for the differences, if any, between those factors used by the State in determining the amounts of such components for all preceding years and the factors as then currently known by the State, as

applicable. Such adjustment shall be computed by the State and paid by the District or credited to the District's account in the manner described in subdivisions (b)(2) and (b)(3) of this article.

(2) *Adjustment: Delta Water Charge and Transportation Charge -- Capital Components for Costs Incurred On or After the Billing Transition Date*. Adjustments for prior underpayments or overpayments of the capital component of the Delta Water Charge and the Transportation Charge to the District for costs Incurred on or after the Billing Transition Date shall be paid in the year following the redetermination.

(3) *Adjustment: Delta Water Charge and Transportation Charge -- Minimum and Variable Components for Costs Incurred On or After the Billing Transition Date* One-twelfth of the adjustments for prior underpayments or overpayments of the District's minimum operation, maintenance, power, and replacement component and variable operation, maintenance and power component of the Delta Water Charge and Transportation Charge for each year shall be added or credited to the corresponding components to be paid in the corresponding month of the year following the redetermination.

29. TIME AND METHOD OF PAYMENT OF DELTA WATER CHARGE AND TRANSPORTATION CHARGE.

The provisions of this article shall apply to costs Incurred both prior to and on or after the Billing Transition Date. References to the Delta Water Charge shall include the Delta Water Charge for costs Incurred prior to the Billing Transition Date and the Delta Water Charge for costs Incurred on or after the Billing Transition Date, separately, as applicable, and references to the Transportation Charge shall include the Transportation Charge for costs Incurred prior to the Billing Transition Date and the Transportation Charge for costs Incurred on or after the Billing Transition Date, separately, as applicable.

(a) **Initial Payments.**

(1) *Delta Water Charge.* Payments by the District under the Delta Water Charge shall commence in the Year of Initial Water Delivery to the District.

(2) *Capital Component of the Transportation Charge*. Payments by the District under the capital component of the Transportation Charge shall commence in the year following the year in which the State commences construction of the Project Transportation Facilities.

(3) *Minimum Operation, Maintenance, Power, and Replacement Component*. Payments by the District under the minimum operation, maintenance, power, and replacement component of the Transportation Charge shall commence for each aqueduct reach in the year following the year in which construction of that reach is completed.

(4) *Variable Operation, Maintenance, Power, and Replacement Component*. Payments by the District under the variable operation, maintenance, power and replacement component of the Transportation Charge shall commence in the Year of Initial Water Delivery to the District.

(b) **Annual Statement of Charges.** The State shall, on or before July 1 of each year, commencing with the year preceding the year in which payment of the respective charge is to commence pursuant to this article, furnish the District with a written statement of the following items:

(1) the charges to the District for the next succeeding year under the capital components and minimum operation, maintenance, power, and replacement components of the Delta Water Charges and Transportation Charges; *provided* that charges for Financing Costs shall be stated as separate items in the Statement of Charges;

(2) the unit charges to the District for the next succeeding year under the variable operation, maintenance, power and replacement components of the

Delta Water Charge and Transportation Charge; and

(3) the total charges to the District for the preceding year under the variable operation, maintenance, power and replacement components of such Delta Water Charge and Transportation Charge; *provided* that through December 31, 1969, the Delta Water Charge shall be based upon a unit rate of $3.50 per acre-foot and shall be paid by the Contractors on the basis of their respective Annual Table A Amounts, as provided in Article 22(b).

All such statements shall be accompanied by the latest revised copies of the documents amendatory to Article 22 and of the tables included in Articles 24 through 27, together with such other data and computations used by the State in determining the amounts of the above charges as the State deems appropriate.

(c) **Monthly Statements**. The State shall, on or before the fifteenth day of each month of each year, commencing with the Year of Initial Water Delivery to the District, furnish the District with a statement of the charges to the District for the preceding month under the variable operation, maintenance, power and replacement components of the Delta Water Charge and Transportation Charge. Such charges shall be determined by the State in accordance with the relevant provisions of Articles 22 and 26 of this contract, upon the basis of metered deliveries of Project Water to the District, except as otherwise provided in those articles.

(d) **Semiannual Payments of Capital Components**. The District shall pay to the State, on or before January 1 of each year, one-half (1/2) of the charge to the District for the year under the capital component of the Delta Water Charge and one-half (1/2) of the charge to the District for the year under the capital component of the Transportation Charge, as such charges are stated pursuant to subdivision (b) of this article; and shall pay the remaining one-half (1/2) of each of such charges on or before July 1 of that year.

(e) **Monthly Payments of Minimum Operation, Maintenance, Power, and Replacement Component**. The District shall pay to the State, on or before the first day of each month of each year, one-twelfth (1/12) of the sum of the charges to the District for the year under the minimum operation, maintenance, power, and replacement components of the Delta Water Charge and Transportation Charge, respectively, as such charges are stated pursuant to subdivision (b) of this article.

(f) **Monthly Payments of Variable Operation, Maintenance, Power, and Replacement Component**. The District shall pay to the State on or before the fifteenth day of each month of each year, the charges to the District under the variable operation, maintenance, power, and replacement components of the Delta Water Charge and Transportation Charge, respectively, for which a statement was received by the District during the preceding month pursuant to subdivision (c) of this article, as such charges are stated in such statement.

(g) **Contest of Charges**. In the event that the District in good faith contests the accuracy of any statement submitted to it pursuant to subdivision (b) or (c) of this article, it shall give the State notice thereof at least ten (10) days prior to the day upon which payment of the stated amounts is due. To the extent that the State finds the District's contentions regarding the statement to be correct, it shall revise the statement accordingly, and the District shall make payment of the revised amounts on or before the due date. To the extent that the State does not find the District's contentions to be correct, or where time is not available for a review of such contentions prior to the due date, the District shall make payment of the stated amounts on or before the due date, but may make the contested part of such payment under protest and seek to recover the amount thereof from the State.

50. WATER SYSTEM FACILITY REVENUE BOND FINANCING COSTS.

(a) **Water System Facility Revenue Bonds to Finance Capital Costs Incurred Prior to the Billing Transition Date.** The provisions of this subdivision (a) shall apply to the Financing Costs of Revenue Bonds issued to finance Water System Facility Capital Costs Incurred prior to the Billing Transition Date. Charges to all Contractors for such Financing Costs shall return to the State each year an amount equal to the Financing Costs the State incurs in that year for such Water System Facility Revenue Bonds.

(1) *Elements of Charge*. Annual charges to recover such Water System Facility Revenue Bond Financing Costs shall consist of two elements.

(A) The first element shall be an annual charge to the District for repayment of Capital Costs of Water System Facilities as determined under Articles 22(a) and 24(a) of this contract with interest at the Project Interest Rate. For conservation facilities, the charge shall be a part of the capital component of the Delta Water Charge in accordance with the provisions of Article 22(a) applicable to Capital Costs Incurred prior to the Billing Transition Date. For transportation facilities, the charge shall be a part of the capital component of the Transportation Charge in accordance with the provisions of Article 24(a) applicable to Capital Costs Incurred prior to the Billing Transition Date.

(B) The second element shall be the District's share of a Water System Facility Revenue Bond Surcharge to be paid in lieu of a Project Interest Rate adjustment. The total annual amount to be paid by all Contractors under this element shall be the difference between the total annual charges under the first element and the annual Financing Costs of the related Water System Facility Revenue Bonds. The amount to be paid by each Contractor shall be calculated annually as if the Project Interest Rate were increased to the extent necessary to produce revenues from all Contractors sufficient to pay such difference for that year. In making that calculation, adjustments in the District's transportation capital component charges for prior overpayments and underpayments shall be determined as if amortized over the remaining years of the Project Repayment Period.

(2) *Identification of Surcharge on Invoices.* The Water System Facility Revenue Bond Surcharge will be identified in the District's invoice.

(3) *Timing of Surcharge Payments*. Surcharge payments shall be made in accordance with Article 29(f) of this contract.

(4) *Termination of Surcharge*. The Water System Facility Revenue Bond Surcharge under Article 50(a)(1)(B) shall cease for each series of Water System Facility Revenue Bonds when that series is fully repaid. However, the

annual charge determined pursuant to Article 50(a)(1)(A) shall continue to be collected for the time periods otherwise required under Articles 22 and 24.

(5) *Reduction of Charges.* After the Department has repaid the California Water Fund in full and after each series of Water System Facility Revenue Bonds is repaid, the Department will reduce the charges to all Contractors in an equitable manner in a total amount that equals the amount of the charges under Article 50(a)(1)(A) that the Department determines is not needed for future financing of facilities of the System which, in whole or in part, will serve the purposes of the water supply contract with the District.

(b) **Water System Facility Revenue Bonds to Finance Capital Costs Incurred On or After the Billing Transition Date**. The provisions of this subdivision (b) shall apply to the Financing Costs of Revenue Bonds issued to finance Water System Facility Capital Costs Incurred on or after the Billing Transition Date. Charges to all Contractors for such Financing Costs shall return to the State each year an amount equal to the Financing Costs the State incurs in that year for such Water System Facility Revenue Bonds. The amount of this charge shall be calculated in two steps as follows:

(1) *Allocation of Water System Facility Capital Costs.* Capital Costs Incurred on or after the Billing Transition Date of Water System Facilities that are conservation facilities shall be allocated among all Contractors in proportion to each Contractor's Maximum Annual Table A Amount. Capital Costs Incurred on or after the Billing Transition Date of Water System Facilities that are transportation facilities shall be allocated among all Contractors in accordance with Article 24(c).

(2) *Determination of Annual Financing Cost Amounts.* The State shall determine and charge the District each year the amount of the Financing Costs the State incurs in that year for the Water System Facility Revenue Bonds issued to finance such Water System Facility Capital Costs allocated to the District.

(c) **Provisions Applicable to All Water System Facility Revenue Bonds.** The provisions of this article shall apply to all Water System Facility Revenue Bonds.

(1) *Credits for Excess Amounts.* The State shall provide credits to the Contractors for excess reserve funds, excess debt service coverage, interest, and other earnings of the State in connection with payment of the Financing Costs of such Water System Facility Revenue Bonds, when and as permitted by the applicable bond resolution or indenture. When such credits are determined by the State to be available, such credits shall be promptly provided to the Contractors and shall be in proportion to the payments of Water System Facility Revenue Bond Financing Costs from each Contractor. Reserves, bond debt service coverage, interest, and other earnings may be used to retire bonds.

(2) *Allocation of Maturities Permitted.* When calculating charges for Water System Facility Revenue Bond Financing Costs, the State may allocate portions of particular maturities of Water System Facility Revenue Bonds and the Financing Costs associated with such maturities to particular Water System Facilities, in order to establish a reasonable relationship between the Economic Useful Life of such facilities and the term of bonds issued to finance such facilities, and may determine the Financing Costs allocated to the District on the basis of such maturity allocation.

(3) *Supplemental Bills for Unanticipated Financing Costs.* The State may submit a supplemental bill to the District for the year if necessary to meet unanticipated costs for Water System Facility Revenue Bond Financing Costs for which the State can issue a statement of charges under this article and any other article of this contract providing for payments that are pledged to the payment of Revenue Bonds issued to finance Project Facility Capital Costs allocated to the District. The relative amounts of any supplemental billing made to the District and to other Contractors for Revenue Bond purposes shall be governed by the otherwise applicable article. Payment of any supplemental billing shall be due thirty days after the date of the invoice.

(4) *Insurance on Contractor Obligations.* To the extent economically feasible and justifiable, as determined by the State after consultation with Contractors, the State shall maintain insurance or other forms of security protecting bondholders and non-defaulting Contractors against costs resulting from the failure of any Contractor to make the payments required by this article.

(5) *Consultation on Financing Plan.* Before issuing each series of Water System Facility Revenue Bonds, the State shall consult with the Contractors, prepare a plan for the State's future financing of Water System Facilities, and give the District an opportunity to comment on the plan. The plan shall include but not be limited to the size of any Water System Facility Revenue Bond issuances and the form of any necessary resolutions, indentures or supplements.

(6) *Defaults.*

(A) If a Contractor defaults partially or entirely on its payment obligations with respect to Water System Facility Revenue Bond Financing Costs and sufficient insurance or other security protecting the non-defaulting Contractors is not provided under subdivision (c)(4) of this article, the State shall allocate a portion of the default to each non-defaulting Contractor. The District's share of the default shall be equal to an amount determined by multiplying the total default amount to be charged to all non-defaulting Contractors by the ratio that the District's Maximum Annual Table A Amount bears to the total of the Maximum Annual Table A Amounts of all non-defaulting Contractors. However, such amount shall not exceed in any year 25 percent of the Water System

Facility Revenue Bond Financing Costs that are otherwise payable by the District in that year. The amount of default to be charged to non-defaulting Contractors shall be reduced by any receipts from insurance protecting non-defaulting Contractors and bond debt service coverage from a prior year and available for such purpose.

(B) If a Contractor defaults partially or entirely on its payment obligations under this article, the State shall also pursuant to Article 20, upon six months' notice to the defaulting Contractor, suspend water deliveries under Article 20 to the defaulting Contractor so long as the default continues. The suspension of water deliveries shall be proportional to the ratio of the default to the total Water System Facility Revenue Bond Financing Cost payments due from the defaulting Contractor. However, the State may reduce, eliminate, or not commence suspension of deliveries pursuant to this subparagraph if it determines suspension in the amounts otherwise required is likely to impair the defaulting Contractor's ability to avoid further defaults or that there would be insufficient water for human consumption, sanitation, and fire protection. The State may distribute the suspended water to the non-defaulting Contractors on terms it determines to be equitable.

(C) During the period of default, credits otherwise due the defaulting Contractor shall be applied to payments due from the defaulting Contractor.

(D) Except as otherwise provided in subparagraph (c) of this article, the defaulting Contractor shall repay the entire amount of the default to the State with interest compounded annually at the Surplus Money Investment Fund rate before water deliveries that had been suspended shall be fully resumed to that Contractor. If the defaulting Contractor makes a partial repayment of its default, the Department may provide a proportional restoration of suspended deliveries. The amount of the default to be repaid shall include any amounts previously received by the State from insurance proceeds, bond debt service coverage, or other reserves, and payments from other Contractors pursuant to this subparagraph (c)(6). The defaulting Contractor shall not be entitled to any make-up water deliveries as compensation for any water deliveries suspended during the period when the Contractor was in default.

(E) At such time as the default amount is repaid by the defaulting Contractor, the non-defaulting Contractors shall receive credits in proportion to their contributions towards the amount of the default with interest collected by the State on the defaulted amount.

(F) In the event there is an increase in the amount a non-defaulting Contractor contributes to reserves and/or bond debt service coverage, such increase shall be handled in the same manner as provided in subparagraph (a) of this article.

(G) Action taken pursuant to this subdivision shall not deprive the State of or limit any remedy provided by this contract or by law for the recovery of money due or which may become due under this contract.

(7) *No Article 51 Reduction.* Amounts of Water System Facility Revenue Bond Financing Costs payable under this contract shall not be affected by any reductions in payments pursuant to Article 51.

(8) *Contract Extension.* In the event the Contract Extension Amendment takes effect, but not all Contractors sign the amendment, the following shall apply: If and to the extent that the charges under Article 50(b)(1) and 50(b)(2) of the water supply contracts of Contractors that have not executed the Contract Extension Amendment ("non-signing Contractors") are not sufficient to recover the annual Financing Costs that relate to Revenue Bonds issued to finance capital costs that are Incurred after the Billing Transition Date and are allocable to such non-signing Contractors, the amount of the shortfall shall be determined. Such shortfall shall be charged to the Contractors that have executed the Contract Extension Amendment ("signing Contractors") in proportion to each such signing Contactor's total Water System Facility Revenue Bond Financing Cost charges under Article 50(b) of this contract.

51. FINANCIAL ADJUSTMENTS.

(a) Article Expiration.

This Article 51 shall be effective through December 31, 2035 and shall be of no further effect on and after January 1, 2036; provided, however, that the provisions of this Article 51 may, to the extent applicable, continue to be used and applied on and after January 1, 2036 for the purpose of truing up amounts owed by the District to the State or by the State to the District for the calendar years up to and ending with calendar year 2035.

(b) State Water Facilities Capital Account.

(1) The State shall establish a State Water Facilities Capital Account to be funded from revenues available under Water Code section 12937(b)(4). Through procedures described in this article and as limited by this article, the State may consider as a revenue need under subdivision (c)(2)(v) of this article and may deposit in the State Water Facilities Capital Account the amounts necessary to pay capital costs of the State Water Facilities for which neither general obligation bond nor revenue bond proceeds are available, including but not limited to planning, reconnaissance and feasibility studies, the San Joaquin Valley Drainage Program and, through the year 2000, the CALFED Bay-Delta Program.

(2) The Director of the Department of Water Resources shall fully consult with the Contractors and consider any advice given prior to depositing funds into this account for any purposes. Deposits into this account shall not exceed the amounts specified in subdivision (c)(2)(v) of this article.

(3) The State shall use revenue bonds or other sources of moneys rather than this account to finance the costs of construction of any major capital projects.

(4) Five years following the Contract Extension Amendment Effective Date, the SWRDS Finance Committee shall review the State Water Facilities Capital Account to determine whether to recommend to the Director that this account be closed. If the Director determines to close the account, the State shall transfer any balance in the account to the SWRDS Support Account.

(5) Unless closed sooner, the State Water Facilities Capital Account shall terminate on December 31, 2035 and the State shall transfer any balance in such account to the SWRDS Support Account.

(c) **Calculation of Financial Needs.**

(1) Each year the State shall calculate in accordance with the timing provisions of Articles 29 and 31 the amounts that would have been charged (but for this article) to each Contractor as provided in other provisions of this contract.

(2) Each year the State shall also establish its revenue needs for the following year for the following purposes, subject to the following limitations:

(i) The amount required to be collected under the provisions of this contract, other than this article, with respect to all revenue bonds issued by the State for Project Facilities.

(ii) The amount required for payment of the reasonable costs of the annual maintenance and operation of the State Water Resources Development System and the replacement of any parts thereof as described in Water Code section 12937(b)(1). These costs shall not include operation and maintenance costs of any Federal Central Valley Project facilities constructed by the United States and acquired by the State of California after 1994, other than the State's share of the joint use facilities which include San Luis Reservoir, the San Luis Canal and related facilities.

(iii) The amount required for payment of the principal of and interest on the bonds issued pursuant to the Burns-Porter Act as described in Water Code section 12937(b)(2).

(iv) Any amount required for transfer to the California Water Fund in reimbursement as described in Water Code section 12937(b)(3) for funds utilized from said fund for construction of the State Water Resources Development System.

(v) For the years 1998 and thereafter, the amount needed for deposits into the State Water Facilities Capital Account as provided in subdivision (b) of this article, but (A) not more than $6 million per year for the years 1998, 1999 and 2000, and (B) not more than $4.5 million per year for the years 2001 and thereafter.

(3) The State shall reduce the annual charges in the aggregate for all Contractors by the amounts by which the hypothetical charges calculated pursuant to subdivision (c)(1) above exceed the revenue needs determined pursuant to subdivision (c)(2) above; provided that the reduction in annual charges in the aggregate for all Contractors shall not exceed $48 million in any year beginning with the first calendar year following the Contract Extension Amendment Effective Date. The provisions regarding the reduction in annual charges that were in effect prior to the Contract Extension Amendment Effective Date shall continue to apply to the entire calendar year in which the Contract Extension Amendment Effective Date

occurs. The reductions under this article shall be apportioned among the Contractors as provided in subdivisions (d), (e), (f) and (g) of this article. Reductions to Contractors shall be used to reduce the payments due from the Contractors on each January 1 and July 1; provided, however, that to the extent required pursuant to subdivision (h) of this article, each Agricultural Contractor shall pay to the Agricultural Rate Management Trust Fund an amount equal to the reduction allocated to such Agricultural Contractor. Any default in payment to the trust fund shall be subject to the same remedies as any default in payment to the State under this contract. To determine whether the reduction in annual charges in the aggregate for all Contractors equals the $48 million limit specified in this subdivision (c)(3), it shall be assumed that all Contractors have executed the Contract Extension Amendment and will share in the available rate reductions consistent with the proportions as provided in this contract, regardless of whether one or more Contractors do not receive a reduction under their respective Water Supply Contracts.

(4) The supplemental billing provisions authorized under this Article 51(c)(4) shall remain in effect through December 31, 2035, unless the Director determines in his or her discretion to eliminate the use of supplemental billing prior to that date or the Director in his or her discretion accepts a recommendation from the SWRDS Finance Committee to eliminate the use of supplemental billing prior to that date.

(i) The State shall inform the SWRDS Finance Committee if the available System cash balances are projected by the State to fall during the succeeding one hundred twenty (120) days to an amount below an amount equal to ninety (90) days operating expenditures. The SWRDS Finance Committee shall make a recommendation in light of such circumstances to the Director.

(ii) The State may submit a supplemental billing to the District for the year in an amount not to exceed the amount of the prior reductions for such year under this Article if necessary to meet unanticipated costs for purposes identified in Water Code Section 12937(b)(1) and (2) for which the State can issue billings under other provisions of this contract, subject to the following procedures and limitations:

(a) The State may only issue supplemental bills pursuant to the provisions of this Article 51(c)(4) when available System cash balances are projected to be less than the amount equal to 90 days operating expenditures.

(b) The term "available System cash balances," for purposes of subdivision (a) of this Article 51(c)(4)(ii) shall mean available amounts in the following California Water Resources Development Bond Fund accounts: System Revenue Account (to the extent the funds in the System Revenue Account are not projected to be needed for payment of Burns-Porter General Obligation Bond debt service within the next two years), General Operating Account, SWRDS Reinvestment Account, and SWRDS Support Account (to the extent the funds in the SWRDS Support Account are not projected to be needed for non-reimbursable expenditures within the next two years).

(c) The term "operating expenditures" for purposes of subdivision (a) of this Article 51(c)(4)(ii) shall mean the costs described in California Water Code Section 12937(b) chargeable to the State Water Project as water supply.

(d) Any supplemental billing made to the District for these purposes shall be in the same proportion to the total supplemental billings to all Contractors for these purposes as the prior reduction in charges to the District in that year bears to the total reduction in charges to all Contractors in that year and shall be treated as reducing the amount of the reduction made available for that year to the Contractor by the amount of the supplemental bill to the Contractor.

(5) The State may also submit a supplemental billing to the District for the year if necessary to meet unanticipated costs for revenue bond debt service and coverage for which the State can issue a statement of charges under provisions of this contract other than this article. The relative amounts of any supplemental billing made to the District and to other Contractors for revenue bond purposes shall be governed by such other applicable provisions of this contract.

(6) Payment of any supplemental billing shall be due thirty days after the date of the invoice. Delinquency and interest on delinquent amounts due shall be governed by Article 32.

(d) **Apportionment of Reductions between Agricultural and Urban Contractors.**

(1) Commencing with the first calendar year following the Contract Extension Amendment Effective Date, the State shall apportion available reductions for each year in accordance with this Article.

(2) Annual reductions in the aggregate amount of $48 million are projected to be available in the first calendar year following the Contract Extension Amendment Effective Date and each succeeding year through calendar year 2035 and shall be applied as follows:

(i) If reductions are available in an aggregate amount that equals $48 million, $11,856,000 of reductions shall be apportioned among the Agricultural Contractors, and $36,144,000 of reductions shall be apportioned among the Urban Contractors.

(ii) If reductions are available in an aggregate amount less than $48 million in any of these years, the reductions shall be divided on a 24.7%-75.3% basis between the Agricultural Contractors and the Urban Contractors respectively.

(3) No Contractor shall be entitled to receive in any year any additional reductions, including any additional reductions to make up for deficiencies in past projected reductions and any additional reductions above an aggregate annual amount of $48 million.

(4) Reductions in annual charges to a Contractor pursuant to this Article 51 (d) shall only be made prospectively beginning with the later of the first calendar year following the Contract Extension Amendment Effective Date or the first calendar year following the date the Contractor executes the Contract Extension Amendment. Apportionments of reductions shall be calculated on the assumption that all Contractors have executed such amendment.

(e) **Revenues and Reports.**

(1) Each year, beginning with the first calendar year commencing after the Contract Extension Amendment Effective Date, the Director shall determine the amount of available Article 51(e) Amounts. The Director shall determine the aggregate amount that would have been charged to all Contractors in any year but for this Article 51 and from that amount shall deduct the sum of

(i) the amount of revenues needed for the purposes specified in subdivisions (c)(2)(i), (ii), (iii), (iv) and (v) plus

(ii) $48 million.

The remaining amount, if any, shall be referred to herein as "Article 51(e) Amounts".

(2) The State shall allocate available Article 51(e) Amounts as follows: The Director in his or her discretion shall allocate and transfer or deposit up to 80% of available Article 51(e) Amounts, as determined on a projected basis, and up to 100% of available Article 51(e) Amounts, as determined on an actual basis, into the General Operating Account, the SWRDS Support Account and/or the SWRDS Reinvestment Account. Any Article 51(e) Amounts determined on an actual basis to be remaining in the Systems Revenue Account after the Director allocates and transfers such amounts to the General Operating Account, the SWRDS Support Account and/or the SWRDS Reinvestment Account shall remain in the Systems Revenue Account and shall be tracked separately in the State's Financial Information System. The Director shall have full discretion regarding the use of the amounts remaining in the Systems Revenue Account.

(3) The State shall prepare and distribute an Annual Rate Reduction Determination Report setting out the factors used to determine reductions in rates pursuant to Article 51(c). The report shall include a display of the distribution of gross annual revenues before, among other items, recreation and fish and wildlife expenditures, contributions to the State Water Facilities Capital Account and reduction in rates pursuant to Article 51(c). The report shall also include a display of the distribution and/or allocation of net annual revenues after reduction in rates pursuant to Article 51(c), to the General Operating Account, SWRDS Support Account, SWRDS Reinvestment Account, 51(e) Sub-Account of the Systems Revenue Account, Davis-Dolwig Fund, State Water Facilities Capital Account, and Suspended Costs, as applicable.

(4) The System Financial Activity Report, which is required to be prepared quarterly pursuant to Article 61(d), shall include annual and accumulated Article 51(e) Amounts and expenditure activity, including the beginning balance, the annual activity and the ending balance for the year for each fund or account into which Article 51(e) Amounts have been transferred or deposited. The System Financial Activity Report should also have sufficient detail to provide comprehensive accounting of annual Article 51(e) Amounts and the uses of the annual Article 51(e) Amounts to enable the SWRDS Finance Committee to assess the use of these amounts.

(f) Apportionment of Reductions Among Urban Contractors.

Reductions in annual charges apportioned to Urban Contractors under subdivision (d) of this article shall be further allocated among Urban Contractors pursuant to this subdivision. The amount of reduction of annual charges for each Urban Contractor shall be based on each Urban Contractor's proportionate share of total allocated capital costs as calculated below, for both project conservation and project transportation facilities, repaid by all Urban Contractors over the project repayment period.

(1) The conservation capital cost component of the reduction allocation shall be apportioned on the basis of maximum annual Table A amount. Each Urban Contractor's proportionate share shall be the same as the percentage of that Contractor's maximum annual Table A amount to the total of all Urban Contractors' maximum annual Table A.

(2) The transportation capital cost component of the reduction allocation shall be apportioned on the basis of transportation capital cost component repayment obligations, including interest over the project repayment period. Each Urban Contractor's proportionate share shall be the same as the percentage that the Contractor's total transportation capital cost component repayment obligation is of the total of all Urban Contractors' transportation capital cost component repayment obligations.

(i) Recalculations shall be made annually through the year 1999. Beginning in the year 2000 recalculations shall be made every five years unless an Urban Contractor requests a recalculation for an interim year and does so by a request in writing delivered to the Department by January 1 of the year in which the recalculation is to take place.

(ii) The transportation capital cost component repayment obligations, for purposes of this Article 51(f), shall be based in the year of recalculation on the then most recent Department of Water Resources Bulletin 132, Table B-15, "Capital Cost Component of Transportation Charge for Each Contractor," or its equivalent, excluding any costs or Table A amount associated with transfers of Table A amounts from Agricultural Contractors pursuant to Article 53.

(3) To reflect the relative proportion of the conservation capital cost component and the transportation capital cost component to the total of all capital cost repayment obligations, the two cost components shall be weighted as follows:

(i) The conservation capital cost component shall be weighted with a thirty percent (30%) factor. The weighting shall be accomplished by multiplying each Urban Contractor's percentage of maximum annual Table A Amounts as calculated in subdivision (f)(1) of this article by thirty percent (30%).

(ii) The transportation capital cost component shall be weighted with a seventy percent (70%) factor. The weighting shall be accomplished by multiplying each Urban Contractor's percentage of transportation capital cost component repayment obligations as calculated in subdivision (f)(2) of this article by seventy percent (70%).

(iii) A total, weighted capital cost percentage shall be calculated for each Urban Contractor by adding the weighted conservation capital cost component percentage to their weighted transportation capital cost component percentage.

(4) The total amount of the annual charges to be reduced to Urban Contractors in each year shall be allocated among them by multiplying the total amount of annual charges to be reduced to the Urban Contractors by the total, weighted capital cost percentages for each such Contractor. If the amount of the reduction to an Urban Contractor is in excess of that Contractor's payment obligation to the Department for that year, such excess shall be reallocated among the other Urban Contractors.

(5) In the case of a permanent transfer of urban Table A amounts, the proportionate share of annual charge reductions associated with that Table A amount shall be transferred with the Table A amount to the buying Contractor. In the case of an Table A amount transfer by either Santa Barbara County Flood Control and Water Conservation District or San Luis Obispo County Flood Control and Water Conservation District, the reductions in annual charges to that agency shall be allocated (a) on the basis of that Table A amount being retained by that agency which bears Coastal Branch Phase II transportation costs, (b) on the basis of that Table A amount being retained by that agency which does not bear Coastal Branch Phase II transportation costs, and (c) on the basis of the balance of that agency's Table A amount which also does not bear Coastal Branch Phase II transportation costs.

(g) **Apportionment of Reductions Among Agricultural Contractors.**

(1) Reductions in annual charges apportioned to Agricultural Contractors under subdivision (d) of this article shall be allocated among the Agricultural Contractors pursuant to this subdivision. The amount of reduction of annual charges for each Agricultural Contractor for the years 1997 through 2001 shall be based on each Agricultural Contractor's estimated proportionate share of the total project costs, excluding the variable operation, maintenance, power and replacement components of the Delta Water Charge and the Transportation Charge and also excluding off-aqueduct power charges, to be paid by all Agricultural Contractors for the years 1997 through 2035, calculated without taking into account this article. For purposes of these calculations, Kern County Water Agency's and Dudley Ridge Water District's estimated project costs shall not

include any costs associated with the 45,000 acre-feet of Annual Table A Amounts being permanently relinquished by those Contractors pursuant to subdivision (j) of Article 53. Also, for purposes of these calculations, an Agricultural Contractor's estimated project costs shall not be reduced by the transfer of any of the 130,000 acre-feet of Annual Table A Amounts provided for in subdivisions (a) through (i) of Article 53. The proportionate shares for 1997 through 2001 shall be calculated as follows:

(i) Each Agricultural Contractor's statement of charges received on July 1, 1994, shall be the initial basis for calculating the proportionate shares for the five years 1997 through 2001.

(ii) Each Agricultural Contractor's estimated capital and minimum components of the Delta Water Charge and the Transportation Charge (excluding off-aqueduct power charges) and Water Revenue Bond Surcharge shall be totaled for the years 1997 through 2035.

(iii) Kern County Water Agency and Dudley Ridge Water District totaled costs shall be reduced for the 45,000 acre-feet of annual Table A amount being permanently relinquished by them.

(iv) Any reductions in an Agricultural Contractor's totaled costs resulting from the transfer of any of the 130,000 acre-feet of annual Table A amount shall be re-added to that Contractor's costs.

(v) Each Agricultural Contractor's proportionate share shall be computed by dividing that Contractor's total costs by the total costs for all Agricultural Contractors determined pursuant to subparagraphs (ii), (iii) and (iv) above.

(2) The reductions in annual charges, for 1997 through 2001, shall be calculated using the method described in subdivision (g)(1) of this article.

(3) The allocation shall be recalculated using the same method described in subdivision (g)(1) of this article every five years beginning in 2002, if any Agricultural Contractor requests such a recalculation. Any recalculation shall be based on project cost data beginning with the year that the recalculation is to become effective through 2035.

(h) Agricultural Rate Management Trust Fund.

(1) Establishment. Through a trust agreement executed contemporaneously with this amendment, the State and the Agricultural Contractors that sign the Monterey Amendments shall establish the Agricultural Rate Management Trust Fund with a mutually agreed independent trustee.

(2) Separate Accounts. The trustee shall maintain within the trust fund a separate account for each Agricultural Contractor that signs the trust agreement to hold deposits made pursuant to this article.

(3) Deposits. Each Agricultural Contractor that signs the trust agreement shall deposit into such Contractor's account within the trust fund, at the same time as payments would otherwise be required by this contract to be made to the State, an amount equal to the amount by which such Contractor's charges under this contract have been reduced by reason of this article, until the balance in such Contractor's account within the trust fund is the same percentage of $150,000,000 as such Contractor's percentage share of reductions made available to all Agricultural Contractors as specified in subdivision (g) of this article. In 2002 and every fifth year thereafter, the Agricultural Contractors will review the maximum accumulation in the trust fund (the "Cap") and determine whether the cap should be adjusted. However, the Cap shall not be reduced below an aggregate of $150,000,000 for all Agricultural Contractor accounts.

(4) Trust Fund Disbursements.

(i) In any year in which the State's allocation of water to an Agricultural Contractor by April 15th of that year is less than one-hundred percent (100%) of the Contractor's requested annual Table A amount for that year, the trustee shall, to the extent there are funds in that Contractor's account, distribute to the State from such account for the benefit of that Contractor an amount equal to the percentage of the total of that Contractor's statement of charges for that year, as redetermined by the State on or about May 15th of that year, for (a) the Delta Water Charge; (b) the capital cost and minimum operation, maintenance, power and replacement components of the Transportation Charge (including off-aqueduct power charges); and (c) the water system revenue bond surcharge, that is equal to the percentage of that Contractor's annual Table A amount for that year that was not allocated to it by the State by April 15th of that year.

(ii) In addition to the provisions of subdivision (h)(4)(i) of this article, if on April 15 of any year any of the irrigable land within the Tulare Lake Basin Water Storage District (Tulare) is flooded, and Tulare in writing requests the trustee to do so, the trustee shall, to the extent there are funds in Tulare's account, distribute to the State from such account for the benefit of Tulare an amount equal to the percentage of the total of Tulare's statement of charges for that year, as redetermined by the State on or about May 15th of that year, for (a) the Delta Water Charge; (b) the capital cost and minimum components of the Transportation Charge (including off-aqueduct power charges); and (c) the water system revenue bond surcharge, that is equal to the percentage of the irrigable land within Tulare that is flooded on April 15.

(iii) Each Agricultural Contractor shall remain obligated to make payments to the State as required by other articles in this contract. Any amount to be disbursed pursuant to subdivisions (h)(4)(i) and (h)(4)(ii) shall be paid by the trustee to the State on July 1 of the year involved and shall be credited by the State toward any amounts owed by such respective Agricultural Contractor to the State as of that date. However, an Agricultural Contractor may direct the trustee to make the disbursement to that Agricultural Contractor which shall in turn make the payment to the State as required by other provisions of this contract. If the amount to be disbursed exceeds the amount owed to the State by such Contractor as of July 1, the excess shall be disbursed by the Trustee to the State at the time of and in payment of future obligations owed to the State by such Contractor. Alternatively, upon the request of such Contractor, all or part of the excess shall be paid by the trustee to that Contractor in reimbursement of prior payments by the Contractor to the State for that year.

(5) Payment of Supplemental Bills. In any year in which a supplemental bill has been submitted to an Agricultural Contractor pursuant to subdivision (c)(4) of this article, such supplemental bill shall be treated as reducing by an equal amount the obligation of such Contractor for that year to make payments into the Agricultural Rate Management Trust Fund. To the extent that such Contractor has already made payments to the trust fund in an amount in excess of such Contractor's reduced trust fund payment obligation, such Contractor may request the trustee to use the excess from the trust fund to pay the supplemental bill.

(6) Discharge of Payment Obligation. Each payment to the State by the trust fund shall discharge and satisfy the Agricultural Contractor's obligation to pay the amount of such payment to the State. No reimbursement of the trust fund by the Agricultural Contractor for such payments shall be required. However, each Agricultural Contractor shall continue to make deposits to the trust fund matching the amount of each year's reductions as provided in subdivision (d) of this article so long as the amount in that Contractor's account is less than its share of the Cap.

(7) Distribution of Funds in Excess of the Cap. Whenever accumulated funds (including interest) in an Agricultural Contractor's account in the trust fund exceed that Contractor's share of the Cap, or the estimated remaining payments the Contractor is required to make to the State prior to the end of the project

repayment period, that Contractor may direct the trustee to pay such excess to the Contractor.

(8) Termination of Trust Fund. At the end of the project repayment period, the Agricultural Rate Management Trust Fund shall be terminated and any balances remaining in the accounts for each of the Agricultural Contractors shall be disbursed to the respective Agricultural Contractors.

(i) **Definitions. For the purposes of this article, the following definitions will apply:**

(1) "Agricultural Contractor" shall mean the following agencies as they now exist or in any reorganized form:

(i) County of Kings,

(ii) Dudley Ridge Water District,

(iii) Empire West Side Irrigation District,

(iv) Kern County Water Agency for 848,130 acre-feet of its Table A amount,

(v) Oak Flat Water District,

(vi) Tulare Lake Basin Water Storage District.

(2) "Urban Contractor" shall mean every other agency having a long term water supply contract with the State as they exist as of the date of this amendment or in any reorganized form as well as Kern County Water Agency for 134,600 acre-feet of its Table A amount.

(j) **Except as provided in subdivisions (c)(4) and (c)(5)**, this article shall not be interpreted to result in any greater State authority to charge the Contractors than exists under provisions of this contract other than this article.

NEW CONTRACT ARTICLE

II. ARTICLE 61 IS ADDED TO THE CONTRACT AS A NEW ARTICLE AS FOLLOWS:

61. FINANCIAL ACCOUNTS AND ACTIVITIES

(a) **General Operating Account**

(1) The State shall maintain a General Operating Account to provide the moneys needed for the following purposes:

(i) To pay or provide for the payment of System costs which are reimbursable by one or more Contractors under their respective Water Supply Contracts in the event System revenues available for such payment are insufficient for such purpose; or

(ii) To pay or provide for the payment of System costs for any System purpose in the event of a System emergency as defined in Article 61(a)(1)(iii).

(iii) A System Emergency, as used in this Article 61(a)(1)(ii) shall mean an immediate, urgent, critical, unexpected, or impending situation that, in the judgment of the Director may cause or pose a risk of causing injury, loss of life, damage to the property, impairment of the financial condition, and/or interference with the normal activities of the System which requires immediate attention and remedial action.

(2) The maximum amount in the General Operating Account shall be set, adjusted and funded as follows:

(i) Upon the Contract Extension Amendment Effective Date, the maximum amount shall be $150 million.

(ii) On or before the first September 1 occurring five (5) years after the Contract Extension Amendment Effective Date and every five (5) years thereafter, the State shall present a business case analysis of the maximum amount reasonably necessary or appropriate to be maintained in the General Operating Account, including an evaluation of the maximum amount and its relationship to the business risks associated with the System cash flow, to the SWRDS Finance Committee for recommendation to the Director regarding a General Operating Account maximum amount adjustment, provided that the maximum amount shall not be less than $150 million.

(iii) To fund the General Operating Account to its maximum amount, the Director may, in his or her discretion, transfer to the General Operating Account (1) amounts determined to be available pursuant to Article 51(e); (2) earnings from the investment of amounts in the General Operating Account; (3) amounts in the SWRDS Reinvestment Account; and (4) amounts in the SWRDS Support Account.

(iv) If the Director determines to decrease the maximum amount pursuant to Article 61(a)(2)(ii), or the maximum amount is otherwise exceeded, the excess amount in the General Operating Account shall be transferred to the SWRDS Reinvestment Account.

(v) The State shall replenish the amounts used from the General Operating Account (1) through charges to the Contractors to the extent the Contractors are obligated to reimburse the State for the costs paid with such amounts and (2) from the SWRDS Support Account or other available revenues (including the sources described in subparagraph (iii) of this Article 61(a)(2)) for costs not reimbursable by the Contractors under their respective Water Supply Contracts.

(vi) General Operating Account investment earnings shall be used to fund the General Operating Account to its maximum amount or, in the Director's discretion, transferred to the SWRDS Support Account and/or the SWRDS Reinvestment Account.

(3) The State shall prepare monthly reports on the balance in and use of the General Operating Account for the Director, and shall provide those reports to the SWRDS Finance Committee. The SWRDS Finance Committee may periodically review reporting frequency and make recommendations to the Director regarding reporting frequency.

(b) **SWRDS Reinvestment Account**

(1) Commencing with the Contract Extension Amendment Effective Date, the State shall establish and maintain a SWRDS Reinvestment Account to provide a continuing source of investment revenue to provide amounts to be transferred to or deposited in the General Operating Account, the SWRDS Reinvestment Account, and the SWRDS Support Account.

(2) To fund the SWRDS Reinvestment Account, the Director may, in his or her discretion, transfer to the SWRDS Reinvestment Account (i) amounts determined to be available pursuant to Article 51(e), (ii) earnings from the investment of amounts in the SWRDS Reinvestment Account, (iii) payments by

the Contractors for capital costs funded from the SWRDS Reinvestment Account, (iv) amounts from the SWRDS Support Account, and (v) amounts from the General Operating Account.

(3) Amounts in the SWRDS Reinvestment Account may be used and/or invested as follows:

(i) To pay capital costs of Project Facilities to the extent those costs are reimbursable by one or more Contractors under their respective Water Supply Contracts. Such capital costs shall be reimbursed to the State in accordance with item 5 of this subparagraph (b) below.

(ii) To pay capital costs of Project Facilities pending reimbursement of the State with the proceeds of revenue bonds issued by the State; and

(iii) To make temporary investments in accordance with the statutory limitations on such investments.

(4) The State shall prepare regular reports on the SWRDS Reinvestment Account for the Director and shall provide those reports to the SWRDS Finance Committee. The State shall consult with the SWRDS Finance Committee about the investments and activities to be funded from the SWRDS Reinvestment Account.

(5) *Amortization of Costs Financed with Amounts in the SWRDS Reinvestment Account.* Charges to amortize Project Facility Capital Costs paid with amounts from the SWRDS Reinvestment Account shall return to the State, in equal annual amounts over an amortization period determined by the State, the amount of each such cost together with an interest charge on the unamortized balance thereof.

(i) The length of such amortization periods may be from ten (10) to fifty (50) years, *provided* that if the capital asset has an Economic Useful Life of less than ten (10) years, the amortization period may be a comparable period of less than ten (10) years.

(ii) The interest charge shall be at a rate equal to the market interest rate at the time the cost is Incurred on municipal Revenue Bonds with the following characteristics:

(a) the same rating as the rating on Revenue Bonds issued by the State to finance Project Facilities, and

(b) the same term as the length of the amortization period, all as determined by the State.

(iii) For the purposes of this subdivision (b)(5), the State may aggregate the Capital Costs of each Project Facility Incurred during each calendar year and determine a composite interest rate and a composite amortization period applicable to the amortization of such costs.

(iv) The amortization charges relating to the costs Incurred during each calendar year shall commence the calendar year starting one year after the end of the calendar year in which such costs were Incurred, and the amount to be amortized shall include capitalized interest for the period from the date or dates the costs are Incurred to the date of commencement of amortization.

(c) SWRDS Support Account

(1) Commencing with the Contract Extension Amendment Effective Date, the State shall establish and maintain a SWRDS Support Account to provide a source of funds to pay System costs that are not chargeable to the Contractors under their respective Water Supply Contracts and for the payment of which there are no other monies available.

(2) To fund the SWRDS Support Account, the Director may, in his or her discretion, transfer to the SWRDS Support Account (i) amounts determined to be available pursuant to Article 51(e); (ii) amounts in the SWRDS Reinvestment Account, (iii) investment earnings in the General Operating Account; (iv) earnings from the investment of amounts in the SWRDS Support Account; and (v) other available revenues. The State shall not charge the District to replenish the SWRDS Support Account for costs not otherwise chargeable to the District under this contract.

(3) If the State is reimbursed or other amounts are appropriated and received for a cost paid from the SWRDS Support Account, the State shall deposit the amount reimbursed or received in the SWRDS Support Account.

(4) The State shall prepare regular reports on the SWRDS Support Account for the Director and shall provide those reports to the SWRDS Finance

Committee. The State shall consult with the SWRDS Finance Committee about the investments and activities to be funded from the SWRDS Support Account.

(d) System Financial Activity Report and Reporting Principles

(1) The State shall prepare and distribute quarterly a System Financial Activity Report that contains the following information:

(i) By fund or account, the activity in the following funds and accounts: the General Operating Account, the SWRDS Support Account, the SWRDS Reinvestment Account, the 51(e) Sub-Account of the Systems Revenue Account, the Davis-Dolwig Fund, and the State Water Facilities Capital Account, and the activity with respect to suspended costs.

(ii) The data in the System Financial Activity Report shall be auditable, which includes an audit trail from the costing ledger (currently the Utility Cost Accounting Billing System, as of the Contract Extension Amendment Effective Date) to the general ledger (currently SAP, as of the Contract Extension Amendment Effective Date) or the Bulletin 132 estimates to the System Financial Activity Report.

(2) Appendix B, entitled System Reporting Principles, contains principles and guidelines which shall be followed, to the extent applicable, in the preparation of System financial reports and financial management reports.

(e) State Water Resources Development System Finance Committee

(1) The State shall establish a joint State and Contractors finance committee, which shall be referred to as the State Water Resources Development System Finance Committee or SWRDS Finance Committee. The membership of the SWRDS Finance Committee shall include both representatives from the State and the Contractors.

(2) The primary purpose of the SWRDS Finance Committee shall be to make recommendations to the Director concerning the financial policies of the System. The State and the Contractors shall describe the scope of the SWRDS Finance Committee in a charter mutually agreeable to the State and the Contractors.

(f) Cost Recovery

In general, the State should seek reimbursement for all System costs from the appropriate customers and users of System facilities. With respect to those System costs that are reimbursable by the Contractors, the State should allocate financial responsibility for such costs in a manner that is both lawful and equitable, and which endeavors to recover such costs from the appropriate Contractors. If the State proposes to not charge any Contractor the full amount that the State is entitled to charge the Contractor under the contract, the State shall present a written proposal to the SWRDS Finance Committee for purposes of developing a recommendation to the Director regarding the proposal. The State shall submit such proposal in writing to the SWRDS Finance Committee 90 days in advance of the Director issuing any decision and within such 90 day period the SWRDS Finance Committee shall provide the Director with a recommendation regarding such proposal. Such proposals shall comply with the structure set out in the SWRDS Finance Committee charter referenced in Article 61(e)(2).

NEW CONTRACT APPENDIX

III. APPENDIX B IS ADDED TO THE CONTRACT AS A NEW APPENDIX AND SHALL READ AS FOLLOWS:

APPENDIX B

SYSTEM REPORTING PRINCIPLES

A. During the term of the water supply contracts, it is likely that financial reports and financial management reports will change in scope, nature, and frequency. Regardless of the exact reports used, such reports shall follow the below principles and guidelines to the extent applicable.

1. Principle 1: Financial reporting will be generated from the general ledger or data warehouse of the financial information system (system of record), such as SAP. The financial system of record is the authoritative source for financial reporting data values in a system. To ensure data integrity, there must be one, and only one, system of record for financial reporting values.

2. Principle 2: Financial reporting is not limited to annual financial statements but will be developed for regular reporting periods.

3. Principle 3: Financial management reporting generated from other financial systems, such as Utility Cost Accounting Billing System (UCABS), will identify and analyze significant variances from prior years or budgets.

4. Principle 4: Financial reporting and financial management reporting will identify unusual items and exceptions, and these items will be documented, reviewed, and resolved by management.

5. Principle 5: DWR will use standardized System-wide business rules and utilize a centralized financial system, such as SAP, UCABS, or other system, to provide controls/validations to ensure data integrity and reliable reporting.

6. Principle 6: DWR will use standardized data integrity rules in the development and publication of reports, including but not limited to the following:

   (1) Data integrity refers to the accuracy and consistency of data stored in a database, data warehouse, data mart or other construct.

   (2) Data integrity processes verify that data has remained unaltered in transit from creation to reception or remains unaltered in transit from one system to the next. Data used outside of the Enterprise Resource Planning (ERP) systems to meet the reporting needs of Program will undergo any number of operations in support of decision-making, such as capture, storage,

retrieval, update and transfer. It is important to have confidence that during these operations, the data will be kept free from corruption, modification and remain unaltered.

(3) Data with "integrity" has a complete or whole structure. Data values are standardized according to a data model and/or data type. All characteristics of the data must be correct – including business rules, relations, dates, definitions and lineage – for data to be complete.

(4) Data integrity is imposed within an ERP database when it is created and is authenticated through the ongoing use of error checking and validation routines.

(5) Data integrity state or condition is to be measured by the validity and reliability of the data values.

(6) Data integrity service and security maintains information exactly as it was input, and is auditable to affirm its reliability.

The SWRDS Finance Committee is charged with providing financial policy recommendations to the Director, and the Director has final discretion on whether or not to accept the recommendations. While the SWRDS Finance Committee is not charged with reviewing the content of financial reports, timely and accurate financial reporting and financial management reporting provides technical committees access to useful information that can be used to formulate proposals on financial policy matters that may be brought to the SWRDS Finance Committee.

IT IS FURTHER MUTUALLY AGREED that the following provisions, which shall not be part of the Water Supply Contract text, shall be a part of this Amendment and be binding on the Parties.

AMENDMENT IMPLEMENTING AND ADMINISTRATIVE PROVISIONS

1. EFFECTIVE DATE OF CONTRACT EXTENSION AMENDMENT.

(a) The Contract Extension Amendment shall take provisional effect ("provisional effective date pursuant to subparagraph (a)") on the last day of the calendar month in which both of the following occur: (i) the State and 15 or more Contractors, with an aggregate maximum annual Table A amount exceeding 3,200,000 acre feet, have executed (or committed in a form satisfactory to the State to execute) the Contract Extension Amendment and (ii) no legal action addressing the validity or enforceability of the Contract Extension Amendment or any aspect thereof has been filed within sixty days of such execution or, if filed, a final judgment of a court of competent jurisdiction has been entered sustaining or validating the Contract Extension Amendments. Subject to subparagraph (b), the provisional effective date pursuant to paragraph (a) shall be the Contract Extension Amendment Effective Date if the conditions set out in subparagraph (e) are met.

(b) If any part of the Contract Extension Amendment of any Contractor is determined by a court of competent jurisdiction in a final judgment or order to be invalid or unenforceable, the Contract Extension Amendments of all Contractors shall be of no force and effect except as provided in subparagraph(c).

(c) The unenforceability and lack of effectiveness of all Contractors' Contract Extension Amendments as provided for in subparagraph (b) may be avoided only if the part of the Contract Extension Amendment determined to be invalid or unenforceable is explicitly waived in writing by the State and 15 or more Contractors, with an aggregate maximum annual Table A amount exceeding 3,200,000 acre feet , in which case the Contract Extension Amendment shall take provisional effect ("provisional effective date pursuant to subparagraph (c)") on the last day of the calendar month in which the requisite waivers are received, but only as to those Contractors submitting such a waiver in writing, subject to subparagraph (e). The provisional effective date pursuant subparagraph (c) shall become the Contract Extension Amendment Effective Date if the conditions set out in subparagraph (e) are met.

(d) If any Contractor has not executed a Contract Extension Amendment or has not submitted a waiver pursuant to subparagraph (c), whichever is applicable, within sixty (60) days of the provisional effective date pursuant to subparagraph (a) or the provisional effective date pursuant to subparagraph (c), as applicable, the amendment shall not take effect as to such Contractor, unless the Contractor and the State, in its discretion, thereafter execute such Contractor's contract extension amendment or the Contractor thereafter submits, and the State in its discretion accepts, the waiver, whichever applies, in which case the Contract Extension Amendment Effective Date for purposes of that Contractor's contract and any associated terms shall be as agreed upon by the State and Contractor.

(e) (1) If at the end of the applicable 60-day period specified in subparagraph (d), 24 or more Contractors with an aggregate maximum annual Table A amount exceeding 3,950,000 acre feet have executed the amendment (or committed to execute the amendment in a form satisfactory to the State) or submitted a waiver pursuant to subparagraph (c), as applicable, the provisional effective date pursuant subparagraph (a) or the provisional effective date pursuant to subparagraph (c), as applicable, shall become the Contract Extension Amendment Effective Date.

(2) If at the end of the applicable 60 day period specified in subparagraph (d), 24 or more Contractors with an aggregate maximum annual Table A amount exceeding 3,950,000 acre feet have not executed (or committed to execute) the amendment or submitted a waiver pursuant to subparagraph (c), as applicable, then the State, after consultation with the Contractors that have executed (or committed to execute) the amendment or submitted a waiver, as applicable, shall within 30 days following such 60 day period determine in its discretion whether to make the provisional effective date pursuant to subparagraph (a) or the provisional effective date pursuant to subparagraph (c), as applicable, the Contract Extension Amendment Effective Date. The State shall promptly notify all Contractors of the State's determination. If the State determines, pursuant to this subparagraph 1(e)(2) to allow the contract amendment to take effect, it shall take effect only as to those Contractors consenting to the amendment taking effect pursuant to this subparagraph 1(e)(2)

(f) (1) During the pendency of a legal action addressing the validity or enforceability of the Contract Extension Amendment, the State and a minimum of 24 Contractors with an aggregate maximum annual Table A amount exceeding 3,950,000 acre feet which have executed (or committed to execute) the Contract Extension Amendment may agree in writing to waive any limitation barring the Contract Extension Amendment from taking effect until a final judgment of a court of competent jurisdiction has been entered (including to waive the "no force and effect " provision in subsection (b)) and instead allow the Contract Extension Amendment to take effect as to such Contractors, subject to such conditions, if any, agreed upon, by the State and such contactors. In such case, the State shall promptly notify all Contractors of the effective date of the Contract Extension Amendment.

(2) If, during the pendency of a legal action addressing the validity or enforceability of the Contract Extension Amendment, less than 24 Contractors with an aggregate maximum annual Table A amount exceeding 3,950,000 acre feet have agreed in writing to waive any limitation barring the Contract Extension Amendment from taking effect until a final judgment of a court of competent jurisdiction has been entered as provided in subsection (1)(f)(1) above, then a Contractor which has so agreed in writing may request the State to consider allowing the contract extension amendment to take effect with the agreement of less than 24 Contractors. Upon

receiving such a request, the State, after consultation with the Contractors that have agreed in writing to waive any limitation as provided in subsection (1)(f)(1) above, may determine in its discretion whether to allow the Contract Extension Amendment to take effect with less than 24 Contractors agreeing in writing to waive the limitation. The State shall promptly notify all Contractors if the State's determines to allow the Contract Extension Amendment to take effect, and include in such notice the effective date of the Contract Extension Amendment and any conditions that would apply. If the State determines, pursuant to this subparagraph 1(f)(2) to allow the contract amendment to take effect, it shall take effect only as to those Contractors consenting to the amendment taking effect pursuant to subparagraph 1(f)(1).

2. POST BILLING TRANSITION DATE ESTIMATES.

If the State determines it to be necessary, the State may rely on estimates and later true-up for billing and reporting purposes in the initial years after the Billing Transition Date.

3. WAIVER AND RELEASE.

Subject to the Contract Extension Amendment taking effect, the District does hereby forever waive, release and discharge the State, and its current and former officers, agents and employees, from any and all past and present protests, claims, damages, actions and causes of action of every kind and description, now existing or hereafter arising, known or unknown, that were or could be or could have been asserted relating to the State's adjustment made prior to the execution date of this Contract Extension Amendment in connection with the proportional responsibility, for System facilities south of and including the Dos Amigos Pumping Plant, between (i) water supply and (ii) recreation and fish and wildlife enhancement.

4. OTHER CONTRACT PROVISIONS.

Except as amended by this amendment, all provisions of the contract shall be and remain the same and in full force and effect, provided, however, that any reference to the definition of a term in Article 1, shall be deemed to be a reference to the definition of that term, notwithstanding that the definition has been re-lettered within Article 1. In preparing a consolidated contract, the parties agree to update all such references to reflect the definitions' lettering within Article 1.

5. COUNTERPART.

This Contract Extension Amendment may be signed in counterpart.

IN WITNESS WHEREOF, the Parties hereto have executed this Amendment on the date first above written.

Approved as to Legal Form
and Sufficiency:

Chief Counsel
Department of Water Resources

STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES

Director

Jan 4, 2019
Date

SANTA CLARA VALLEY WATER DISTRICT

Signature

Norma J. Camacho
Chief Executive Officer
Title

Dec. 12, 2018
Date

AGREEMENT IN PRINCIPLE
CONCERNING EXTENSION OF THE STATE WATER PROJECT
WATER SUPPLY CONTRACTS

EXECUTION VERSION

JUNE 18, 2014

DATE: June 18, 2014

SUBJECT: Agreement in Principle Concerning Extension of the State Water Project[1] Water Supply Contracts

This document contains a statement of principles that could provide the foundation for an agreement between each State Water Project Contractor[2] (Contractor) and the Department of Water Resources (DWR or Department) that will extend and otherwise amend the Water Supply Contract between such Contractor and DWR.

Outline of Agreement in Principle

I.	Objective 1	Term of Contract
II.	Objective 2A	Reserves
III.	Objective 2B	Accounts (SRA, SSA, FCA)
IV.	Objective 2C	Flow of Funds
V.	Objective 2D	Financial Management
VI.	Objective 2E	Supplemental Billing
VII.	Objective 2F	Cost Recovery
VIII.	Objective 2G	SWRDS Reporting Principles
IX.	Objective 2H	51(e) Revenue Reporting Requirements
X.	Objective 3A	Simplification of Billing
XI.	Objective 3B	Replacement Accounting System
XII.	Objective 3C	Article 1(hh)
XIII.	Objective 3D	Billing Authorization
XIV.	Objective 4	BDCP and DHCCP Participation
XV.	Provision 1	Other Contract Provisions
XVI.	Provision 2	Environmental Review Process
XVII.	Provision 3	Authorized Representative Signatures

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[1] The State Water Project is the name commonly used to refer to the State Water Resources Development System (Water Code Section 12931)

[2] The State Water Project Contractors includes Alameda County Flood Control and Water Conservation District (Zone 7), Alameda County Water District, Antelope Valley-East Kern Water Agency, Castaic Lake Water Agency, City of Yuba City, Coachella Valley Water District, County of Butte, County of Kings, Crestline-Lake Arrowhead Water Agency, Desert Water Agency, Dudley Ridge Water District, Empire West Side Irrigation District, Kern County Water Agency, Littlerock Creek Irrigation District, The Metropolitan Water District of Southern California, Mojave Water Agency, Napa County Flood Control and Water Conservation District, Oak Flat Water District, Palmdale Water District, Plumas County Flood Control and Water Conservation District, San Bernardino Valley Municipal Water District, San Gabriel Valley Municipal Water District, San Gorgonio Pass Water Agency, San Luis Obispo County Flood Control and Water Conservation District, Santa Barbara County Flood Control and Water Conservation District, Santa Clara Valley Water District, Solano County Water Agency, Tulare Lake Basin Water Storage District, and Ventura County Flood Control District.

STATEMENT OF PRINCIPLES

I. OBJECTIVE 1: TERM OF CONTRACT

A. Water Supply Contract Term Extension

1. Extend term of the SWP water supply contracts to December 31, 2085.

II. OBJECTIVE 2A: RESERVES

A. General Operating Account (GOA)

1. **Uses of GOA** - Cash flow deficiencies resulting from chargeable water supply purposes and/or during a SWRDS emergency for any SWRDS purpose.

2. **SWRDS Emergency** - An immediate, urgent, critical, unexpected, or impending situation that, in the judgment of the Director, Department of Water Resources (Director), may cause or pose a risk of causing injury, loss of life, damage to the property, impairment of the financial condition, and/or interference with the normal activities of the State Water Resources Development System which requires immediate attention and remedial action.

3. **Initial Cap** - Increase the authorized General Operating Account (GOA) initial cap to $150 million in Article 51(a)(3).

4. **Cap Adjustment Determination** - Every five years subsequent to the year of the initial cap increase, there shall be a business case analysis on the GOA authorized cap including an evaluation of the cap and business risks associated with SWRDS cash flow provided to the SWRDS Finance Committee for recommendation to the Director regarding a GOA cap adjustment. If there is a decrease in the cap (but the cap shall not be lower than $150 million), the excess funds would be transferred to the SWRDS Reinvestment Account (SRA).

5. **Cap Adjustment Funding Source (Pre-2035)** - Shall be the Director's discretion to use 51(e) revenues[3], investment earnings retained in the GOA, and transfers of funds from the SRA and SWRDS Support Account (SSA).

6. **Cap Adjustment Funding Source (Post-2035)** - Shall be the Director's discretion to use the investment earnings retained in GOA and the funds within the SRA and SSA.

7. **Rate of Funding for Cap** - Limitation on the amount ($2 million per year) and timing of additional contributions to the GOA contained in Article 51(e)(3)(v) will be deleted. DWR will be able to use any amount of available 51(e) revenues to increase funds in the GOA up to the authorized maximum GOA funding level and such funding shall be subordinate to the annual rate management reductions to the Contractors.

[3] The definition and calculation of 51(e) revenues will be included in the contract amendment language.

8. **GOA Replenishment** - Replenishment of the use of GOA funds will come from charges to the Contractors to the extent the expended funds were spent on chargeable water supply purposes and from the SSA or other available revenues for costs not chargeable to the Contractors.

9. **GOA Reporting** - DWR will prepare monthly reports on the balance and use of the GOA for the Director, which will be provided to the SWRDS Finance Committee. The SWRDS Finance Committee will periodically review reporting frequency and make recommendations to the Director regarding reporting frequency.

10. **GOA Investment Earnings** - shall be used as follows:

    a) Funding GOA to authorized GOA funding level;

    b) Transferred, at the discretion of the Director, to the SSA and/or to the SRA.

III. OBJECTIVE 2B: ACCOUNTS (SRA, SSA, FCA)

A. SWRDS Reinvestment Account (SRA)

1. **Effective Date of SRA** - The SRA shall be established and take effect upon the effective date of the contract extension amendment.

2. **SRA Uses** - The primary purpose is to provide a post-2035 SWRDS revenue stream by investing SRA funds in chargeable SWRDS facilities and programs.

3. **Funding Source** - At the discretion of the Director, available Article 51(e)(1)(ii) revenues collected by the State pre-2035. The Director also has discretion to transfer funds from the SSA or the GOA.

4. **Cap on SRA** - There will be no Cap or Cap Adjustments to the SRA.

5. **SRA Investments** - At the discretion of the Director, authorized SRA investments shall be as follows:

    a) Investment in SWRDS capital facilities, recovered at the prevailing municipal bond market rates corresponding to the SWRDS bond rating at the time of financing, in maturity ranges that may extend 10 to 50 years, provided that if the capital asset being financed has a useful life of less than 10 years, the investment may be recovered over a comparable period of less than 10 years;

    b) Bridge financing of capital costs in lieu of the SWRDS commercial paper program; and

    c) Allowable investments for SWRDS that generate a monetary return on investment.

6. **Use of SRA Funds** - At the discretion of the Director, the SRA funds, including but not limited to investment earnings, shall be used to:
    a) Provide a source of replenishment funds to the SSA;
    b) Provide a source of funds to be held in the SRA for investment purposes; and
    c) Provide a funding source for funding level adjustments to the GOA.
7. **SRA Review** - The SWRDS Finance Committee is to be consulted about the investments and activities to be funded from the SRA.
8. **SRA Reporting** - DWR will prepare regular reports on the SRA for the Director, which reports will be provided to the SWRDS Finance Committee.

B. SWRDS Support Account (SSA)

1. **Effective Date of SSA** - The SSA shall be established and take effect upon the effective date of the contract extension amendment.
2. **SSA Uses** - The purpose of the SSA shall be to provide a source of funds to pay for non-chargeable expenditures where there are no funds or revenue sources available to pay for such costs. If reimbursement or a source of revenue is received after the expenditure is incurred this revenue shall be deposited in the SSA.
3. **SSA Review** - The SWRDS Finance Committee shall be consulted about the projects and activities to be funded from the SSA.
4. **SSA Reporting** - DWR will prepare regular reports on the SSA for the Director, which will be provided to the SWRDS Finance Committee.
5. **Initial Cap** - There would be no cap on the SSA.
6. **Funding Source for Initial Funding** - 51(e) revenues and/or the remaining balance of the State Water Facilities Capital Account (FCA) once the FCA is closed.
7. **SSA Replenishment** - Shall be accomplished through 1) reimbursements received for expenditures made from the SSA; 2) at the discretion of the Director, transfers from the SRA and/or from the GOA's available investment earnings, 3) deposits, in the discretion of the Director, from other available revenues, and 4) interest and other investment income retained in the SSA. DWR will not charge the Contractors to replenish the SSA for costs not chargeable to the Contractors under the Water Supply Contracts.

8. **SSA Interest Earnings** – At the Director's discretion, retained in the SSA to reduce the annual SRA replenishment requirement.

C. State Water Facilities Capital Account (FCA)

1. The State Water Facilities Capital Account (FCA) pursuant to Article 51(c)(2)(v) shall be reviewed by the SWRDS Finance Committee after five years from the date of the contract amendment to recommend to the Director whether or not it should be closed and the balance of the account transferred to the SSA.

IV. OBJECTIVE 2C: FLOW OF FUNDS

A. Maintain the Monterey Amendment Article 51 Flow of Funds with the following edits/additions:

1. Increase Annual Rate Reductions to $48 million. The Annual Rate Reductions shall no longer apply after December 31, 2035 and the applicable provisions in Article 51 shall be deleted as of that date.

2. After the $48 million in annual rate reductions, the Director shall have the discretion to allocate and transfer up to 80% of available 51(e) revenues, as determined on a projected basis, and up to 100% on an actual basis into one or more of the following accounts:

    a) General Operating Account (GOA)

    b) SWRDS Support Account (SSA)

    c) SWRDS Reinvestment Account (SRA)

    After funds are deposited into a, b, and c above, any remaining available 51(e) revenues will remain in the Systems Revenue Account and will be tracked separately in DWR's Enterprise Resource Planning (ERP) system. The Director will have full discretion over the use of these funds. DWR will prepare financial reports annually with supporting documentation of the determination and provide these reports to the Finance Committee.

3. Contractors shall agree to forego additional rate management reductions including additional rate management reductions to make up for deficiencies in past projected rate management reductions or to provide any additional rate management reductions above $48 million annually pursuant to Article 51(e)(3). Effective with the contract amendment, Article 51(e)(3) shall be deleted.

4. The contract amendment shall specify those provisions in Article 51 that shall remain in effect after December 31, 2035 (such as the General Operating Account provision as it may be amended) and those provisions that will no longer apply after December 31, 2035 and shall be deleted as of that date.

5. Contractors shall agree to waive and release issues related to DWR's recent adjustment of the Contractors' responsibility for facilities south of Dos Amigos.

V. OBJECTIVE 2D: FINANCIAL MANAGEMENT

A. State Water Resources Development System Finance Committee

1. Immediately, the Department of Water Resources shall establish a joint Department of Water Resources and Contractor finance committee (Committee).

2. The membership of the Committee shall include both representatives from the Department of Water Resources and representatives from the Contractors.

3. The primary purpose of the Committee shall be to make recommendations to the Director of the Department of Water Resources concerning the financial policies of the State Water Resources Development System.

4. The Department of Water Resources and the Contractors shall describe the scope of the committee in a charter mutually agreeable to the Department of Water Resources and the Contractors.

VI. OBJECTIVE 2E: SUPPLEMENTAL BILLING

A. Supplemental Billing

1. The supplemental billing provisions authorized under Article 51(c)(4) shall remain in effect through December 31, 2035, unless the Director determines in his or her discretion to eliminate the use of supplemental billing prior to that date or upon Director's acceptance of a recommendation from the SWRDS Finance Committee. In full consultation with the SWRDS Finance Committee, DWR will review the System cash balances when the System's forecasted 120 days cash balance becomes critical. The Committee will make a recommendation for action to the Director. The supplemental billing provision may only be used when available System cash balances are projected to be less than an amount equal to 90 days operating expenditures[4]. The term "available System cash balances" shall mean the funds in the following California Water Resources Development Bond Fund accounts: System Revenue Account (to the extent the funds in the System Revenue Account are not projected to be needed for payment of Burns-Porter General Obligation Bond debt service for the next two years), GOA, SRA and SSA (to the extent the funds in the SSA are not projected to be needed for non-chargeable expenditures for the next two years).

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[4] A description of "operating expenditures" will be included in the contract amendment language.

VII. OBJECTIVE 2F: COST RECOVERY

A. Cost Recovery

1. In general, DWR should seek reimbursement for all SWRDS costs from the appropriate customers and users of SWRDS facilities, including the State. With respect to those SWRDS costs that are reimbursable by the Contractors, DWR should allocate financial responsibility for such costs in a manner that is both lawful and equitable, and which endeavors to recover such costs from the appropriate Contractors. If the Department proposes to not charge any Contractor the full amount that the Department is entitled to charge the Contractor under the contract, DWR shall bring a written proposal to the Finance Committee for purposes of developing a recommendation to the Director regarding the proposal. DWR shall submit such proposal in writing to the Finance Committee 90 days in advance of the Director issuing any decision and within such 90 day period the Finance Committee shall provide the Director with a recommendation regarding such proposal. Such proposals will comply with the structure set out in II.D.2 of the SWRDS Finance Committee Charter.

VIII. OBJECTIVE 2G: SWRDS REPORTING PRINCIPLES [EXHIBIT TO THE CONTRACT]

A. During the term of the water supply contracts, it is likely that financial reports and financial management reports will change in scope, nature, and frequency. Regardless of the exact reports used, such reports shall follow the below principles and guidelines to the extent applicable.

1. Principle 1: Financial reporting will be generated from the general ledger or data warehouse of the financial information system (system of record), such as SAP.

    - The financial system of record is the authoritative source for financial reporting data values in a system. To ensure data integrity, there must be one, and only one, system of record for financial reporting values.

2. Principle 2: Financial reporting is not limited to annual financial statements but will be developed for regular reporting periods.

3. Principle 3: Financial management reporting generated from other financial systems, such as Utility Cost Accounting Billing System (UCABS), will identify and analyze significant variances from prior years or budgets.

4. Principle 4: Financial reporting and financial management reporting will identify unusual items and exceptions, and these items will be documented, reviewed, and resolved by management.

5. Principle 5: DWR will use standardized System-wide business rules and utilize a centralized financial system, such as SAP, UCABS, or other system, to provide controls/validations to ensure data integrity and reliable reporting.

6. Principle 6: DWR will use standardized data integrity rules in the development and publication of reports, including but not limited to the following:

   (1) Data integrity refers to the accuracy and consistency of data stored in a database, data warehouse, data mart or other construct.
   (2) Data integrity processes verify that data has remained unaltered in transit from creation to reception or remains unaltered in transit from one system to the next.
       a. Data used outside of the Enterprise Resource Planning (ERP) systems to meet the reporting needs of Program will undergo any number of operations in support of decision-making, such as capture, storage, retrieval, update and transfer. It is important to have confidence that during these operations, the data will be kept free from corruption, modification and remain unaltered.
   (3) Data with "integrity" has a complete or whole structure. Data values are standardized according to a data model and/or data type. All characteristics of the data must be correct – including business rules, relations, dates, definitions and lineage – for data to be complete.
   (4) Data integrity is imposed within an ERP database when it is created and is authenticated through the ongoing use of error checking and validation routines.
   (5) Data integrity state or condition is to be measured by the validity and reliability of the data values.
   (6) Data integrity service and security maintains information exactly as it was input, and is auditable to affirm its reliability.

The SWRDS Finance Committee is charged with providing financial policy recommendations to the Director, and the Director has final discretion on whether or not to accept the recommendations. While the SWRDS Finance Committee is not charged with reviewing the content of financial reports, timely and accurate financial reporting and financial management reporting provides technical committees access to useful information that can be used to formulate proposals on financial policy matters that may be brought to the SWRDS Finance Committee.

IX. OBJECTIVE 2H: 51(e) REVENUE REPORTING REQUIREMENTS

A. 51(e) Revenue Report

1. Create and distribute the Annual Rate Reduction Determination Report. In addition, display the distribution of Gross Annual Revenues before Recreation, Fish and Wildlife

Expenditures, Facilities Capital Account and Rate Management Credits and Net Annual Revenues after Rate Management Credits to the accounts listed in item 2 below.

2. Create and distribute quarterly an Activity Report by fund-account for all uses, including but not limited to the following accounts:
    a) General Operating Account (GOA)
    b) SWRDS Support Account (SSA)
    c) SWRDS Reinvestment Account (SRA)
    d) Systems Revenue Account, 51(e) Sub-Account
    e) Davis-Dolwig Fund
    f) Facilities Capital Account
    g) Suspended Costs

3. The Activity Report shall display the annual and accumulated 51(e) revenue and expenditure activity, including the beginning balance, the annual activity and the ending balance for the year.

4. Reporting data shall be auditable which includes an audit trail from the costing ledgers to the general ledger or the Bulletin 132 estimates to the Activity Report.

5. Report should have sufficient detail to provide comprehensive accounting of annual 51(e) revenues and the uses the of annual 51(e) revenues to enable the SWRDS Finance Committee to assess the utilization of these revenues.

X. OBJECTIVE 3A: SIMPLIFICATION OF BILLING

A. Implement the Freeze-Go Billing Methodology

1. The freeze-go date shall be January 1 of the first calendar year starting six (6) months after the contract extension takes effect, but not earlier than January 1, 2017, provided that if the Department determines it to be necessary, the Department may rely on estimates and later true-up for billing and reporting purposes in the initial implementation years after the freeze go date.

2. Methodology will recover all costs incurred on and after the freeze-go date, by converting and authorizing repayment on a Pay-As-You-Go methodology.

3. Amend the definition of the Project Repayment Period to apply only to those costs incurred prior to the freeze-go date.

4. The term of the Project Repayment Period, January 1, 1961 through December 31, 2035, will remain the same.

5. The Water Systems Revenue Bond Surcharge will apply only to those costs incurred prior to the freeze-go date and will terminate at the completion of the Project Repayment Period.

6. Amend the definition of the Project Interest Rate to apply only to those costs incurred prior to the freeze-go date. No interest rate, including the Project Interest Rate, shall be applied to the over/under charges for costs incurred after the freeze-go date. The Project Interest Rate will remain 4.610%.

7. In identifying "costs incurred" for purposes of determining whether the cost is incurred before the freeze-go date or on or after the freeze-go date, the following shall apply:

   a) Variable costs shall be deemed to occur when the goods or service is provided, regardless of when the expenditure for such goods or service is recorded in the financial information system;

   b) Capital and minimum costs shall be deemed to occur when the expenditure for the goods or service is recorded in the financial information system, regardless of the date the goods or service is provided.

B. Defining the Pay-As-You-Go Repayment of Costs Incurred On and After the Freeze-Go Date

1. The annual cost recovery within a bill year for estimated annual operation, maintenance, power, and replacement costs for project conservation facilities.

2. The annual recovery of actual debt service, including repayment of the SRA, created by SWRDS financing activities, within a bill year for financed capital transportation and conservation facilities.

3. A capital asset which has a short useful life and/or will not have a substantial cost, may be charged to the Contractors in the year the cost is incurred. The SWRDS Finance Committee may review and make recommendations to the Director regarding the policy of charging the costs of such assets.

C. Defining the Pay-As-You-Go Repayment of Actual Debt Service from SWRDS Financing Capital Costs On and After the Freeze-Go Date

1. Authorize DWR to finance 100% of all capital costs.

2. Authorize DWR to use various methods of financing including Water System Revenue Bonds and SRA, with each method providing an annual repayment schedule which includes a principal and interest (debt service) component over the life of the financing.

3. Authorize DWR to bill an amount that is equal to the accumulated annual debt service payments due per the debt service schedules for SRA investments or matching dollar for dollar the SWRDS annual debt service payments including the bond cover requirements, providing 100% capital cost recovery at the financed interest rate over the term of the financing while meeting the additional bond debt cover requirements.

XI. OBJECTIVE 3B: REPLACEMENT ACCOUNTING SYSTEM (RAS)

A. Elimination of the Replacement Accounting System (RAS)

1. Eliminate the Replacement Accounting System (RAS) for Transportation and Conservation Facilities with the intent to have replacement costs treated as a minimum or capital cost.

2. The unencumbered cash balance of the RAS funds are to be returned to the SWP Contractors using the RAS allocation methodology.

XII. OBJECTIVE 3C: ARTICLE 1 (hh)

A. Expanding Water System Facilities Authorized to be Financed by Water System Revenue Bonds Under Article 1(hh)

1. Eliminate the January 1, 1987 date for existing facilities within Article 1(hh)(8); provision to now read as follows, " Finance all repairs, additions, and betterments to conservation or transportation facilities and to all other facilities described in this sub-article (hh) except for item (5) the land acquisition prior to December 31, 1995 for the Kern Fan Element of the Kern Water Bank."

2. Add provision to expand Article 1(hh) to include "Finance all other capital projects (i.e. projects and programs for which revenue bonds can be sold) mutually agreed upon in writing by DWR and 80% of the affected Contractors, provided that the approving Contractors' Table A amounts exceed 80% of the Table A amounts representing all affected Contractors". "Affected Contractors" means those Contractors which would be obligated to pay a share of the debt service for such project.

XIII. OBJECTIVE 3D: BILLING AUTHORIZATION

A. Billing Authorization

The Department, in fixing and establishing prices, rates, and charges for water and power, shall include as a reimbursable cost of any state water project an amount sufficient to repay all costs incurred by the department, directly or by contract with other agencies, for the preservation of fish and wildlife and determined to be allocable to the costs of the project works constructed for the development of that water and power, or either. Costs incurred for the enhancement of fish and wildlife or for the development of public recreation shall not be included in the prices, rates, and charges for water and power, and shall be nonreimbursable costs.

Such recreational purposes include, but are not limited to, those recreational pursuits generally associated with the out-of-doors, such as camping, picnicking, fishing, hunting, water contact sports, boating, and sightseeing, and the associated facilities of campgrounds, picnic areas, water and sanitary facilities, parking areas, viewpoints, boat launching ramps, and any others necessary to make project land and water areas available for use by the public.

In administering this Contract “development of public recreation” shall include recreation capital and operation and maintenance.

XIV. OBJECTIVE 4: BDCP AND DHCCP PARTICIPATION

This Objective will not be part of the SWP contract amendment based on this AIP. Instead, Contractor participation in the BDCP and DHCCP will be addressed through a separate public negotiation and environmental review process to develop appropriate SWP water supply contract amendments. DWR has begun the administrative process that will be used to facilitate the public negotiations of such amendments. The first public negotiation session is scheduled for December 2014.

XV. PROVISION 1 – OTHER CONTRACT PROVISIONS

Except as amended, all provisions of the Water Supply Contract shall be and remain in full force and effect.

XVI. PROVISION 2 – ENVIRONMENTAL REVIEW PROCESS

DWR and the Contractors agree that this AIP is intended to be used during the environmental review process for the California Environmental Quality Act (CEQA), to define the proposed project description for the purposes of CEQA, and to permit the next steps of the water supply contract extension process, including scoping and the preparation of the EIR.

The AIP principles are not final contract language and do not represent a contractual commitment by either DWR or the Contractors to approve any proposed project, to sign contract amendments, or to extend the contract. By concurring with the AIP, DWR and the Contractors express their intent to move forward with the CEQA process with DWR as lead agency and the Contractors as responsible agencies, and ultimately develop a proposed project consisting of contractual amendments consistent with the AIP principles and prepare the EIR for consideration by DWR and the Contractors.

At the end of the CEQA process and in compliance with CEQA, DWR and the Contractors will each individually evaluate the EIR and contract amendments, exercise their independent judgment, and determine whether or not to certify the EIR, approve the proposed project and sign the contract amendments or to approve an alternative project. Consequently, even though DWR and the Contractors have agreed to the AIP for the purposes described in the preceding paragraphs, DWR and each Contractor retain their full discretion under CEQA to consider and adopt mitigation measures and alternatives, including the alternative of not going forward with the proposed project.

XVII. PROVISION 3 – AUTHORIZED REPRESENTATIVE SIGNATURES

DWR and each Contractor may express concurrence with this AIP by having their authorized representatives sign below. DWR and each Contractor will use their best efforts to make a decision whether to sign the AIP by September 1, 2014. The AIP may be signed in counterparts.

STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES

By:
Name: Mark W. Cowin
Title: Director
Date: 8/4/2014

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT, ZONE 7

By:
Name:
Title:
Date:

ALAMEDA COUNTY WATER DISTRICT

By:
Name:
Title:
Date:

ANTELOPE VALLEY – EASTERN KERN WATER AGENCY

By:
Name:
Title:
Date:

CASTAIC LAKE WATER AGENCY

By:
Name:
Title:
Date:

XVII. PROVISION 3 – AUTHORIZED REPRESENTATIVE SIGNATURES

DWR and each Contractor may express concurrence with this AIP by having their authorized representatives sign below. DWR and each Contractor will use their best efforts to make a decision whether to sign the AIP by September 1, 2014. The AIP may be signed in counterparts.

STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT, ZONE 7

By: ______________________
Name: G. F. Duerig
Title: General Manager
Date: 19 Sept 2014

ALAMEDA COUNTY WATER DISTRICT

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

ANTELOPE VALLEY – EASTERN KERN WATER AGENCY

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

CASTAIC LAKE WATER AGENCY

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

XVII. PROVISION 3 – AUTHORIZED REPRESENTATIVE SIGNATURES

DWR and each Contractor may express concurrence with this AIP by having their authorized representatives sign below. DWR and each Contractor will use their best efforts to make a decision whether to sign the AIP by September 1, 2014. The AIP may be signed in counterparts.

STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT, ZONE 7

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

ALAMEDA COUNTY WATER DISTRICT

By: ______________________
Name: WALTER L. WADLOW
Title: GENERAL MANAGER
Date: SEPTEMBER 24, 2014

ANTELOPE VALLEY – EASTERN KERN WATER AGENCY

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

CASTAIC LAKE WATER AGENCY

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

XVII. PROVISION 3 – AUTHORIZED REPRESENTATIVE SIGNATURES

DWR and each Contractor may express concurrence with this AIP by having their authorized representatives sign below. DWR and each Contractor will use their best efforts to make a decision whether to sign the AIP by September 1, 2014. The AIP may be signed in counterparts.

STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES

By: ________________
Name: ________________
Title: ________________
Date: ________________

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT, ZONE 7

By: ________________
Name: ________________
Title: ________________
Date: ________________

ALAMEDA COUNTY WATER DISTRICT

By: ________________
Name: ________________
Title: ________________
Date: ________________

ANTELOPE VALLEY – EASTERN KERN WATER AGENCY

By: ________________
Name: DAN FLORY
Title: GENERAL MANAGER
Date: 9/15/14

CASTAIC LAKE WATER AGENCY

By: ________________
Name: ________________
Title: ________________
Date: ________________

XVII. PROVISION 3 – AUTHORIZED REPRESENTATIVE SIGNATURES

DWR and each Contractor may express concurrence with this AIP by having their authorized representatives sign below. DWR and each Contractor will use their best efforts to make a decision whether to sign the AIP by September 1, 2014. The AIP may be signed in counterparts.

STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES

By:
Name:
Title:
Date:

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT, ZONE 7

By:
Name:
Title:
Date:

ALAMEDA COUNTY WATER DISTRICT

By:
Name:
Title:
Date:

ANTELOPE VALLEY – EASTERN KERN WATER AGENCY

By:
Name:
Title:
Date:

CASTAIC LAKE WATER AGENCY

By:
Name: Dan Masnada
Title: General Manager
Date: August 27, 2014

CITY OF YUBA CITY

By: ______________________
Name: steven c. Kroeger
Title: city manager
Date: 7/16/14

COACHELLA VALLEY WATER DISTRICT

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

COUNTY OF BUTTE

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

COUNTY OF KINGS

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

CRESTLINE LAKE ARROWHEAD WATER AGENCY

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

DESERT WATER AGENCY

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

CITY OF YUBA CITY

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

COACHELLA VALLEY WATER DISTRICT

By: Barrett
Name: J. M. Barrett
Title: General Manager
Date: July 25, 2014

COUNTY OF BUTTE

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

COUNTY OF KINGS

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

CRESTLINE LAKE ARROWHEAD WATER AGENCY

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

DESERT WATER AGENCY

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

CITY OF YUBA CITY

By: ____________________
Name: ____________________
Title: ____________________
Date: ____________________

COACHELLA VALLEY WATER DISTRICT

By: ____________________
Name: ____________________
Title: ____________________
Date: ____________________

COUNTY OF BUTTE

By: ____________________
Name: ____________________
Title: ____________________
Date: ____________________

COUNTY OF KINGS

By: Joe Neves
Name: Joe Neves
Title: Chairman
Date: SEP 9 2014

CRESTLINE LAKE ARROWHEAD WATER AGENCY

By: ____________________
Name: ____________________
Title: ____________________
Date: ____________________

DESERT WATER AGENCY

By: ____________________
Name: ____________________
Title: ____________________
Date: ____________________

CITY OF YUBA CITY

By:
Name:
Title:
Date:

COACHELLA VALLEY WATER DISTRICT

By:
Name:
Title:
Date:

COUNTY OF BUTTE

By:
Name:
Title:
Date:

COUNTY OF KINGS

By:
Name:
Title:
Date:

CRESTLINE LAKE ARROWHEAD WATER AGENCY

By: STEPHEN L. PLEASANT
Name:
Title: PRESIDENT, BOARD OF DIRECTORS
Date: 7/3/14

DESERT WATER AGENCY

By:
Name:
Title:
Date:

CITY OF YUBA CITY

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

COACHELLA VALLEY WATER DISTRICT

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

COUNTY OF BUTTE

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

COUNTY OF KINGS

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

CRESTLINE LAKE ARROWHEAD WATER AGENCY

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

DESERT WATER AGENCY

By: ______________________
Name: David K. Luker
Title: General Manager
Date: August 19, 2014

DUDLEY RIDGE WATER DISTRICT

By: ____________________
Name: DALE K. MELVILLE
Title: MANAGER - ENGINEER
Date: 8-13-2014

EMPIRE WESTSIDE IRRIGATION DISTRICT

By: ____________________
Name: ____________________
Title: ____________________
Date: ____________________

KERN COUNTY WATER AGENCY

By: ____________________
Name: ____________________
Title: ____________________
Date: ____________________

LITTLEROCK CREEK IRRIGATION DISTRICT

By: ____________________
Name: ____________________
Title: ____________________
Date: ____________________

MOJAVE WATER AGENCY

By: ____________________
Name: ____________________
Title: ____________________
Date: ____________________

THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

By: ____________________
Name: ____________________
Title: ____________________
Date: ____________________

DUDLEY RIDGE WATER DISTRICT

By:
Name:
Title:
Date:

EMPIRE WESTSIDE IRRIGATION DISTRICT

By: John Howe
Name: John Howe
Title: President
Date: 8/20/2014

KERN COUNTY WATER AGENCY

By:
Name:
Title:
Date:

LITTLEROCK CREEK IRRIGATION DISTRICT

By:
Name:
Title:
Date:

MOJAVE WATER AGENCY

By:
Name:
Title:
Date:

THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

By:
Name:
Title:
Date:

DUDLEY RIDGE WATER DISTRICT

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

EMPIRE WESTSIDE IRRIGATION DISTRICT

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

KERN COUNTY WATER AGENCY

By: ______________________
Name: James M. Beck
Title: General Manager
Date: 8/28/14

LITTLEROCK CREEK IRRIGATION DISTRICT

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

MOJAVE WATER AGENCY

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

DUDLEY RIDGE WATER DISTRICT

By: ____________________
Name: ____________________
Title: ____________________
Date: ____________________

EMPIRE WESTSIDE IRRIGATION DISTRICT

By: ____________________
Name: ____________________
Title: ____________________
Date: ____________________

KERN COUNTY WATER AGENCY

By: ____________________
Name: ____________________
Title: ____________________
Date: ____________________

LITTLEROCK CREEK IRRIGATION DISTRICT

By: ____________________
Name: Travis Berglund
Title: General Manager
Date: 08/28/2014

MOJAVE WATER AGENCY

By: ____________________
Name: ____________________
Title: ____________________
Date: ____________________

THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

By: ____________________
Name: ____________________
Title: ____________________
Date: ____________________

KERN COUNTY WATER AGENCY

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

LITTLEROCK CREEK IRRIGATION DISTRICT

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

MOJAVE WATER AGENCY

By: ______________________
Name: Kirby Brill
Title: General Manager
Date: August 14, 2014

THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

NAPA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

OAK FLAT WATER DISTRICT

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

PALMDALE WATER DISTRICT

DUDLEY RIDGE WATER DISTRICT

By: ______________________________
Name: ______________________________
Title: ______________________________
Date: ______________________________

EMPIRE WESTSIDE IRRIGATION DISTRICT

By: ______________________________
Name: ______________________________
Title: ______________________________
Date: ______________________________

KERN COUNTY WATER AGENCY

By: ______________________________
Name: ______________________________
Title: ______________________________
Date: ______________________________

LITTLEROCK CREEK IRRIGATION DISTRICT

By: ______________________________
Name: ______________________________
Title: ______________________________
Date: ______________________________

MOJAVE WATER AGENCY

By: ______________________________
Name: ______________________________
Title: ______________________________
Date: ______________________________

THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

By: ______________________________
Name: JEFFREY KIGHTLINGER
Title: GENERAL MANAGER
Date: AUG. 27, 2014

NAPA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

By: Jill Techel
Name: Jill Techel
Title: Chairperson
Date: 11/14/2014

APPROVED AS TO FORM
Office of County Counsel
By:
Date: 11-10-2014

ATTEST:

By: Deputy
Secretary of the District Board

OAK FLAT WATER DISTRICT

By:
Name:
Title:
Date:

PALMDALE WATER DISTRICT

By:
Name:
Title:
Date:

PLUMAS COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

By:
Name:
Title:
Date:

APPROVED 10/21/14
FLOOD CONTROL & WATER
CONSERVATION DISTRICT
GLADYS I. COIL
SECRETARY OF THE DISTRICT
BY Deputy

SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT

By:
Name:
Title:
Date:

SAN GABRIEL VALLEY MUNICIPAL WATER DISTRICT

By:
Name:
Title:
Date:

NAPA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

By:
Name:
Title:
Date:

OAK FLAT WATER DISTRICT

By: Anthea G Hansen
Name: Anthea G. Hansen
Title: General Manager
Date: 8/26/14

PALMDALE WATER DISTRICT

By:
Name:
Title:
Date:

PLUMAS COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

By:
Name:
Title:
Date:

SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT

By:
Name:
Title:
Date:

SAN GABRIEL VALLEY MUNICIPAL WATER DISTRICT

By:
Name:
Title:
Date:

NAPA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

OAK FLAT WATER DISTRICT

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

PALMDALE WATER DISTRICT

By: Dennis D. LaMoreaux
Name: Dennis D. LaMoreaux
Title: General Manager
Date: August 28, 2014

PLUMAS COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

SAN GABRIEL VALLEY MUNICIPAL WATER DISTRICT

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

NAPA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

By:
Name:
Title:
Date:

OAK FLAT WATER DISTRICT

By:
Name:
Title:
Date:

PALMDALE WATER DISTRICT

By:
Name:
Title:
Date:

PLUMAS COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

By:
Name:
Title:
Date:

SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT

By: Douglas D. Headrick
Name: Douglas D. Headrick
Title: General Manager
Date: August 19, 2014

SAN GABRIEL VALLEY MUNICIPAL WATER DISTRICT

By:
Name:
Title:
Date:

NAPA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

By:
Name:
Title:
Date:

OAK FLAT WATER DISTRICT

By:
Name:
Title:
Date:

PALMDALE WATER DISTRICT

By:
Name:
Title:
Date:

PLUMAS COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

By:
Name:
Title:
Date:

SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT

By:
Name:
Title:
Date:

SAN GABRIEL VALLEY MUNICIPAL WATER DISTRICT

By:
Name: Darin J. Kasamoto
Title: General Manager
Date: August 13, 2014

SAN GORGONIO PASS WATER AGENCY

By: Jeffrey W Davis
Name: Jeff Davis
Title: General Manager
Date: 7-22-14

SAN LUIS OBISPO COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

By:
Name:
Title:
Date:

SANTA BARBARA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

By:
Name:
Title:
Date:

SANTA CLARA VALLEY WATER DISTRICT

By:
Name:
Title:
Date:

SOLANO COUNTY WATER AGENCY

By:
Name:
Title:
Date:

TULARE LAKE BASIN WATER STORAGE DISTRICT

By:
Name:
Title:
Date:

SAN GORGONIO PASS WATER AGENCY

By: ____________________
Name: ____________________
Title: ____________________
Date: ____________________

SAN LUIS OBISPO COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

By: ____________________
Name: ____________________
Title: ____________________
Date: ____________________

SANTA BARBARA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

By: ____________________
Name: ____________________
Title: ____________________
Date: ____________________

SANTA CLARA VALLEY WATER DISTRICT

By: ____________________
Name: Beau Goldie
Title: Chief Executive Officer
Date: 8/28/14

SOLANO COUNTY WATER AGENCY

By: ____________________
Name: ____________________
Title: ____________________
Date: ____________________

TULARE LAKE BASIN WATER STORAGE DISTRICT

By: ____________________
Name: ____________________
Title: ____________________
Date: ____________________

SAN GORGONIO PASS WATER AGENCY

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

SAN LUIS OBISPO COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

SANTA BARBARA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

SANTA CLARA VALLEY WATER DISTRICT

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

SOLANO COUNTY WATER AGENCY

By: David Okita
Name: DAVID OKITA
Title: GENERAL MANAGER
Date: 8/15/14

TULARE LAKE BASIN WATER STORAGE DISTRICT

By: ______________________
Name: ______________________
Title: ______________________
Date: ______________________

SAN GORGONIO PASS WATER AGENCY

By:
Name:
Title:
Date:

SAN LUIS OBISPO COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

By:
Name:
Title:
Date:

SANTA BARBARA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

By:
Name:
Title:
Date:

SANTA CLARA VALLEY WATER DISTRICT

By:
Name:
Title:
Date:

SOLANO COUNTY WATER AGENCY

By:
Name:
Title:
Date:

TULARE LAKE BASIN WATER STORAGE DISTRICT

By:
Name: Mark A. Gilkey
Title: General Manager
Date: September 2, 2014

VENTURA COUNTY FLOOD CONTROL DISTRICT

By: Bill Hicks
Name: Bill Hicks
Title: President, Casitas Municipal Water District, administrator for Ventura County Flood Control District Contract
Date: September 10, 2014

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DRAFT FINAL CHARTER AGREEMENT BETWEEN THE DEPARTMENT OF WATER RESOURCES AND STATE WATER PROJECT CONTRACTORS

TO ESTABLISH AND IMPLEMENT A STATE WATER RESOURCES DEVELOPMENT SYSTEM FINANCE COMMITTEE

THIS CHARTER AGREEMENT to establish and implement a State Water Resources Development System Finance Committee ("**Agreement**") is made between the State of California, acting by and through its Department of Water Resources ("**DWR**"), and those public agencies whose representatives' signatures appear below (**"Contractors"**), herein referred to collectively as "**Parties**."

RECITALS

1. **WHEREAS**, DWR is responsible for constructing, operating and maintaining the State Water Resources Development System ("**SWRDS**");
2. **WHEREAS**, Contractors have long-term contracts (**"Contracts"**) with DWR to receive water from SWRDS, which Contracts are similar in all material respects; and
3. **WHEREAS**, pursuant to such Contracts, Contractors are obligated to reimburse DWR for water supply-related SWRDS costs; and
4. **WHEREAS**, DWR and Contractors have agreed to extend such Contracts and to amend certain other terms relating primarily to SWRDS financial matters ("**Contract Amendments**"); and
5. **WHEREAS**, DWR and Contractors understand and agree that it is in their mutual interests to continue to maintain the financial integrity of SWRDS;
6. **WHEREAS**, DWR has agreed in the Contract Amendment to establish the SWRDS Finance Committee to discuss and make recommendations concerning the financial policies of SWRDS.
7. **WHEREAS**, this Agreement is intended to provide a framework for such cooperative efforts and the development of financial policy recommendations, and entering into this Agreement is part of the consideration for entering into the Contract Amendments.

AGREEMENT

NOW THEREFORE, DWR and Contractors agree as follows:

I. EFFECTIVE DATE AND TERM

This Agreement shall be binding on DWR and those Contractors whose representatives' signatures appear below; provided, however, that the Agreement shall only take effect and be binding as to an individual Contractor upon that Contractor's contract amendment taking effect. The Agreement shall remain in effect as long as the contract amendment remains in effect, unless terminated earlier by mutual consent of all the Parties. The Agreement may be amended by the mutual consent of all the Parties.

II. SWRDS FINANCE COMMITTEE

A. Establishment

1. A State Water Resources Development System ("**SWRDS**") Finance Committee is hereby established by and among DWR and Contractors.

B. General Scope and Intent

1. As set forth more fully below, the SWRDS Finance Committee is intended to promote coordination, communication and cooperation among DWR and Contractors regarding SWRDS financial policies, work plans and reports. More specifically, the SWRDS Finance Committee is expected to provide recommendations necessary to effectively coordinate and execute comprehensive financial management of SWRDS.
2. The SWRDS Finance Committee is not intended or expected to address specific SWRDS budget line items, individual project budgets or individual transactions, but rather shall address those financial matters that are broad in scope and applicability.

C. Composition, Selection and Terms

1. The SWRDS Finance Committee shall be composed of and governed by representatives from both DWR and Contractors.
2. Members:
   a) DWR shall select five (5) representatives to serve as its official members of the SWRDS Finance Committee ("**DWR Members**"). DWR also shall select five (5) representatives to serve as alternates ("**DWR Alternates**") in the event one or more of the DWR Members is absent or otherwise unable to participate on the Committee.
   b) Each Contractor may designate one representative ("**Contractor Representative**") to attend Finance Committee meetings to represent the Contractor. Contractors shall select five Contractor Representatives to serve as their official members of the SWRDS Finance Committee ("**Contractor Members**"). The five Contractor Members shall come from each of the following Classes of Contractors:
      - Class 1 – Plumas County Flood Control and Water Conservation District, County of Butte, City of Yuba City, Solano County Water Agency, Napa County Flood Control and Water Conservation District, Alameda County Flood Control and Water

Conservation District, Zone 7, Alameda County Water District and Santa Clara Valley Water District

- Class 2 – Tulare Lake Basin Water Storage District, County of Kings, Dudley Ridge Water District, Empire West Side Irrigation District, Oak Flat Water District, Kern County Water Agency
- Class 3 – Metropolitan Water District of Southern California
- Class 4 – Santa Barbara County Flood Control and Water Conservation District (Central Coast Water Authority), San Luis Obispo County Flood Control and Water Conservation District, Castaic Lake Water Agency, Ventura County Watershed Protection District (Casitas Municipal Water District)
- Class 5 – Antelope Valley-East Kern Water Agency, Coachella Valley Water District, Crestline-Lake Arrowhead Water Agency, Desert Water Agency, Mojave Water Agency, Palmdale Water District, San Bernardino Valley Municipal Water District, San Gorgonio Pass Water Agency, Littlerock Creek Irrigation District, San Gabriel Valley Municipal Water District

Each Class also shall select a representative from their Class to serve as an alternate ("**Contractor Alternate**") in the event their Contractor Member is absent or otherwise unable to participate on the Committee.

Each Class shall determine its own method of selecting their Contractor Member and Contractor Alternate.

c) Members and Alternates shall be appointed to serve one-year terms commencing on January 1 of each year. Members and Alternates may serve multiple terms, but shall be appointed or re-appointed each year as appropriate.

d) By December 15 of each year, DWR and Contractors shall exchange lists of the Members and Alternates that have been selected to serve on the SWRDS Finance Committee for the following year. Such lists shall include the name, title and contact information for each Member and Alternate on the list.

3. Chair and Vice-Chair:

a) The SWRDS Finance Committee shall have a Chair and Vice-Chair, who shall be appointed to serve one-year terms in January of each year.

b) A DWR representative shall serve as the Chair and shall be selected by and from the DWR Members appointed to serve on the Committee for that year.

c) A Contractor representative shall serve as the Vice-Chair and shall be selected by and from the Contractor Members who have been appointed to serve on the Committee for that year.

D. Meetings and Agendas

1. The SWRDS Finance Committee shall meet as frequently as is necessary to carry out its responsibilities, but no less than two times annually, at such times and locations as

determined by the Committee Chair and Vice-Chair. The Chair and Vice-Chair each shall have the authority to call a meeting and shall do so upon their own motion or upon the request of any Member of the Committee. Each Member shall endeavor to attend all scheduled meetings or ensure that an Alternate attends in his/her absence.

2. Prior to each meeting of the SWRDS Finance Committee, the Chair or Vice-Chair shall prepare a written agenda. Proposed agenda items shall be submitted in writing to the Chair or Vice Chair prior to the meeting for consideration. Each proposed agenda item shall follow a standard format (SWRDS Finance Committee Proposal Template) that includes the following sections:
   a) A description of the issue or matter to be considered by the Committee, including, if applicable, attempts that have been made to resolve disputes.
   b) A justification of why the issue or matter is within the Committee's scope and purpose.
   c) A discussion of at least two alternative solutions intended to resolve the issue or matter under consideration and the consequences of inaction.
   d) The preferred alternative or recommendation.
   e) The name and contact information for the sponsor(s) of the issue.

   If a proposed agenda item is deemed to be consistent with the intent of this Agreement by either the Chair or the Vice-Chair, then it shall be placed on the agenda.

3. In addition to the ten (10) designated Members, the meetings of the SWRDS Finance Committee shall be open to all designated Contractor Representatives and DWR alternates. Other subject matter experts, contractor staff, and/or DWR staff may be invited by the Chair or Vice Chair, as needed, to provide relevant and material input pertaining to individual issues brought to the Committee. All designated representatives can participate in discussions based on procedures and rules in Section G below.

E. Quorum

1. A quorum of the SWRDS Finance Committee shall consist of six (6) Members. In the absence of a quorum, the Committee may receive information, but shall not take any actions, make any recommendations, or engage in any other business or activities.

F. Minutes

The Chair or Vice Chair shall be responsible for the keeping of minutes of each SWRDS Finance Committee meeting. Copies of the minutes shall be provided to the Committee Members within two weeks after a meeting.

G. Procedures and Rules

The SWRDS Finance Committee may adopt such procedures and rules as it determines are necessary or convenient to govern the conduct of the Committee or to assist the Committee in carrying out its responsibilities. Procedures and Rules will be established as mutually agreed upon by members of the Committee.

H. **Technical or Ad Hoc Committees**

The SWRDS Finance Committee may establish such technical, ad hoc or other sub-committees as it determines are necessary or convenient to assist the Committee in carrying out its responsibilities.

I. **Recommendations to the DWR Director**

1. After discussion of a given issue or matter, the Committee will designate a Member or Members to prepare a written recommendation for the Director. All Members who concur will sign the recommendation indicating concurrence.

2. If there are competing recommendations for a given issue or matter, multiple written recommendations may be prepared for the Director's consideration. Members will sign the appropriate recommendation indicating their support.

3. Within thirty (30) business days after receipt of a recommendation or recommendations, the Director will issue a decision of acceptance or rejection, and if the Director does not accept the recommendation, an explanation for his/her decision. Such decision or explanation will be provided by the Director in writing or orally at a regularly scheduled SWRDS Finance Committee meeting. If the Director needs additional information and time, the Finance Committee will be notified.

III. DESIGNATION OF SWRDS CHIEF FINANCIAL MANAGER

A. Consistent with state personnel rules and regulations, DWR shall create and fill a new position to be known as the SWRDS Chief Financial Manager ("**CFM**").

B. The CFM shall serve as the single point of authority over all SWRDS financial matters. The CFM shall have the responsibility and authority throughout DWR to oversee and implement, in a timely manner, all SWRDS financial policies and shall report directly to the DWR Director or the Deputy Director in charge of the SWP.

C. Working with the SWRDS Finance Committee, the CFM shall develop and enhance those financial policies, work plans and administrative measures necessary or appropriate to provide comprehensive and cost effective financial management of SWRDS.

D. The SWRDS Finance Committee and CFM shall coordinate and cooperate with each other at all times in carrying out their respective responsibilities.

E. Until DWR creates and fills the new CFM position, it shall designate the SWP Deputy Director who shall serve in the same capacity as described above.

IV. CONSIDERATION OF SWRDS FINANCIAL POLICIES MATTERS

A. The SWRDS Financial Committee shall serve as a forum for discussions regarding financial policy matters applicable to the construction, operation and maintenance of SWRDS facilities and as a channel for making recommendations to the DWR Director concerning such matters.

B. In general, the types of financial policy matters that should be brought to the SWRDS Finance Committee for consideration are ones that are broad in nature and that cannot be resolved more effectively in another forum such as an existing Contractor committee. Characteristics of SWRDS financial policy matters that would properly be brought to the SWRDS Finance Committee include those that:

1. affect a group of Contractors, rather than individual contractors;
2. potentially apply to multiple projects, rather than individual projects; and
3. involve potentially large transactions or a large number of transactions.

In weighing these factors, an important consideration shall be whether the SWRDS financial policy matter at issue would potentially merit ultimate resolution by the DWR Director.

C. Contractors understand and acknowledge that although the SWRDS Finance Committee is charged with providing financial policy recommendations to the DWR Director, the DWR Director shall retain final discretion on whether or not to accept such recommendations.

V. DEVELOPMENT AND APPROVAL OF SWRDS FINANCIAL ENHANCEMENT WORK PLANS

A. The SWRDS Finance Committee shall guide the development of the SWRDS financial enhancement work plans ("**SWRDS Work Plans**") in cooperation and coordination with the CFM.

B. The SWRDS Finance Committee shall review and approve all SWRDS Work Plans prior to implementation.

C. The SWRDS Finance Committee also shall provide input and recommendations to the DWR Director regarding implementation of such work plans.

D. Once a work plan is approved, the SWRDS CFM, or the SWP Deputy Director if the CFM is not yet appointed, shall be responsible for ensuring the SWRDS Work Plans are implemented in a timely manner.

VI. SWRDS REPORTING PRINCIPLES

A. The SWRDS Finance Committee is charged with providing financial policy recommendations to the DWR Director, and the DWR Director has final discretion on whether or not to accept the recommendations. While the SWRDS Finance Committee is not charged with reviewing the content of financial reports, timely and accurate financial reporting and financial management reporting provides technical committees access to useful information that can be used to formulate proposals on financial policy matters that may be brought to the SWRDS Finance Committee.

B. Regardless of the exact nature, scope and frequency, such reports shall follow the principles set forth in Exhibit XX (See Offer Section VIII. Objective 2G: SWRDS Reporting Principles) of the Contract, as applicable.

VII. ENFORCEMENT

This Agreement and any of its terms and provisions may be enforced through an action seeking specific performance or equitable relief only. No Party shall be liable for damages for any breach of this Agreement or its terms and provisions.

VIII. GENERAL PROVISIONS

A. Authority

Each Party represents and warrants that: (1) the Party has the authority to enter into this Agreement; (2) the individual signing on behalf of the Party has been duly authorized to execute this Agreement by that Party; and (3) upon execution by such individual, that Party shall be bound by the terms and provisions of this Agreement without any further act, approval or authorization of such Party or its governing body or management.

B. Successors and Assigns

Any agency, which as a successor or assignee, becomes a party to a Contract with DWR shall be entitled to become a party to this Agreement. Any party to this Agreement which ceases to be a party to a Contract with DWR shall cease to be a party to this Agreement.

C. Third-Party Beneficiaries

This Agreement is intended to apply solely to its signatories and their successors and approved assigns. This Agreement does not confer any rights or interests on any other private or public persons or entities (“non-Parties”). This Agreement shall not be construed as permitting any non-Party to maintain a suit at law or in equity to enforce the terms of this Agreement or to assert any other claims based on that non-Party’s alleged status as a third-party beneficiary.

D. No Waiver

A waiver of any term or provision of this Agreement by any Party shall not constitute or be construed as a waiver of any other term or provision of this Agreement by that Party. No waiver of a term or provision of this Agreement shall be binding unless and until executed in writing by the Party providing the waiver.

E. Joint Drafting; Voluntary Execution

This Agreement was drafted jointly by all Parties. Each Party represents and warrants that: (1) it has read and understands the meaning and effect of all terms and provisions of this Agreement; (2) that prior to execution of this Agreement, it had the opportunity to consult with legal counsel regarding the meaning and effect of this Agreement and its terms and provisions; and (3) it is voluntarily entering into this Agreement.

F. Section Titles

The section titles in this Agreement are for convenience of reference and organization only and shall not be used to modify, explain or interpret any terms or provisions of this Agreement.

G. Counterparts

This Agreement may be executed in counterparts, each of which shall constitute an original, but all of which shall constitute one and the same agreement; provided, however, that each signing Party shall have received a copy of the signature page(s) signed by every other Party.

H. **Governing Law**

This Agreement shall be construed in accordance with the laws of State of California.

I. **Amendment**

This Agreement may not be amended except through the express written consent of all Parties.

[SIGNATURE BLOCKS]

State Water Project Contract Extension Amendment

December 12, 2018

Santa Clara Valley Water District

Recommendation

- Adopt a resolution making CEQA findings
- Authorize CEO to execute the State Water Project Contract Extension Amendment

Why the Extension Amendment is Needed

- Bond financing for terms extending beyond 2035

- Avoids escalation of charges to meet 2035 termination date

- Mismatch between DWR debt service obligations (30 years) and SWP Contractor capital repayment terms (M&I: 50 years, AG: 75 years)

Purpose of Extension Amendment

1. Ensure continued water service from the State Water Project (SWP) beyond 2035

2. Improve financial management of the SWP

Agreement Development

Step 1

Negotiate Terms of Extension Amendment

2013 – Mar 2014

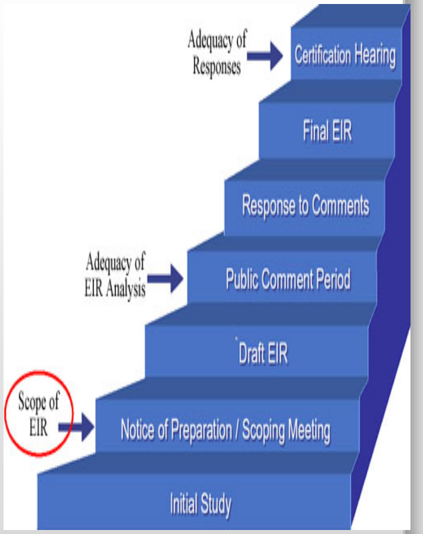
Step 2

Develop Agreements in Principle (AIP)

Mar – July 2014

Step 3

CEQA Process



2014 -2018

Step 4

Extension Amendment

2018

Key terms of Extension Amendment

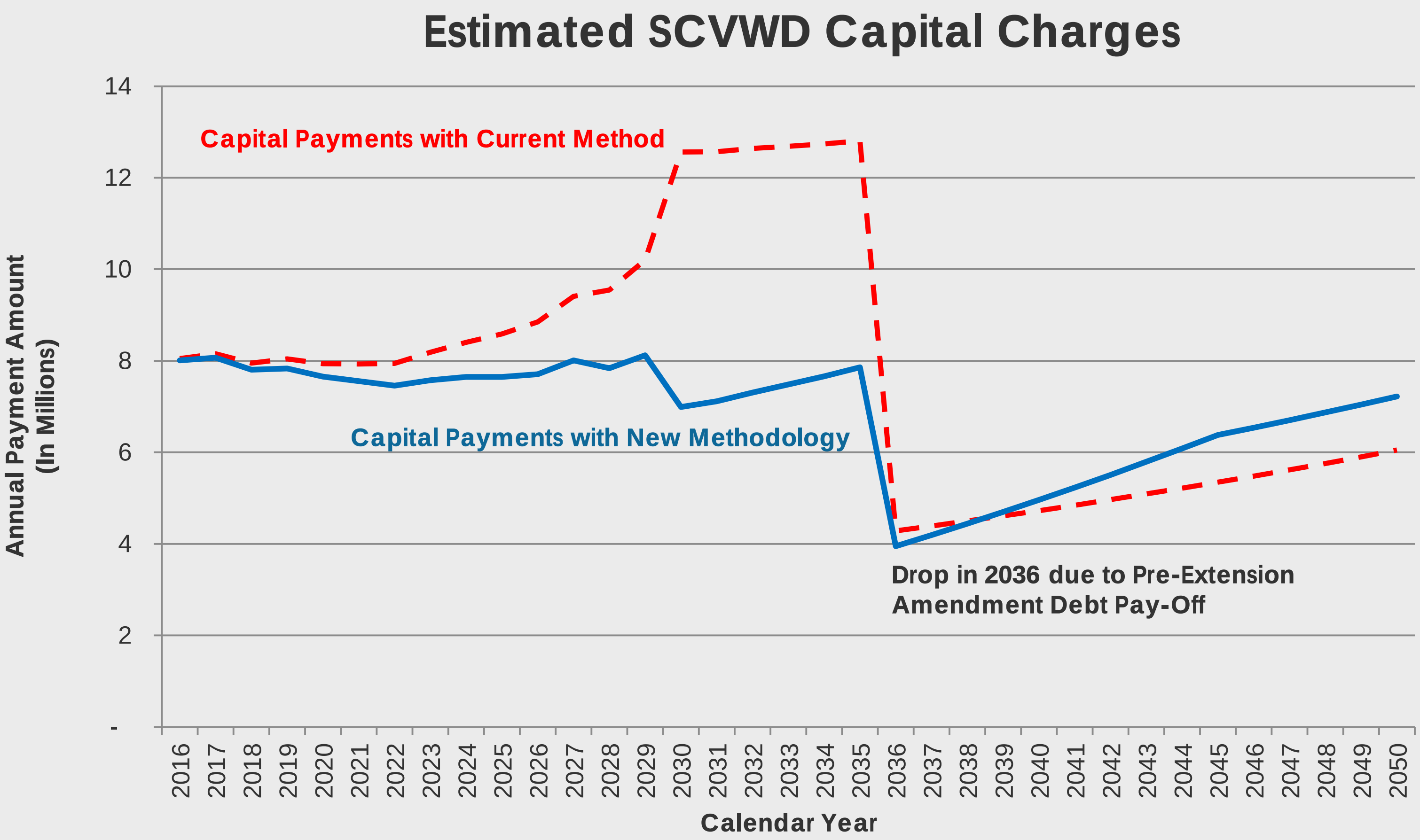
1. Extends term of contract to 2085
2. Implementation of "Pay-as-You-Go" billing methodology
3. Creation of a new financial structure
4. Creation of a joint Finance Committee

Key terms of Extension Amendment

"Pay-As-You-Go" billing provisions

- Applies to O&M expenses and debt service on capital costs
- Matches project expenditures with contractor repayment obligations
- Maintains short and long term affordability

Impact on Annual SWP Payments



Key terms of Extension Amendment

New financial structure

- Increases DWR's operating reserves
- Creates a new State Water Resources Development System Reinvestment Account (SRA)
- Creates a new State Water Resources Development System Support Account (SSA)

Key terms of Extension Amendment

New Finance Committee

- Provides forum & framework for contractors to participate in financial policy development
- Provides recommendations on financial policy and use of funds
- Acts as a check and balance on DWR's new financial structure
- Governed by a new charter agreement

Recommendation

- Adopt a resolution making CEQA findings
- Authorize CEO to execute the State Water Project Contract Extension Amendment

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